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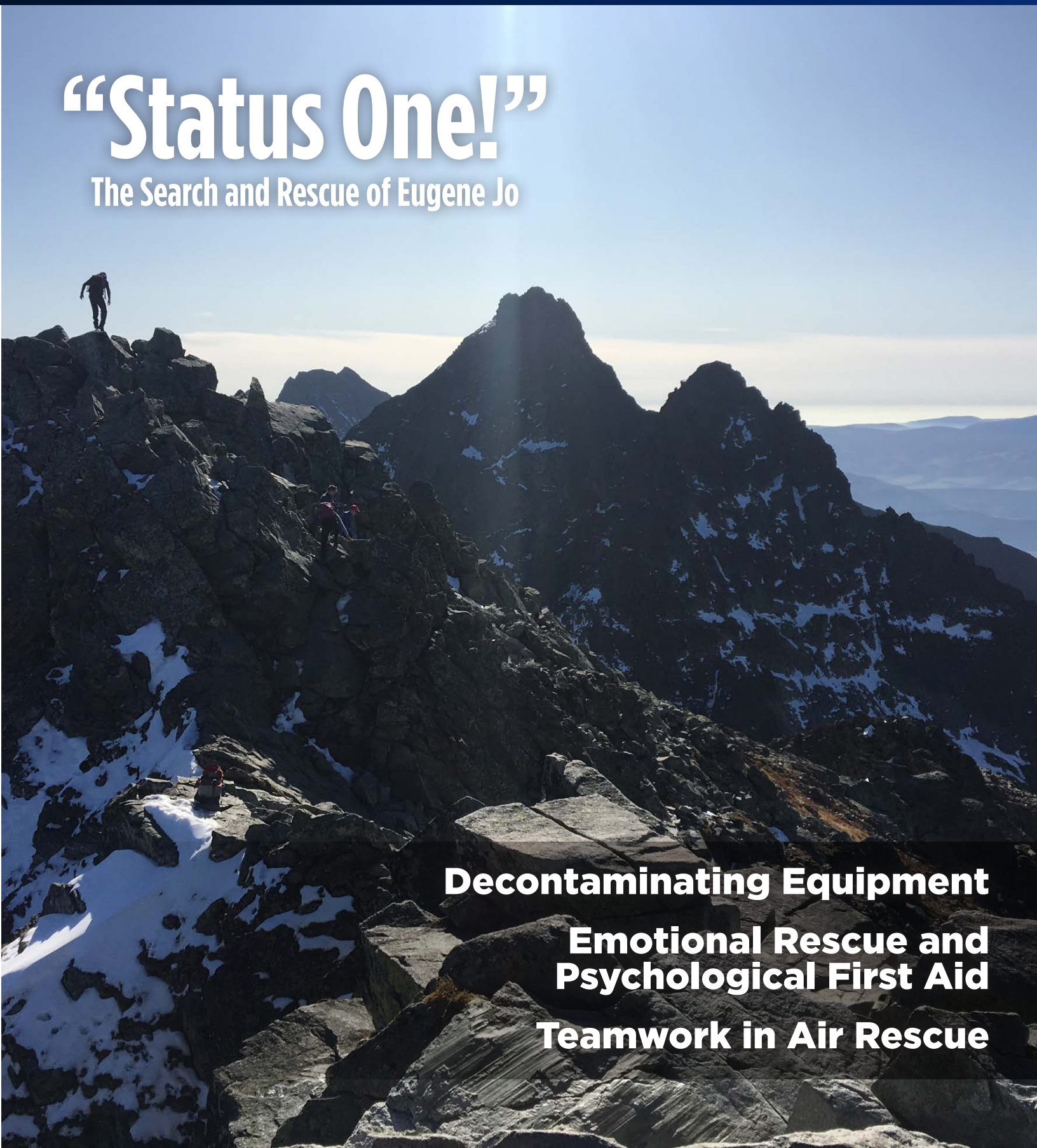

"Status One!"

The Search and Rescue of Eugene Jo

Decontaminating Equipment

Emotional Rescue and Psychological First Aid

Teamwork in Air Rescue

MOUNTAIN RESCUE ASSOCIATION

Fall 2020

ON THE COVER: View from summit of Rysy, highest peak in Poland

MRA Leadership

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The Los Angeles County Sheriff's Department helicopter, Air-5, lowers a medic to Jo and his rescuers. One of the Altadena team members (lower right, in red) guides the pilot. (Altadena Mountain Rescue Team)

Persistent Status One: Staying Positive on a Seven-Day Search

Los Angeles County, Calif. The hike was a short one: two miles in, lunch, and two miles out, covering a moderate trail that traversed the south side of Mt. Waterman in Los Angeles County. It was another hot, sunny Southern California Saturday.

Eugene Jo was not an avid or experienced hiker. It was only the second time the 73-year-old had hiked with this group, which included six other hikers. He carried nothing more than their lunches and a few bottles of water.

Jo was reported missing by his hiking group the afternoon of June 22, 2019. He was last seen on the Three Points Trail in the San Gabriel Mountains of the Angeles National Forest.

The Los Angeles County Sheriff's Department's Montrose Search and Rescue Team got the call around 1900 that evening. The Sierra Madre Search and Rescue Team (SMSR) and the Altadena Mountain Rescue Team were called to assist.

The teams learned that Jo was not prepared to be out overnight. He had a hat, walking sticks, and a small red backpack, but no additional food or water and no light sources or cell phone.

Further complicating the start of the mission was the language barrier; Jo and his hiking group were Korean. While the command post crew was able to gather some of the basic information from those who were with him, more in-depth and detailed information was hard to come by. They were initially told that Jo had bad knees and frequently fell down. Yet gathering anything more definitive about Jo's medical condition was stymied due to communication problems and the fact that his family was not immediately available. In addition, the overhead team knew *where* he was last seen but got conflicting information about *when* he was last seen.

Efforts the first night were concentrated around the point last seen (PLS) and the immediate paths off the main trail. Another group of searchers from seven SAR teams in Los Angeles County arrived the following morning, and the search assignments expanded.

While continuing the search around the PLS, search teams also started investigating drainages and ridgelines, knowing Jo could have inadvertently walked onto a game trail that would have taken him away from the trailhead and in the wrong direction.

Additional out-of-county teams arrived Monday morning to help with the search. Teams searching off-trail areas reported difficult conditions including dense brush, steep slopes and sheer cliffs. Searching was slow, painstaking work. The searchers often questioned Jo's ability to move through the rough terrain, given his reportedly bad knees and physical instability.

There was no sign of tracks, broken bushes, or any other indication that someone might have passed through. Yet even as the days wore on and as team members cycled through, the search strategy was never reflective of being in a recovery mode. The overhead staff believed Jo could very well have made it past even the most treacherous areas. They just had to figure out how and where.

"Our mindset was that he's alive until we find him and he's not," recalled one veteran SAR member. "It never stopped being an active search-and-rescue mission."

An interview with Jo's son and daughter further contradicted information given at the start of the search. They revealed that they were unaware of any medical conditions, and though Jo may have fallen once or twice, it was not a chronic condition. Both believed strongly that their father would never give up. His daughter cited Jo's military service and predicted that he would use his survival skills to stay alive. They were adamant: If Jo could find water, he would survive. The bigger question was whether he would stay put or whether would he continue walking, trying to find his way out.

As searches in the long, hot days continued, assignments focused on the area around the PLS in addition to the drainages, ridgelines, and slopes. Despite the conditions and tough terrain, the search teams did not complain even though each day's efforts didn't yield any results.

It was hard to avoid the idea that Jo could be down. He could have fallen, hit his head or become dehydrated. While all of these scenarios were certainly possible, the command staff continued to believe that if Jo found water, he could survive – even a week into the search.

