Mutual Aid

BY THOMAS CHMIELOWIEC SR.

When the Q400 struck a house and exploded, the volunteer fire chief pulled ARFF specialists into a massive response.

A call from air traffic control (ATC) captured the attention of 10 firefighters on duty at Buffalo Niagara (New York, U.S.) International Airport Fire Department (BNIA-FD). The message for aircraft rescue and fire fighting (ARFF) at about 2220 on Thursday, Feb. 12, 2009, said that a regional turboprop established on the localizer of the Runway 23 instrument landing system could be down somewhere between the outer marker and Harris Hill, near Akron, approximately 12 nm (22 km) northeast of the airport (see p. 20).

All the firefighters went to their trucks, but for about a minute they sat idle in the firehouse with no place to go. That gave them an eerie feeling, listening to their radios as ATC repeatedly called "Colgan 3407" and got no answer. The flight crew of a nearby airliner flying in instrument meteorological conditions had told ATC that the missing aircraft could not be seen visually or on the display of their traffic-alert and collision avoidance system.[1]

Some of the firefighters anticipated the possibility that the aircraft had traveled thousands of feet along the ground and wiped out a neighborhood. They did not know yet that the Colgan Air Bombardier Q400 had struck only one house.

Between one and two minutes after the crash phone rang, one of the firefighters telephoned Amherst Fire Control, the dispatch center for 15 local volunteer fire departments, to find out whether an aircraft was reported down in its districts. The dispatchers said they were being flooded with phone calls, and that they had dispatched Clarence Center Volunteer Fire Company (CCVFC) to a specific address in Clarence Center for a "possible aircraft into structure" call.

Firefighters from 17 fire departments, most volunteers, responded to the scene.

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The firefighter then asked the dispatchers, "Would you like us to start rolling toward that site just in case?" By two minutes after the initial alert from ATC, one of the three BNIA-FD crash trucks — supported by one structural pumper with foam capability and extra hoses — responded with full ARFF crews and a captain. They arrived at the scene 12 minutes later.

So began 11 days of ARFF mutual aid to various stages of firefighting, crash site recovery and accident investigation in Clarence Center, a village surrounded by the Town of Clarence. There probably were some flaws somewhere along the line, but, at least to me, they were so unnoticeable that I will remember this experience as a picture-perfect firefighting operation by all the fire companies involved.

At BNIA, the full airport emergency plan was put into place. Christopher Putney, fire chief of BNIA-FD, was in command of airport response, ARFF on-scene and off-scene operations and keeping the airport functional during the emergency. With the help of four captains, he safely coordinated crew involvement in all activities, including sending firefighters as standby emergency medical technicians to the center where family members received official information and counseling during the unfolding tragedy.

My crash-related duties began just after midnight at the BNIA-FD firehouse, and my first shift at the scene was Friday 0700–1100 as the captain on the third ARFF relief crew. My understanding of the firefighting response reflects personal experience; published accounts from a few key participants such as David Case, then chief of the CCVFC and incident commander, and Timothy Norris, the assistant chief and first firefighter to reach the crash site; findings of the U.S. National Transportation Safety Board (NTSB); and recorded ATC and fire service radio communications.