Searchers in the field had instructions that if anyone found Jo, the three categories for his condition were Status One: alive and well; Status Two: alive but down; and Status Three: deceased.

HE'S ALIVE UNTIL WE FIND HIM AND HE'S NOT

Chris Gonzales had been with the Altadena Search and Rescue Team just six months before the search for Eugene Jo. The hike that he and Fred Pearce, one of Altadena's senior members, were assigned sounded grueling. If previous reports about the search area were anything to go by, Gonzales and Pearce were in for a tough day. "They told us to take a lot of water, and that there'd be lots of bushwhacking. But they also told us we'd be extracted by air, so that helped," Gonzales said.

Another team had hiked into Devil's Canyon the previous day but found no sign of Jo. Pearce and Gonzales found a number of hikers' tracks; all but three had turned around and headed back up canyon. None of them was Jo.

Their trail ended at the Devil's Canyon Campground, a scraggly, remote spot on the side of a creek. Other than a tent and some camping supplies, it was deserted. Gonzales

and Pearce walked the banks, one on each side, calling out for Jo. But the creek was flowing so fast that they couldn't hear one another, much less a response from someone who was probably weak and in distress.

The pair came across a group of hikers, "[They were] three girls who said they'd been in the area since the previous day and had talked to one of the search teams, but had not seen Mr. Jo," Gonzales said.

The search team knew the creek would dead end in less than a mile and so decided to eat lunch before finishing their assignment. "We took our packs off. The girls were standing next to us, talking. I'd opened the top of my pack, got out my sandwich and was just about to take the first bite when I heard a cry for help," Gonzales said. "I looked at Fred, my eyes got big, and I might have said the F word."

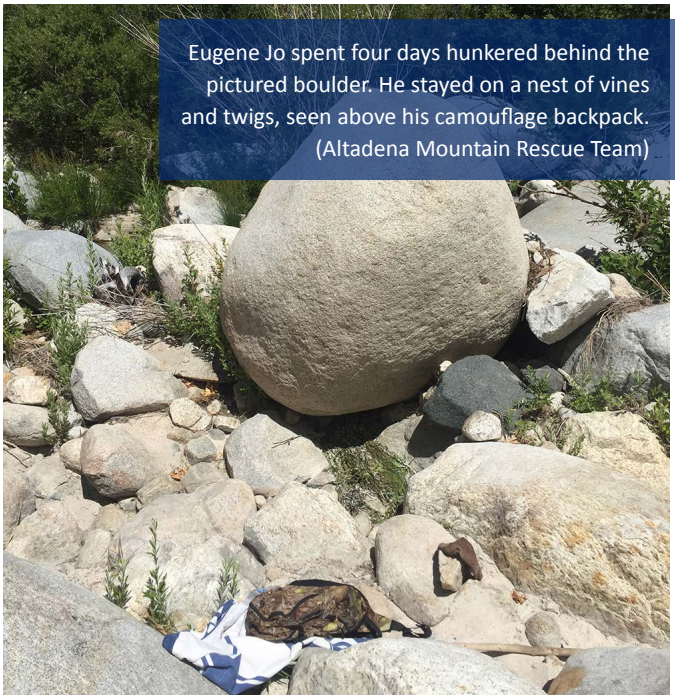
Pearce and Gonzales took off running, Gonzales on the bank of the creek and Pearce splashing down the middle. The creek took a sharp turn, and hunched behind a huge boulder, was Eugene Jo. "I asked, 'Are you Mr. Jo?' and he said yes. I told him, 'We are so relieved to find you.' He looked at me and said, '*You're* relieved?"

Jo had been there for four days.

Pearce assessed Jo while Gonzales yelled for the girls to grab any food they had in their packs and hand it over. They came up with a smorgasbord of trail mix, energy bars, and candy. Jo had been near the creek the whole time, and while he had plenty of water, he had no food. He survived by eating cactus flowers, the buds that sprout from cactus tops in spring. Peanut M&Ms were a welcome change.

"Status One! Status One! Status One!" Gonzales shouted into the radio. The command post held its collective breath. "Are you sure? Repeat your transmission."

Air-5 personnel, along with Gonzales and Pearce, ride to the Command Post. (Altadena Mountain Rescue Team)



Eugene Jo spent four days hunkered behind the pictured boulder. He stayed on a nest of vines and twigs, seen above his camouflage backpack. (Altadena Mountain Rescue Team)

Gonzales said it again. The command post staff erupted into cheers.

Jo was able to walk, but just barely. The LASD's AIR 5 helicopter arrived in 20 minutes and lowered a medic. Pearce, Gonzales and the medic carried Jo away from the creek so that a nearby snag wouldn't be blown down by the helicopter's rotorwash. Jo and the medic were hoisted up and flown to a hospital for evaluation.

Gonzales and Pearce later learned that the previous search teams had missed Jo by about 300 yards. Their distance from him and the sound of rushing water in the creek made it impossible for him to hear their voices or whistles. On this day, Pearce and Gonzales were closer, only 35 yards away. And although they were around a bend in the creek, the wind carried the sound of laughter. That was what Jo heard – not a whistle, not a shout, but the sound of a young girl laughing.

Had Jo stayed at the spot where he lost the trail, the searchers would have found him the next day. But like most people, he didn't stay in one place. He searched for the trail in the fading afternoon light. But it was near twilight, the light was changing, shadows moved and made everything look different from one minute to the next.

He went downhill toward water, through terrain so difficult and waterfalls so steep they required a rappel to descend. Somehow Jo managed to ascend a canyon wall and bypass the

waterfalls. When he finally reached the creek, he continued to slog downriver, believing that he would eventually reach a lake or some other sort of manmade structure. He even managed to walk by the campground unnoticed because the creek bed is lower than the campground and shielded by dense foliage. The spot where he finally made his camp was almost directly below the command post but separated by hundreds of feet.

Searchers discovered another inaccuracy in the information at the start of the search: None of the clothing or gear descriptions given by his fellow hikers was accurate. For example, his backpack wasn't red, it was camouflage. Pearce and Gonzales came across a number of items on the trail, photographing and taking coordinates of each one. But in the end, none of it belonged to Jo. The only thing Jo had was an old emergency blanket he'd found. He laid it on a rock, hoping someone would see it, either from a nearby ridgeline or from the air. But it was so old that it lost its reflective properties.

Jo had heard the helicopters searching overhead but was unable to get their attention. He had spent four days by that boulder, well-hydrated but weak from hunger, resting on a nest of leaves and twigs. Jo's children were right. He had used his military survival training. He found water, and he survived.

Had Jo continued down river, he would have proved the exception to the popular belief that salvation lies down river. "From his location, it gets even harder," Gonzales said. "In three-quarters of a mile the terrain gets tougher and choked with brush. He would not have continued downstream anyway because he was too exhausted."

A total of 25 teams from 10 counties took part in the mission, including teams from as far away as Marin and San Diego counties. More than 325 searchers covered about 3,200 acres with help from LASD's search dogs, the Special Enforcement Bureau's Unmanned Aircraft System, and helicopters from the Sheriff's department and the Los Angeles County Fire Department.

Eugene Jo at the hospital, flanked by (from left) Deputy Dan Paige, LASD (retired), Fred Pearce and Chris Gonzales of the Altadena Mountain Rescue Team. (Altadena Mountain Rescue Team)

Jo's boots, which had fallen apart. He used the laces to keep the soles attached. (Altadena Mountain Rescue Team)

Relieved and grateful to find their subject alive, the team members finally went home to wash off the dirt, tend to their bruises, and catch up on some much-needed sleep.

The mission was a reminder to never underestimate a person's determination and ability to endure extraordinary conditions to survive and stay alive. Jo did exactly what some people thought he could not do. He travelled through terrain that had stopped tougher, more experienced hikers, and ended up in an area few people believed he could reach, all without leaving a trace.