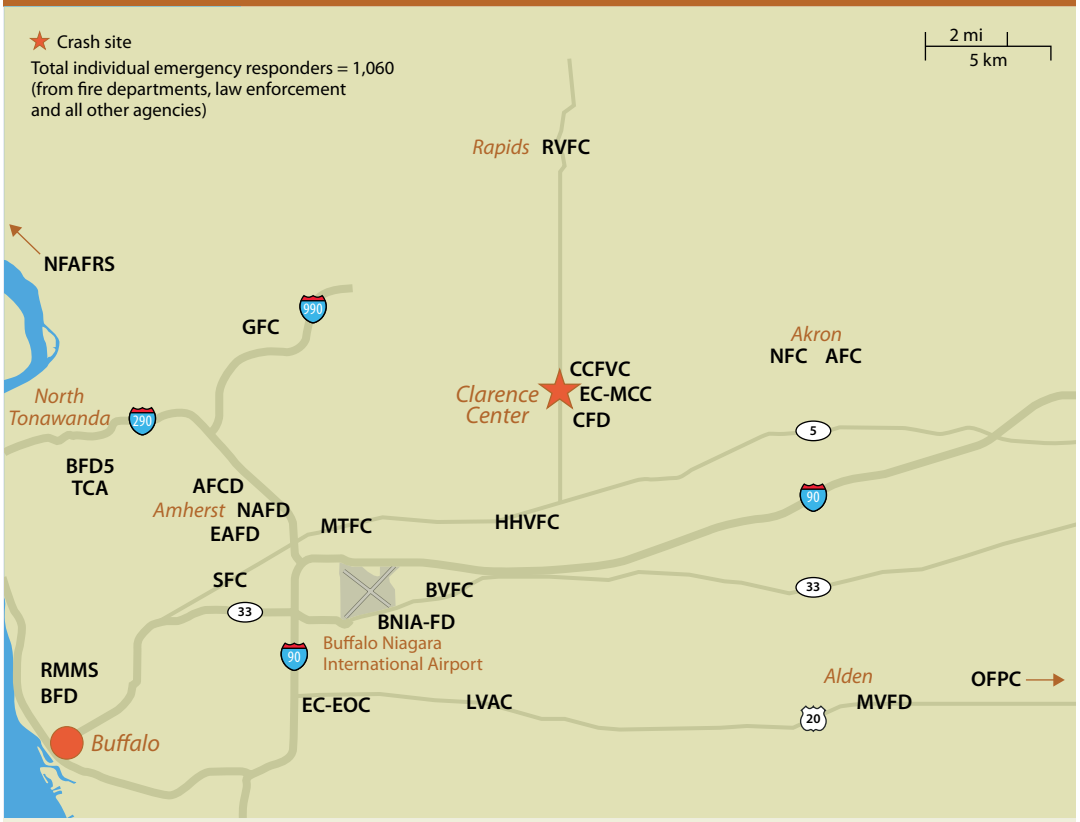
First Arrivals

This event happened on Long Street just 525 ft (160 m) from the CCVFC firehouse, shortly after a few firefighters had returned from an emergency medical services call. BNIA weather conditions included near-freezing temperature, winds west–southwest at 14 mph (23 kph) with light snow and mist, the NTSB said.

From inside their own houses, Norris and Case heard a loud but muffled impact of the aircraft with the house. Running outside, they heard an explosion and saw a fireball.[2,3] Seconds later, at 2219, their signal emitters sounded with the alarm from Amherst Fire Control, Case recalled.

Norris drove his fire command truck three blocks from his house to the location in about 15 seconds, and Case arrived in his fire command car after driving about 0.5 mi (1 km) from his house as a wall of flames about 60 to 70 ft (18 to 21 m) high lit up the village.

Fire Departments Respond to Colgan Air Flight 3407



Fire Incident Command, Communication and Documentation

AFCD = Amherst Fire Control (Dispatcher)
CCVFC = Clarence Center Volunteer Fire Company
EC-EOC = Erie County Emergency Operations Center
EC-MCC = Erie County Mobile Command Center (Clarence Town Hall)

Mutual Aid Fire Departments
(Fire, emergency medical services, hazardous materials and/or scene recovery)

AFC = Akron Fire Company
BFD = Buffalo Fire Department
BFD5 = Brighton Fire District No. 5
BNIA-FD = Buffalo Niagara International Airport Fire Department
BVFC = Bowmansville Volunteer Fire Company
CFD = Clarence Fire District No. 1
EAFD = East Amherst Fire Department
GFC = Getzville Fire Company
HHVFC = Harris Hill Volunteer Fire Company
LVAC = Lancaster Volunteer Ambulance Corps
MTFC = Main Transit Fire Company
MVFD = Millgrove Volunteer Fire Department
NAFD = North Amherst Fire Department
NFAFRS = Niagara Falls Air Force Reserve Station
NFC = Newstead Fire Company
OFPC = Office of Fire Prevention and Control (New York)
RMMS = Rural/Metro Medical Services
RVFC = Rapids Volunteer Fire Company
SFC = Swormville Fire Company
TCA = Twin City Ambulance

Sources: U.S. National Transportation Safety Board, David Case, Thomas Chmielowiec Sr.

Figure 1

While driving to the location, Case asked Amherst Fire Control to dispatch heavy rescue vehicles from two nearby volunteer fire companies with full crews, a water-cascade system and shoring materials to support search and rescue (Figure 1).

The aircraft fuel tanks were ruptured by the impact, and burning Jet A fuel was concentrated in the basement of the crushed house. Burning natural gas from a household meter broken in half — with its valve left in the full-open position — also fueled the flames, thick smoke and radiant heat. The flames were going straight up; the wind was not a factor.

The fire area was confined to part of the residential lot. Firefighters ordered the shutdown of all utilities as part of their standard operating procedures, yet a continuing flow of natural gas feeding the fire was not recognized for a while.

The fire chief and assistant fire chief sized up the situation, including the protruding aircraft vertical stabilizer, and confirmed on Amherst Fire Control's designated radio channel for on-scene operations that a relatively large airplane had struck the house, and the house was fully involved. BNIA-FD simultaneously got this information by telephone from Amherst Fire Control, and confirmed the crash and its location to ATC.

Fast Attack

Some firefighters who arrived with the first CCVFC and mutual aid fire engines were assigned to do a systematic 360-degree perimeter check, searching and listening for any sound of survivors,[4] as close to the fire as possible and in surrounding areas including trees and roofs. Other CCVFC firefighters simultaneously laid in about four or five 1.75-in (4.45-cm) hoses and established a water supply from a hydrant in front of their firehouse. Unlike most calls in which firefighters can don their standard structural turnout gear — that is, protective clothing — and self-contained breathing apparatus (SCBA) en route, the first-arriving CCVFC firefighters did this while on scene. The first mutual aid fire company to arrive also established a water supply from a second hydrant near the house.

"After crews searched the entire area, it was finally determined there were no survivors," Case recalled. Around this time, he requested one crash truck from BNIA-FD to help extinguish the fire with aqueous film-forming foam and the Erie County mobile command unit. The two ARFF crews already were en route, however.

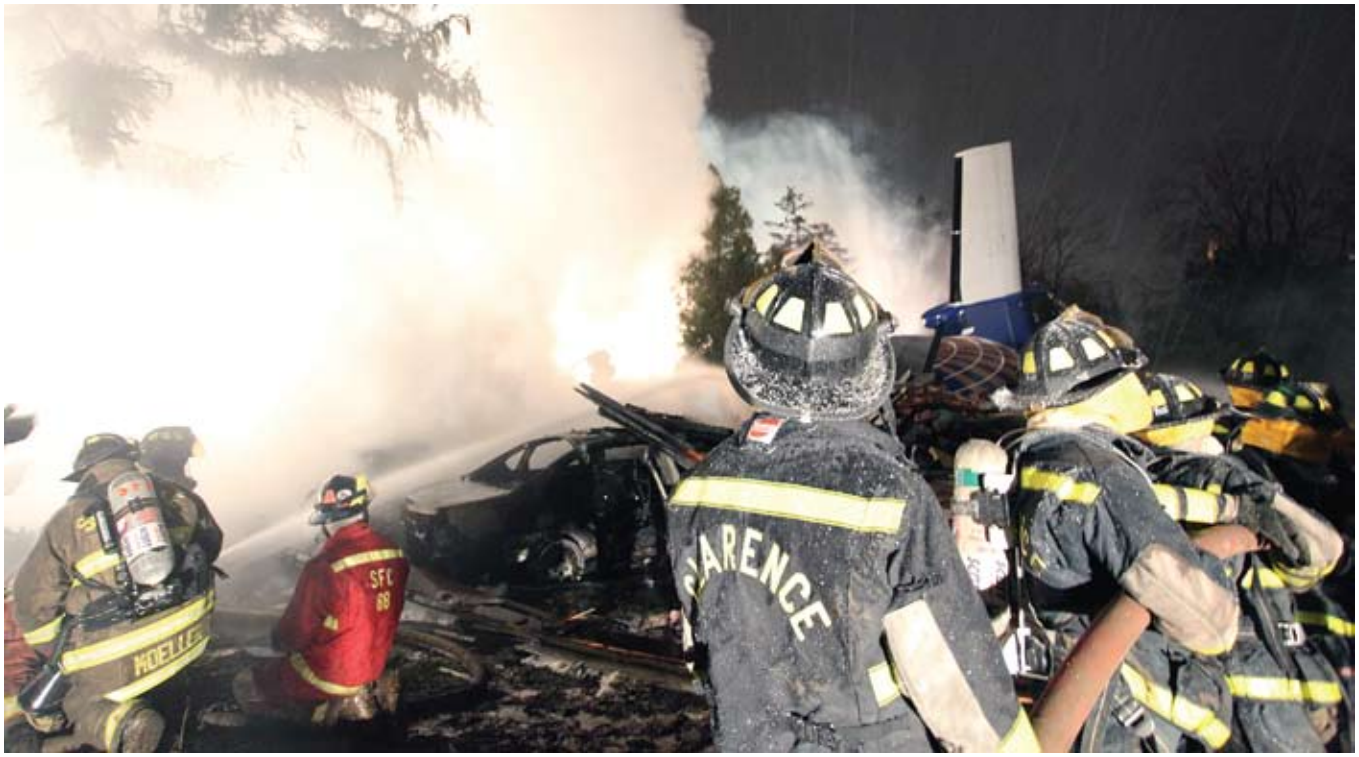
"We quickly refocused our attention to fire-suppression operations as we started to gain headway," Case said. "The Erie County mobile command unit arrived. Inside the command post, we tried to determine how many people were on the plane and the quantity of fuel. Originally, we thought just a crew was bringing the plane in." He learned from emergency medical technicians that two of the three occupants of the house had escaped and survived.