Carolyn Grumm, Chuck Stoughton, and Lois Pilant Grossman contributed to this story.

Olympic Mountain Rescue Takes Ownership of Headquarters

By Rachel Moser and Tiffany Royal

Olympic Mountain Rescue, Bremerton, Washington

Olympic Mountain Rescue has recently become the owner of its own headquarters, a significant milestone in this small unit's history.

The team has gone from renting a small truck bay and meeting space in a community hall for more than 40 years to managing the entire 3,500-square-foot facility that includes two engine bays, a truck bay, and meeting and office space.

"The opportunity to become owners of our own facility was a dream for many years that didn't seem possible," said John Myers, OMR chairman. "We are so pleased now to have this building which affords us the room to store and maintain our equipment, and to host trainings and to grow. In the end, the mission of the team is strengthened and secured by this acquisition."

OMR was formed in 1957 by a group of Bremerton climbers, and for the next 12 years had no truck or place to store group gear. The team met in a vacant classroom at the local community college. OMR members taught the basic mountaineering course at the college at that time. The course is still in existence today.

The unit obtained its first truck in 1974, an Army surplus crew cab pickup with an added canopy. It was stored at various members' homes and garages, but storage problems arose when a larger truck was purchased in 1978.

It was at this point that the unit started renting the single truck bay and meeting space at the Westgate Improvement Club in Bremerton, a community hall used by residents and the local fire department. OMR has been using this space since the late 1970s.

In December 2017, the managers of Westgate approached OMR's board of directors about giving the building to OMR. The owners were getting older and wanted to hand off the maintenance to a group they knew would take the facility to the next level.

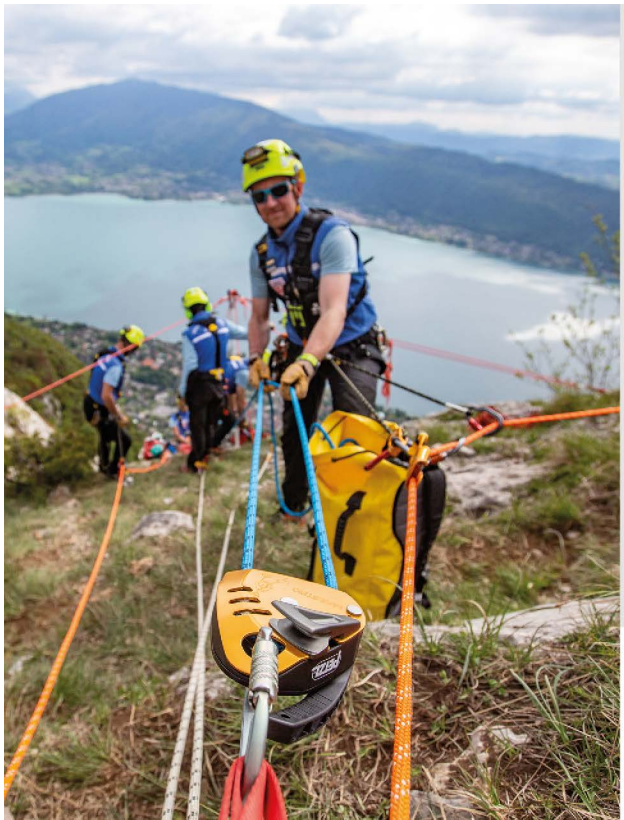
The donation of the building, which was built in 1962, included funding to update the building's much needed yet deferred maintenance.

After research, meetings and the official transfer of ownership in Spring 2018, several dedicated OMR members started the huge effort to overhaul the aging building into OMR's new headquarters, including improving the utilities and training areas.

Fire hose drying racks were removed, carpet was pulled up, a new heating system was installed, and fresh coats of paint were applied both inside and outside, in addition to plenty of deep cleaning. Outside, the parking lot was repaired and sealed, and 40 spaces were restriped. New outdoor lighting was installed, adding a significant level of safety to the neighborhood. Local homeowners stopped by often to show gratitude and appreciation for the new changes.

The building's kitchen was converted into OMR's library, housing numerous mountaineering and climbing books generously donated by several members. The fire hall's original office and bunker spaces are used as a meeting place, storage for the radios and maintenance supplies, and coffee and snacks for middle-of-the-night missions. The Harold Brooks Community Center (named after an original member of the Westgate Improvement Club) continues to be available to the local community to rent for classes, gatherings, rummage sales, and more.

In addition, a concession stand and storage building on the corner of the property, adjacent to baseball ballfields, is rented by a local PeeWees sports organization.



The building's double engine bay is shared by OMR and the Kitsap branch of The Mountaineers for training and gear and truck storage. The single truck bay is rented to a local plumber for storage.

The last significant project will replace the 57-year-old roof, original to the building, which has significant damage from water, rot, and carpenter ants. The unit has determined it will cost about $50,000 for roofing materials alone, as labor will be provided free by OMR members. OMR is currently undergoing fundraising and grant writing efforts to find the money.

In the past year, owning the building has proved beneficial to the unit, utilizing it to its full potential, including hosting its own large-scale classroom training sessions, such as the annual two-day Search and Rescue Academy.

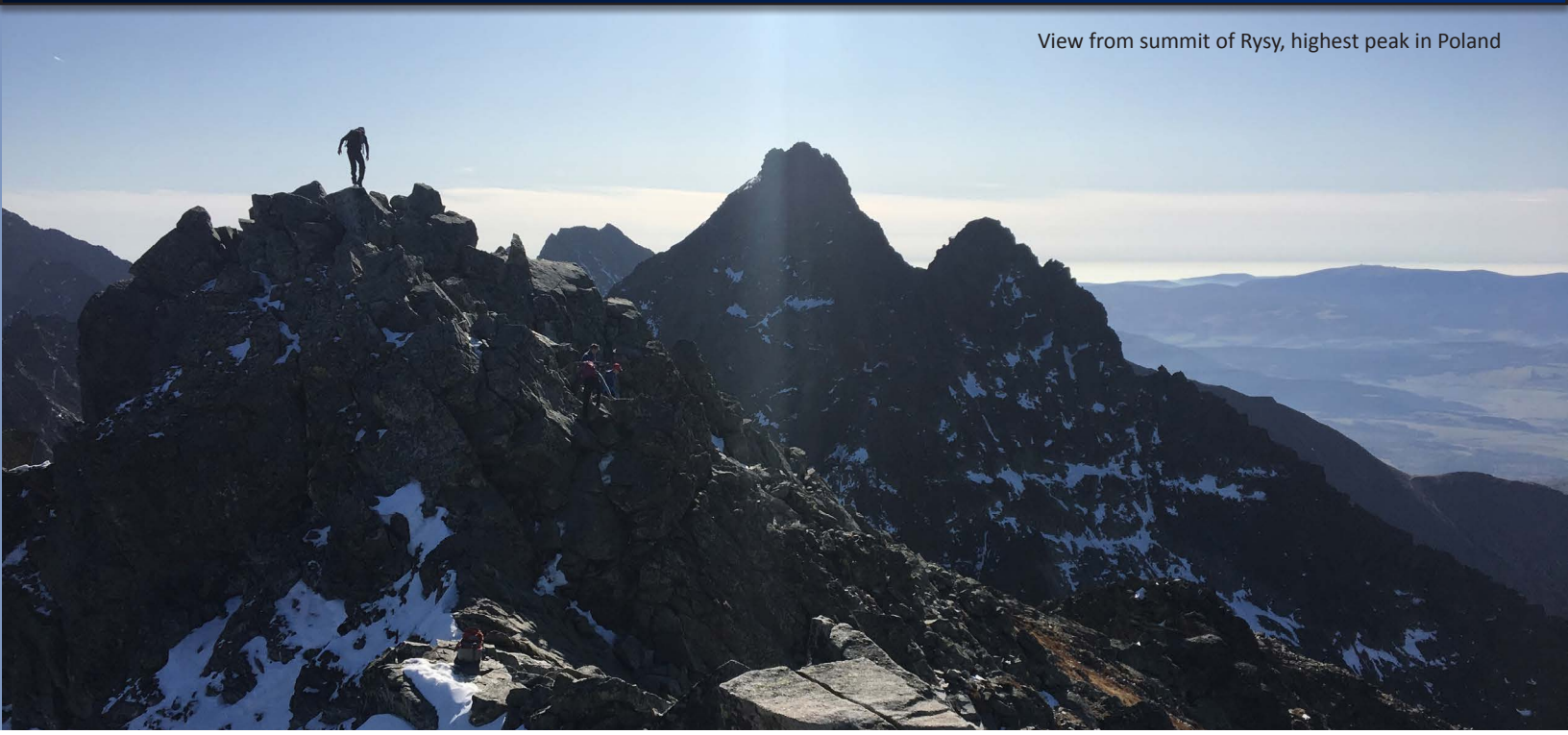
To celebrate nearly a year of hard work and ownership, the unit hosted an open house in August 2019 to show off the new building, which included attendance of community members, local sheriff's deputies, fellow Tacoma Mountain Rescue Unit members, and the Mayor of Bremerton and his wife.