The wood-frame house struck by the airplane initially was destroyed by the impact forces, not fire, and two vehicles burned next to it. Because curtains of water from deluge and blitz guns quickly were applied, the garage building behind the house and the brick house 20 ft (6 m) to the north never caught fire, despite exposure to radiant heat from approximately 5,800 lb (2,631 kg) of burning fuel. At the brick house, there was heat damage, such as the plastic globe of the electric meter and vinyl electric-service entrance cable melting, and minor damage from flying debris.

The crash truck, equipped with a roof turret operated from the cab, had a capacity of 3,000 gal (11,356 L) of water and 412 gal (1,560 L) of foam concentrate. This water tank can be refilled four times with water before exhausting one tank of foam concentrate. The pumper, equipped with a bumper turret operated from the cab, carried 750 gal (2,839 L) of water and 90 gal (341 L) of foam concentrate. ARFF personnel reported that the bulk of the early fire extinguishment took approximately 90 minutes.

Natural Gas Threats

The NTSB determined that National Fuel Gas, the utility company, was



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called at 2358 regarding blowing and burning gas, and its crew arrived on scene Friday at 0033. NTSB said, "The crew shut off the flow of gas at the homes on both sides of the accident site. The crew was initially unable to shut off the flow of gas at the destroyed home because the gas shutoff valve and gas meter were directly in the fire area. About 0130, after National Fuel [Gas] had completed all of the work that it could safely accomplish, the incident commander … requested that the crew retreat from the site."

Gas company officials then determined that a system shutdown affecting about 50 homes would be required to stop the flow of gas at the fire scene. After consulting others about possible evacuation of the residents in the early morning hours and freezing temperatures, the CCVFC fire chief held off on the shutdown, the NTSB said.

When I arrived early Friday morning, I learned that one reason that the overall fire was not yet declared under control was an apparent magnesium fire creating a hot spot underground in the cockpit area. For unknown reasons, it could not be knocked down with foam, water or F-500.[5] My crew came closer with the crash truck and dumped 450 lb (204 kg) of Ansul Purple-K[6] down a vent hole. Each time I would dump some Purple-K down there, the fire would go out. Then a few seconds later, it would erupt again with a "whoosh" sound.

At that point, I told the other firefighters, "We don't just have magnesium down there, we have natural gas." They answered, "A gas company crew was here last night, and we understood they had shut off the gas from the street to the house." I replied, "Then we must have a broken line underground." The incident commander then asked the gas company to do additional work.

In the meantime, a large number of people already were walking on the crash site itself. One of the ARFF firefighters on the crash truck looked at the cab display of images from the roof-mounted infrared camera. He told me, "It's a roaring furnace underground; look what I'm picking up from 10 ft [3 m] down." So I called over representatives from the Federal Aviation Administration (FAA), Federal Bureau of Investigation (FBI) and NTSB. They hopped up in the truck cab to see the display, and I told them, "If I were you, I would pull all of my people off the site. I don't know what's going on here yet but that may be natural gas burning underground." They agreed to leave. "This delayed the NTSB accessing the scene and beginning the investigation," Case recalled.

The NTSB report said, "About 0855, the incident commander allowed National Fuel [Gas] to enter the front yard of the destroyed home to secure the flow of gas at the home, which put out the natural gas fire." This time, while digging up the affected area, the company's crew discovered that a short piece of PVC (polyvinyl chloride plastic) pipe between the main line and the house shutoff valve had been ruptured from the force of the airplane impact. Once they sealed off the pipe, the flame coming out of the vent hole diminished.

Working carefully so as not to disturb too much of the site after gas flow stopped, the ARFF crew noticed another small fire in part of the fuselage near the vent hole. I asked the NTSB investigator-in-charge if we could move this part closer to the road to get a better angle for extinguishment and flood the area. The NTSB agreed, and a highway excavator was brought to the scene to lift up some of the rubble. That small fire and some hot spots were extinguished within 45 minutes.

The relief crew after mine then flooded the area with approximately 9,000 gal (34,069 L) of water to extinguish any debris left burning from the underground fire and saturate the ground. All major firefighting was concluded at that point.