Interactive booths allowed visitors to learn about aspects of mountain rescue, including rigging, APRS[1] and InReach tracking demos. Members showed off the new library and provided a meal from some of the unit's highly regarded chefs.

This winter, the unit was able to transform the normally industrial-like and fluorescent-lit space into a quaintly decorated dinner hall for OMR's annual awards banquet and holiday potluck, hosting about 70 members, spouses, and friends.

"We have wasted no time in converting the retired and underutilized spaces within the old fire station to our purposes," Myers said. "As a result, we now have a clean, comfortable, and useful space that this year has transformed our operations and has already paid dividends to us in the form of improved training facilities, community support, and increased interest in membership. It's really been a milestone year for our team."

1 Automatic Packet Reporting System is an amateur radio-based system for real time digital communication of information about the local area. Data can include object Global Positioning System coordinates, weather station telemetry, text messages, announcements, queries, and other telemetry.



View from summit of Rysy, highest peak in Poland

ICAR MEDCOM REPORT, Zakopane, Poland

OCTOBER 2019

ALISON SHEETS MD DELEGATE

CHRISTOPHER VAN TILLBURG MD ALTERNATE DELEGATE

The International Commission on Alpine Rescue (ICAR) Mountain Emergency Medicine Commission (MEDCOM) met in Zakopane Poland as one of the four main commissions to ICAR. ICAR has grown significantly in the last few years,68 people from 22 countries are represented in the MEDCOM alone. Much of the MEDCOM business revolves around the research and publication of recommendations to the international mountain medicine community. This year, we spent a great deal of time discussing the revision of previous recommendation in order to keep them up to date and relevant to mountain SAR.

The development of both an internal web-based forum and a new open access website is one important development in the MEDCOM. This will allow us to better get our message out to the ICAR community. The forum is for working within the MEDCOM and access is limited, but the new website- www.info@icar-med.com, is up and running and makes it easy to view existing recommendations, educational programs, and upcoming events. We encourage all who are interested to take a look.

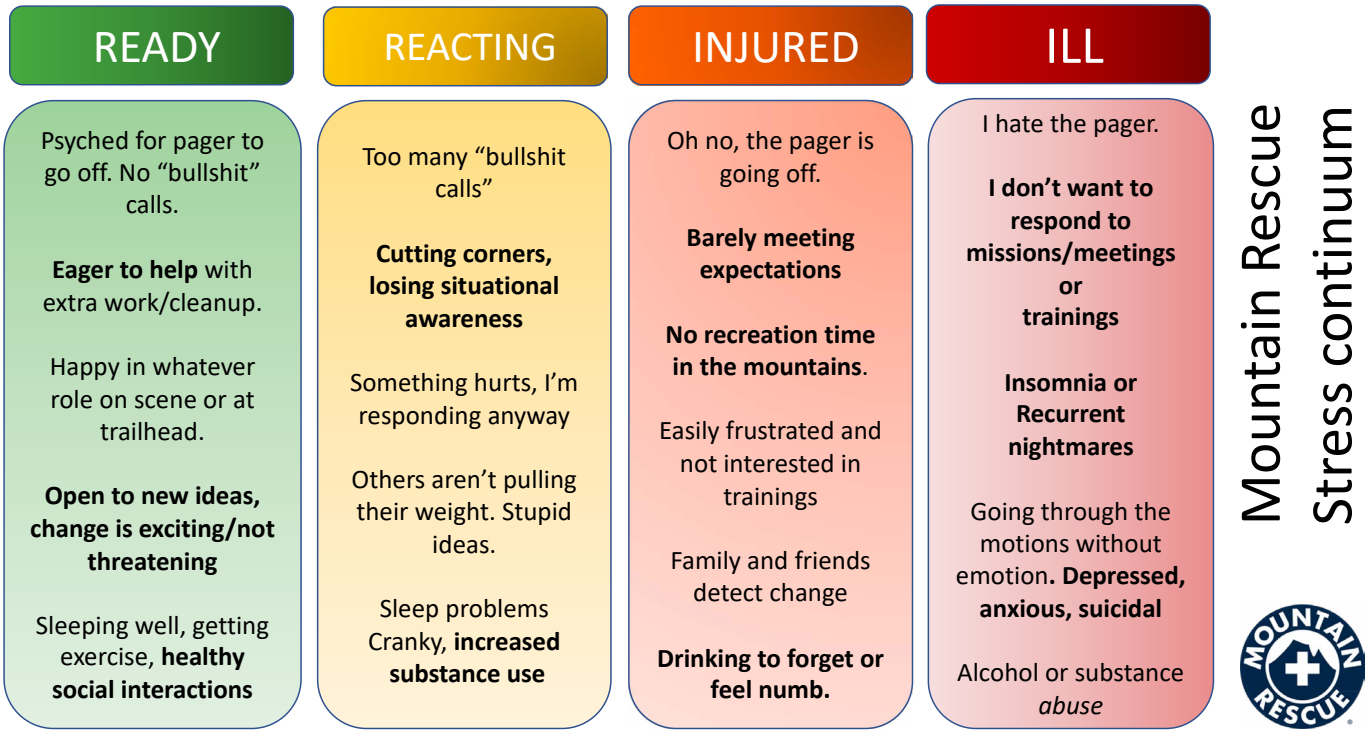
Two vice presidents were elected to the MEDCOM this year, Dr. Natalie Holzl, anesthesiologist representing the German Association of Mountain and Expedition Medicine (BExMed), and Dr. Alison Sheets, emergency physician representing Mountain Rescue Association, USA. They will assist president Dr. John Ellerton from the UK.

The newest recommendations to be made by ICAR MEDCOM will include "Determination of Death" Dr. Corinna Schoen and "Suspension Syndrome" Dr. Simon Roach. Determination of death is aimed at allowing non-physicians to more confidently decide when a mountain casualty is deceased, allowing decreased urgency and risk in evacuation decisions. New recommendations for "suspension syndrome", which is illness, syncope or death after hanging motionless in a harness, bring forward recent research to provide a more evidence-based approach to suspension injury treatment and rescue. It also includes the recommendation that rope work should not be performed alone. (see draft of entire recommendation below) Both of these ICAR MEDCOM recommendations and research will be submitted to peer-reviewed and will be on the MEDCOM website once finalized.

Dr. Alison Sheets presented research findings and recommendations on the psychological stress injuries associated with mountain search and rescue. The MRA has been on the forefront of this topic with much activity in the USA. The ICAR MEDCOM team is working to expand the awareness and education of this important topic to a wider audience. Official MEDCOM recommendations will be forthcoming in 2020.

The stress continuum remains an important model for improving awareness of stress injury and provides a convenient way of facilitating identification and treatment of stress injured rescuers. Although the incidence of PTSD, suicide, and other stress related injuries is not well described in the mountain rescue population, first responders (law, fire, EMS) have twice the rate of suicide as the general population and suicide is now recognized as the leading occupational killer of emergency responders (Responder Strong 2018). Utilization of emotional rescue techniques including establishing calm, safety, connection, providing hope and self-efficacy should be taught to rescuers and incorporated in to team culture as part of normal first aid training. Normalization and de-stigmatization of mental health discussions will go a long way in reducing the detrimental effects of stress injuries.

Jason Williams from University of New Mexico presented the current status of the Diploma in Mountain Medicine (DiMM) program. The DiMM is the only internationally endorsed program for training in mountain medicine and rescue techniques recognized by International Society of Mountain Medicine, ICAR, and Union Internationale des Associations d'Alpinisme. The course involves a minimum of 120 hours, usually in a separate winter and summer program, and provides training and practice in all areas of mountain medicine. Additionally, extra modules exist in helicopter operations, terrestrial rescue specialty and wilderness and expedition medicine. The diploma is awarded to students with medical training and certification of paramedic or higher. BLS



providers are not eligible. Visit the ICAR website for a list of the 22 approved course sites and additional information.

All four commissions, MEDCOM, Terrestrial, Avalanche and Air, joined for two discussions related to avalanche safety and rescue. The first was a presentation posing the question as to whether avalanche safety training should include CPR to "forge a better chain of survival" by Heiko Stopsack, paramedic from Washington state. His opinion is that recreationalists taking introductory courses in avalanche safety should be required to have CPR as part of that training.

Dr. Christopher Van Tilburg, MRA Alternate Delegate to MEDCOM, presented the question, "should airbags be mandatory avalanche safety equipment?" He presented the work of Haegli et al regarding the survival benefit of avalanche airbags showing a reduction in mortality of 22% to 11% in avalanche victims. In that study there was a 20% non-inflation rate. The audience agreed that airbags are a potentially valuable addition to rescuer safety equipment but ICAR has generally not made "mandatory" recommendations.

Many manufacturers and sponsors discussed their products in joint sessions. One interesting product from a Swedish company, twICEme, uses Bluetooth technology to allow rescuers to access personal medical information from patients who have loaded the information into a small device placed in a helmet. Privacy control managed by a two-minute time out after access of information is done. Obviously, questions about nefarious access came up but the idea is that the information available is limited to emergency care needs and would not be a repository of personal demographic info or insurance details.

A helmet from twICEme uses Bluetooth technology to store medical information of its user and allow access by rescuers (ICAR)

"Heat Illness and Injury" presented by Dr. Drew Harrell and Dr. Risa Garcia from University of New Mexico, reviewed the Grand Canyon National Park's extensive experience with heat related illness. Despite a well-established Preventative SAR program, the canyon's "upside-down-mountain", where retreat requires uphill travel, and the 145 F ground temperatures in the bottom, result in many cases of severe dehydration, heat stroke, and hyponatremia (life-threatening low sodium from overhydration and salt loses). They are very aggressive with cooling for heat stroke utilizing the river and ice brought in by helicopter to rapidly reduce core temperatures. As the "Rim to Rim" and the "Rim to Rim to Rim" hiking and running have become popular, they are seeing increasing numbers of exercise induced hyponatremia. As a result the park service paramedics began performing blood tests in the field and infusion of intravenous fluids with 3% saline to rapidly correct sodium levels pre-hospital. This rapid correction has proven to be well tolerated and goes against historic teaching in emergency medicine. In 2019 so far 10 patients

have had this rapid correction performed with no detrimental effects reported.

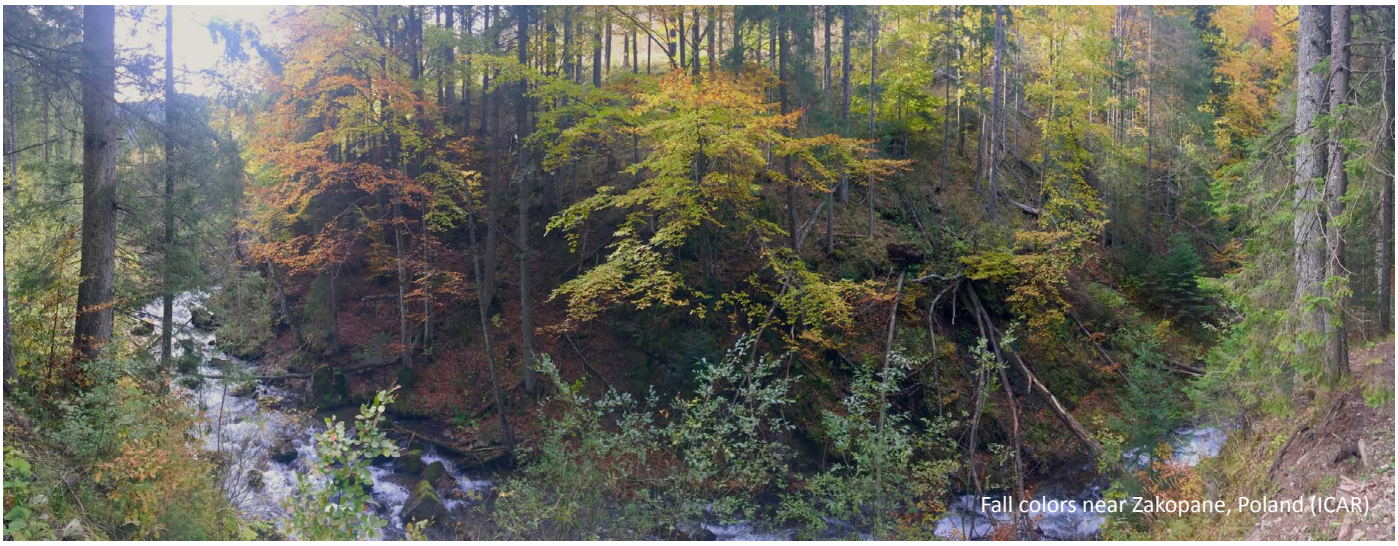
Outdoor Emergency Care, 6th Revision was reviewed by Dr. David Johe. The National Ski Patrol (NSP) was voted as a 2b member of ICAR in 2018. Dr. Johe reviewed the role of the NSP and the structure of the educational program and various ski resorts. There are 30,000 ski patrollers in the USA and over 90% of the resorts use the NSP volunteers. Many resorts have both NSP volunteers and paid professional patrollers. Outdoor Emergency Care is the first aid program developed by the NSP and is required for most patrollers. The course includes 60-80 hours of classroom and online training along with 40 hours of skills and practical evaluation. Revisions will update and modernize material but likely no major changes.

"Tactical Alpine Medicine" presented by Markus Isser, Österreichischer Bergrettungsdienst (ÖBRD), Austria, provided an approach to mountain rescue that was both practical and entertaining in its presentation. He referred to the immediate location of a casualty such as in dangerous terrain or beneath a hovering helicopter as the "red zone". In this area treatment interventions are limited to a single airway maneuver and hemorrhage control

Presenters demonstrate the use of a 'space blanket' for treating a patient. (ICAR)

(tourniquet). Once a patient has been moved to a safer location, additional treatment may be considered. Markus then demonstrated the many uses of a "space blanket". Additionally, they pull tested the folded space blanket and found that it could hold 250 kg. Several novel uses were demonstrated including as sunglasses, tourniquet, transporting a patient on your back, and heat retention. The best way to wrap someone was demonstrated by placing the blanket under the jacket, over the head, and under the groin like a diaper. This wrap was practical and fast.