We were advised Friday afternoon by the NTSB that recovery would start Saturday morning. The first crews of the Buffalo Fire Department Rescue 1, Engine 21 and Ladder 6 vehicles arrived then as a specialty team. With ARFF support and under the direction of then-Buffalo Fire Commissioner Michael Lombardo, these crews spent three days helping the NTSB and the Erie County Medical Examiner's Office to separate the human remains, personal effects, wreckage, house and evidence for the accident investigation.

Minor Delay

Looking back at a few issues, the fact that a lot of the Clarence Center streets initially were clogged with other fire equipment meant that the first ARFF crews had difficulties — for about 20 minutes — trying to get the crash truck and support truck to the locations designated by the incident commander. Part of the access problem was temporary mass confusion, with many civilians crowding the area before arriving law enforcement secured the perimeter, began evacuating residents and ordered onlookers to leave.

Given the total fatalities on the aircraft, the destruction of the house and the fire confined to that small area, the time lost was not of much concern. Case later noted that the BNIA-FD firefighters had to communicate on radio frequencies that were incompatible with the six channels implemented by CCVFC and other

David Bissonette, standing, Clarence disaster coordinator; and left-right, Sgt. Bert Dunn, Clarence Police; Scott Bylewski, Clarence town supervisor; and Capt. Steven Nigrelli, New York State Police, speak with news media on Feb. 14, 2009.

volunteer fire companies dispatched by Amherst Fire Control.

Lessons Learned

There really was no time to think about what to do. Everything that firefighters are taught and trained to do kicked in, and CCVFC and mutual aid did the right things automatically.

Whether emergency calls occur on or off the airport, everybody in Western New York's ARFF and volunteer fire companies knows what they have to do because of annual briefings, cross-training and drills. If a crash truck is ever needed, they know how to hook up the crash truck to hydrants, how to do hose layouts and connections, and how to apply foam.

Case, the incident commander, has cited lessons from the overall experience: Firefighters may need drills to prepare for situations involving minimal/no time en route to don turnout gear or mentally rehearse what they will do while riding in their apparatus; even with NTSB assistance, firefighters at times had concerns and difficulty accomplishing both fire control and preservation of the accident scene; the incident commander must ensure absolutely that utilities have been shut off completely; personal relationships developed earlier during joint drills among fire departments are an extremely positive factor under such stressful conditions; and the incident commander sometimes must turn down requests and postpone decisions that can wait.

I concur. Firefighters hear about it if one responding agency doesn't "click" with another. From my personal perspective, we did not have conflicts at this scene. When a problem arose requiring a quick multi-agency decision, the coordinators got together and the problem was rectified — usually in a few seconds.

On this topic, I learned much from how David Bissonette, the disaster coordinator for Clarence, ran the emergency coordination. By 30 minutes after the alarm, he had established the location for the Erie County mobile command center at Clarence Town Hall and the news media staging area, enabling incident command officers to remain focused on scene safety, fire suppression and protecting exposed property from the fire and heat.

To read an enhanced version of this story, go to the FSF Web site <www.flightsafety.org/asw/mar10/flight3407-arff.html>.

Thomas Chmielowiec Sr. retired as a captain in August 2009 after 28 years with the Buffalo Niagara International Airport Fire Department. Wayne Rosenkrans, an ASW senior editor, assisted in adapting and updating this story from the author's 2009 ARFF Working Group Conference presentation.

Notes

1. NTSB. *Loss of Control on Approach. Colgan Air, Inc. Operating as Continental Connection Flight 3407, Bombardier DHC-8-400, N200WQ, Clarence Center, New York. February 12, 2009.* Accident Report NTSB/AAR-10/01. Feb. 2, 2010.
2. Case, David. "Response to Crash of Flight 3407." *Fire Engineering.* Aug. 1, 2009.
3. Case, David. Telephone interview for Internet podcast by Bobby Halton, editor-in-chief of *Fire Engineering*, Feb. 16, 2009.
4. The NTSB final report said, "This accident was not survivable. … The Erie County Medical Examiner's Office determined that the cause of death for the airplane occupants and the ground victim was multiple blunt force trauma."
5. Firefighters typically use F-500, produced by Hazard Control Technologies, for fuel fires. Unlike aqueous film-forming foam that deprives a fire of oxygen, F-500 stops combustion with encapsulating micelles, described as "chemical cocoons around the hydrocarbon fuel neutralizing the fuel leg of the fire tetrahedron [the chemical reaction]."
6. Firefighters typically use Ansul Purple-K, a potassium bicarbonate–based dry chemical containing chemical additives, to extinguish burning flammable liquids, gases, greases and/or energized electrical equipment.