The ICAR MEDCOM spent a day in Krakow before the regular conference to visit the Krakow Hypothermia Centre at the University Hospital. Southern Poland has advanced treatment protocols for hypothermia and has had very good success with extra-corporeal life support (ECLS) in severe hypothermia cases. Additionally, the MEDCOM members were placed in a dark, cold chamber (-30C) with wind and snow to practice hypothermia field treatment techniques. The difficulties and limitations of performing medical assessments, treatment, and utilization of equipment in extreme cold were painfully reinforced.


Fall colors near Zakopane, Poland (ICAR)

Dr. Pasquier gave a hypothermia update. A review of literature regarding the "Swiss Staging" of hypothermia shows that field findings- vital signs, mental status, etc., do not correlate well with actual core temperature expected with clinical stage. Additionally, vital sign changes do not behave predictably as hypothermia progresses. As one might imagine, research on hypothermia is limited to animal models and case reports with fewer cases of mild to moderate hypothermia in the medical literature. This is a good reminder to consider factors other than cold (such as trauma or medical conditions) when patient's presentation is inconsistent with expected hypothermia findings.

The Hospital Outcome Prediction after ECLS (HOPE) score provides a prediction of the survival probability in hypothermic cardiac arrest patients undergoing ECLS rewarming. The score ranges from 0% to 100% chance of survival to hospital discharge. It has been validated and is a better predictor of survival than potassium level alone, which has been used historically. Although this is a tool for use in hospital, SAR teams should be familiar with it in order to obtain the necessary information from the field for the decision tool to be utilized. The following data points are used: Age, gender, type of hypothermia (with or without asphyxia or submersion), CPR duration, serum potassium (mmol/L), and temperature. In general, best outcomes are from patients with no history of asphyxia. See links to original articles for more information on HOPE score.

https://doi.org/10.1016/j.resuscitation.2018.02.026
https://doi.org/10.1016/j.resuscitation.2019.03.017

"Standardizing our approach to preventing and treating hypothermia"- was presented by Dr. Live Kummen. Dr. Kummen developed a nation-wide program to train Norwegian People's Aid Volunteers in dealing with hypothermia. Norway has an average annual daytime temperature of 9.5 C so hypothermia is a common problem for SAR and EMS. She approached development of the program in a practical "train like you fight" style. This included standardized, light, compact, weather-resistant equipment such as waterproof instructors manual, waterproof notebook with flow charts and report forms. She addressed all methods of heat loss in a "warmies" kit which includes wool base-layers, balaklava, pad (folded, not rolled), chemical heat blanket, sleeping bag, vapor barrier, trauma shears for clothing removal and emergency shelter. The cost for her kit is approximately 1000 euros. She did not use patient core temperatures or "staging" as this program is aimed at volunteer first aid providers. Standardized training was mostly done outside. Benefits of the program, besides better patient care and potential outcomes, included increased awareness on the problem of hypothermia and improved PSAR.

Finally, several short presentations utilizing case reports were proposed to ICAR MEDCOM including utilization of advanced airway interventions and use of blood products, following military approaches, in mountain rescue. It is important to understand that in many areas of Europe, mountain SAR is a professional activity and physicians and advanced providers are often on scene via helicopter. Some agencies in the USA are able to provide this level of care but most MRA teams do not have advanced providers in the field. Other medico-legal issues also limit prehospital options for many USA based volunteer teams. Nevertheless, all options to help our patient have better outcomes are worth considering and should

be discussed with local medical control. Visit the ICAR MEDCOM website for international recommendations.

Future ICAR MEDCOM spring conferences will be held in Christchurch New Zealand April 16-19, 2020 and Glenmore Lodge, Scotland April 8-10 April 2021. I will be attending both representing the MRA. ICAR General Assembly scheduled for Thessaloniki, Greece, October 13-17, 2020, and Reichenau an der Rax, Austria October 27-31, 2021. All MRA ICAR delegates will be there.

Nr.	Suspension syndrome recommendation-DRAFT	Grade
1	We suggest the following classification of suspension syndrome: 1. Acute suspension syndrome a) Near suspension syncope (characterized by light-headedness, pale skin, warmth, blurred vision or nausea)[12,14] b) Suspension syncope[12,14] c) Suspension cardiac arrest (after exclusion of other causes of cardiac arrest, e.g. myocardial ischaemia, trauma, hypothermia)[4,15] d) Post-suspension cardiac arrest within 60 min after rescue[4] 2. Subacute a) Sensory or motoric deficit in the legs persisting for >24 hours after rescue[4] b) End organ dysfunction, in particular rhabdomyolysis-associated acute kidney injury[4,9] c) Cardiac arrest >60 min after rescue[4]	2C
2	Rope work should never be conducted alone.	1A
3	Persons suspended in a harness should be rescued as soon as possible, even if the casualty is asymptomatic, as time to (near) syncope and cardiac arrest is variable and unpredictable.[12]	1A
4	While awaiting rescue, persons suspended freely on a rope should move their legs in order to reduce venous pooling.[12]	2B
5	If no adjoining structures are in reach, foot loops should be used to step in and activate the muscle pump.[1,4,12,15]	2B
6	If the casualty is no longer able to act, the first rescuer reaching the casualty should raise the victim's legs to create a more horizontal position while measures are taken to lower the patient to the ground.[12,15]	2C
7	Once the casualty is on the ground, the casualty should be positioned supine. Assessment and treatment should follow standard advanced life support algorithms.[4,12,16-18]	1A
8	After prolonged hanging (>2 hours), monitoring for serum potassium and creatinkinase should be established and renal replacement therapy considered in patients with acute kidney injury.[3,4]	2C
9	In case of cardiac arrest, hyperkalaemia and pulmonary embolism should be considered as potentially reversible causes and respectively treated.[18]	

ICAR AIR RESCUE

Rick Lindfors, Meridian Lead Editor

The following is an abridged report based on the October, 2019 meeting of the Air Rescue Commission of the International Commission for Alpine Rescue. The meeting was held in Zakopane, Poland, with the original report prepared by ICAR air rescue Commission President Charley Shimanski. The notes are abridged for publication in Meridian. Some parts of the presentation are presented here in full for complete details. Editor's notes may be added for additional details not included in the provided ICAR report.

The October, 2019 meeting marked the 71st anniversary of ICAR, and included a record number of participants including pilots, rescuers, technicians and medics. Participants took part in workshops and seminars over four days. Four rescue helicopters from four different countries took part in demonstrations and test flights.

USA INCIDENTS AND ACCIDENTS

Rescue Helicopter Crashes Trying to Rescue a Helicopter Crash Casualty

A Polk County, Fla. Sheriff's Office helicopter crash-landed into a swampy field while responding to an earlier gyrocopter crash on October 3, 2019.

A Coast Guard Air Station Clearwater MH-60 Jayhawk helicopter aircrew rescued two pilots from two helicopter crashes. The two subjects were transported to Tampa General Hospital. The rescue pilot was treated and released; the gyrocopter pilot remained in the hospital.

Helicopter Hits a Firetruck

The crew of the BK117 was responding to a scene call on December 24, 2018 in Strum, Wis. The decision was made to land at an alternate landing zone in front of the fire station instead of a pre-established landing area one mile away.

The approach was made under NVG. The pilot stopped his approach 3 feet above ground to avoid an unreported obstacle at the leading edge of the landing zone. The tail rotor made contact with the top of a fire truck parked to block the street at one end of the landing zone.

The pilot lost tail rotor control and the aircraft nose spun to the right. The pilot immediately lowered the collective and impacted the ground. The aircraft rotated approximately 225 degrees before coming to a complete stop. The pilot performed an emergency shut down and the crew exited the aircraft once the rotor blades stopped.

According to persons involved, "the ground party did not establish landing zone using common practices to set the proper size and identify obstacles. It is imperative that... aviation programs provide landing zone safety training. The ground staff on site had not received training to develop a landing zone."

Once the crew agreed to land at the smaller landing zone, they acknowledged that it seemed smaller than normal. The crew continued to consider options of going to the previously established landing zone instead of focusing on landing area they had chosen. Because of this, they did not discuss the obstacles in the landing zone... and did not maintain situational awareness once they were committed to the landing zone.

Program Accepts a Call that Two Other Programs Refused Due to Weather

A HEMS Survival Flight Inc. helicopter (pictured) was headed to pick up a patient from a hospital in Pomeroy, Ohio on January 29, 2019.

About half an hour before Survival Flight departed, the emergency department requested a patient transport from MedFlight in Columbus. The assigned team's pilot determined that weather conditions were below their program's weather minimums.

Minutes before Survival Flight departed, the emergency department issued another request, this one to HealthNet Aeromedical Services, another Survival Flight competitor. The HealthNet pilot declined to complete the flight due to atmospheric conditions that fell below weather minimums.

Around 7 AM, the single-engine, turbine-powered, Bell 407 N191SF collided with forested, rising terrain about four miles northeast of Zaleski, Ohio.

The helicopter's last known location at an altitude of 1,528 ft. MSL, traveling at 132 knots on a course of 072°.

The OCS said that about 15 minutes after departure, the helicopter made a turn to the right, then "a sharp left turn," which was immediately followed by a no-tracking alarm.

The wreckage extended about 600 ft. downslope on a heading of about 345°. One main rotor blade had separated from the main rotor hub and was embedded in a tree.

Editor's note: Pilot Jennifer Topper and flight nurses Bradley Haynes and Rachel Cunningham were killed in the crash. TV station WBNS (CBS) reported on May 19, 2020 that the NTSB concluded that the crash was caused by Survival Flight's "inadequate management of safety." The agency said the pilot left without a thorough check of weather conditions before the flight. The NTSB said the helicopter hit two bands of snow showers, reducing visibility and the pilot's sharp left turn was likely to move to an area of better visibility. The NTSB also reported that current and former Survival Flight employees felt pressure from management to take on flights in inclement weather conditions and take flights turned down by other air ambulance services.

Litter Spins 175 times During Rescue of 74 year-old Woman

A 74 year-old woman was flown off Piestewa Peak after she suffered an injury while hiking near Phoenix, Ariz on June 4, 2019. During the hoist operation, the rescue aircraft remained in a stationary hover and the rescued woman spun in the basket for roughly a minute before the spinning subsided and the crew safely delivered her to an ambulance. The litter spun 175 times.

In a press conference following the incident.Phoenix Police Department Aviation Unit chief pilot Paul Apolinar said, "Sometimes, when we bring the helicopter up from the ground, [the basket] will start to spin. We have a line attached to the basket that is supposed to prevent that. Today, it didn't." A Fire Department spokesperson also reported, "The potential for the basket to spin is something that's a known phenomenon in the hoist rescue industry, "It's not something that's inherent to the basket or inherent to the bag. It's just something that occurs every now and then and we train to deal with it."

ICAR Air Rescue Commission President Charley Shimanski conducted an informal telephone interview three months after the incident with members of the Phoenix Fire Department Special Operations Unit. Shimanski was later told that the agency leadership "would not want any documents or presentations created by another agency regarding this incident."

The 74-year-old hiker was treated for dizziness and nausea. Officials said she was treated at a trauma center and listed in stable condition. According to her husband, "Her eyes were all blackened. Her face was black and blue. Her hands and feet were blue. The nurse said 'the blood went all to her head and broke the small vessels in her face.'"

The incident was discussed at the ICAR AirCom meetings in Zakopane, Poland, followed by lengthy discussion about dynamic hoist operations.

HEMS Helicopter Crashes at its Airport, Killing Pilot and Nurse

An A-109 helicopter crashed in foggy conditions near Brainerd, Minn., northwest of Minneapolis on June 28, 2019. Heavy fog existed, but within minimums for an instrument landing.

Paramedic Josh Duda was injured. He later told investigators that the pilot reported foggy conditions on the approach to the airport and that they needed to go around. He then noticed the helicopter spin to the right and hit the ground.

According to the paramedic, the runway surface and lights were visible below a thin fog layer during the approach... He recalled the pilot remarking that the weather conditions were foggy, and they would need to go-around. The main fuselage and tail boom exhibited crushing "consistent with a high velocity vertical descent."

Pilot Tim McDonald and flight nurse Deb Schott were killed in the crash.

Firefighter Injured by Falling Tree under Rotor Wash (July 31, 2019 – Angelo National Forest, California)

Firefighter Edgardo Garay and his engine crew responded to an incident to render medical aid to an injured hiker on July 31, 2019.

While the medevac helicopter was preparing to hoist the patient out, it is believed that the helicopter's rotor wash knocked over a dead tree, striking Firefighter Garay and his partner on the head.

Both engine crewmembers were transported to hospital via helicopter. Firefighter Garay was in the hospital's Intensive Care Unit (ICU) and was treated for a subdural hematoma.

Texting Contributed to fatal Crash

The pilot of a medical helicopter that crashed in Mosby, Mo., on August 26, 2011 had been texting, and that was a contributing factor to the disaster that killed four people, according to NTSB.

The case is the first fatal commercial aircraft accident involving texting. The crash was caused by a tired pilot who skipped preflight safety checks that would have revealed

Police investigate the wreckage of a Survival Flight helicopter that crashed in Vinton County, OH in January, 2019. Three people were killed. (Ohio State Highway Patrol)

the helicopter was low on fuel. After discovering the fuel problem, the pilot decided to continue on the last leg of the flight anyway.

The pilot exchanged 20 personal text messages preceding the helicopter crash, according to the NTSB. The helicopter crashed in a field as the craft was approaching an airport where the pilot planned to refuel. The pilot, a nurse, a paramedic and a patient all died.

The pilot missed several opportunities to see that the helicopter was low on fuel before he began the first leg of the mission. The pilot told the communications center that he was low on fuel, estimating he had enough for 45 minutes of flight instead of the 30 minutes he really had.

When the helicopter crashed, there was no fire. Less than one liter of fuel remained in the craft, which lost power due to "fuel exhaustion."

Pilot Used His Cell Phone While in Flight

A news helicopter pilot who was killed a crash on September 16, 2017 in Lincoln County, N.M., had placed a cell phone call to his car rental company during the accident. Bob Martin was the only person on board the helicopter when it impacted terrain. He was returning to Albuquerque from Roswell, New Mexico, following an assignment in the area.

DRONES – ASSETS AND HAZARDS

Will Smith, MD, Paramedic, FAEMS of Teton County SAR presented on drones and associated issues.

Unmanned Aerial Vehicles (UAV) represent a growing industry and drones are both assets in our SAR world and hazards in our helicopter airspace. UAV development now includes military, commercial, agriculture, natural resources, and medical (AEDs, blood, snake antivenin, medications, telemedicine, and life safety items)

Deconfliction of search and rescue helicopter airspace is a growing issue as more and more drones are a growing number of drone sightings by manned aircraft.

Smith presented information about how Teton County Search and Rescue has Established its UAS program for SAR. This included discussion about:

- Certifying (Regulations)
- Training / Equipping
- What UAV is right?
- Concepts for SAR Operations and Deploying for Mission

A poster warning drone users of the dangers of flying drones near firefighting aircraft. (USDA/Dept. Of Interior)

The FAA regulates UAV's and certifies UAV pilots through Part 107 – (Remote pilot certificate with Small Unmanned Aircraft Systems (UAS).)

Limitations of drones include short battery life, limited flight conditions (Weather, altitude), payload and center of gravity limitations, air space conflicts, and the need for specialized equipment and operators.

TEAMWORK IN HEMS

Larry Koren, David Lujan, Jason Williams of Albuquerque/ Bernalillo County, New Mexico, presented materials on a pilot program to improve air rescue.

Since 2013, Bernalillo County's Sheriff and Fire Departments have conducted joint helicopter search and rescue (SAR) missions within the state of New Mexico.

Over the years, Bernalillo County Sheriff and Fire personnel have gained valuable experience saving people from deadly situations using helicopter assets. The Bernalillo county search and rescue efforts have fostered working relationships with many stakeholders.

In 2017, the University of New Mexico, Department of Emergency Medicine – International Mountain Medicine Center expressed an interest in participating in a pilot project with Bernalillo County's air rescue efforts. A new dynamic partnership emerged.

The Bernalillo County Sheriff's Office expressed an interest in working with UNM's internationally recognized mountain medicine educational institution known as the International Mountain Medicine Center (IMMC). The IMMC solely focuses its efforts on mountain emergency medicine and rescue through education, research, and clinical practice.

The relationship embodies a pure collaboration aimed at achieving:

1. Rescuing people from austere environments while reducing risks for all rescue stakeholders.
2. Providing collaborative lifesaving training to rescue and medical personnel.
3. Enhancing lifesaving rescue capabilities of BCSO, BCFD, UNM School of Medicine stakeholders, and others.

2018 Pilot Project

- Three-month period during peak SAR season. At hanger staffing
- Addition of UNM paramedic or physician technical rescuer

Three goals:

1. Increased staffing
2. Collaborative training
3. Financial analysis

Future Educational Program Development

- Alpine Helicopter Rescue Specialty Course (AHEMS) - Diploma in Mountain Medicine Specialty Course
- Collaborative course instruction by UNM, BCSO, and BCFD
- Local, regional, national, and International outreach opportunities

EMOTIONAL RESCUE/ PSYCHOLOGICAL FIRST AID

Alison Sheets, MD, is the Vice President, ICAR Medical Commission Rocky Mountain Rescue Group in Boulder, Colorado. The focus of Dr. Sheets' presentation was the pertinence of mental health issues and suicide among first responders, and how to address it in rescue.

Epidemiology

- Suicide statistics- first responders (law, fire, ems) with twice the rate of suicide as the general population
- Suicide is now recognized as the leading occupational killer of emergency responders
- Stress injury and PTSD in first responders
  - A Canadian study found high rates of PTSD (24.5%), depression (29.6%) and panic disorder (10.3%) among paramedics.
  - First responders develop these conditions much more than the general population.
- Most people will feel the effects of a stressful event- this is normal
  - Elevated heart rate
  - Tunnel vision
  - Poor memory formation

- Repeated exposure and particular types of exposure tend to be more impactful.
  - Known victims, teammates
  - Children, fatalities
  - Resources overwhelmed, poor leadership, unclear mission
  - Danger, environmental hazards
  - Rescuer tired, emotionally drained, injured
- When stress response continues, physical (neurohormonal) changes occur
  - Increased cortisol
  - Startle response, flashbacks
  - Anxiety
- Longer term symptoms can lead to PTSD
  - Panic
  - Withdrawal from social interactions
  - Depression, suicidality

How do we as rescuers prepare ourselves and our teammates?

- How do we recognize "operational readiness"?
- How do we deal with the stress injured rescuer or patient?
- When do we need to get professional help?
- Does anything really work?

The 5 Principles of Emotional Rescue (Psychological or stress first aid)

- **Safety-** remove from danger, confirm physical safety.
- **Calm-** reduce stimuli, breathing techniques, visual separation.
- **Self-efficacy-** help patient re-establish control, give task.
- **Connection-** involve other team members, friends, family.
- **Hope-** plan for future, follow up/check in, provide mental health resources.

Many teams are incorporating emotional rescue into normal daily operations

- Normalize the language and conversation around stress injuries.
- Foster connection and build resilience.
- Practice psychological first aid in the field.
- De-escalate after stressful missions.
- Check in later, call 2-3 days out.
- Ask at startup of next mission, opt out option.
- Have referral to professional care in place.

Do Interventions work? When to get Professionals Involved?

- Calm, safety, self-efficacy, connection and hope within the team are helpful at any stage and good support systems is the best predictor of recovery.
- Critical incident stress debrief (CISD) - can help but can harm
- Cognitive behavioral therapy (CBT)- helps for stress injury, PTSD
- Eye Movement Desensitization and Reprocessing (EMDR)- effective for PTSD

Further information regarding ICAR and upcoming events, contact
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MRA MedCom

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Medical Officer, Summit County Rescue Group, Breckenridge, CO
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DISINFECTING EQUIPMENT CONTAMINATED WITH BIOHAZARD

Disinfection of equipment with low-absorptive surfaces, such as litters, vacuum splints, blood pressure cuffs

For low level disinfection of equipment, first remove solid debris like dried blood. This can generally be accomplished with mild detergents. Disinfectants do not work against solid debris. After that, any Environmental Protection Agency/Food and Drug Administration approved disinfectant used as directed should suffice when abiding by "wet-time." Disinfectants kill the vast majority of pathogens on surfaces. Some examples used in health care are bleach wipes, Diversey Oxivir 1 Wipes and PDI SuperSani-Cloths®. The active ingredients are usually bleach, quaternary ammonium compounds, isopropyl alcohol, and peroxides.

Use of disinfectants and wet-time:

It is critical to remember that disinfectants must have sufficient wet-time (also called dwell-time or contact-time), during which they are visibly wet on a surface, in order to provide adequate disinfection. Different disinfectants have different wet-times. Manufacturers show the necessary wet-time on the side of the container. This can be a challenge in low humidity environments where disinfection may require multiple applications. For example, if a product gives a short wet-time for some pathogens and a long wet-time for others, such as C. diff (*Clostridium difficile*). If you are simply diluting household sodium-hypochlorite bleach, you can dilute 1:50 in water and use a 2-minute wet-time.

Safety:

- Never mix disinfectants. This can cause toxic fumes.
- Never mix any chemical with bleach.
- Always review the Safety Data Sheet (SDS).
- Wear personal protective gear, such as gloves, as recommended by the disinfectant manufacturer.
- Disinfect in an adequately ventilated area.
- Disinfection of equipment with high-absorptive surfaces, such as clothing, hypothermia bags, and blankets

It is important to remove solid debris as much as is possible. A hot water, full wash cycle with 1:100 household bleach dilution is generally effective. Not all gear can tolerate this method, however; follow manufacturer recommendations. An appropriate laundry disinfectant additive can be used instead of bleach. Most MRA teams do not have their own laundry facilities. Working with your local ambulance or fire department is a good idea as they typically run disinfectant laundry loads.

Life-safety equipment disinfection, such as ropes and helmets

It can be a challenge if you have to disinfect something like a helmet or a rope where you must worry about chemical degradation. You can contact the manufacturer for advice or replace the item.

Letter from the Editor

MRA colleagues,

As we forge ahead in what will surely be a year for the history books, there are two major points that I want to drive forward to close this issue of Meridian.

First and foremost, all teams deserve praise for weathering the coronavirus pandemic while continuing the Mountain Rescue Association mission of "saving lives through rescue and mountain safety education." While businesses across the country closed, the outdoors was open. In the pandemic, nature provided one of few available respites for people who spent increased amounts of time at home and away from their normal routines of socialization and stress relief. Teams across the country were called to action to help climbers, hikers and other adventurers during this time, and at increased risk to themselves and their families. Volunteer search and rescue often does not carry a risk to the loved ones of rescuers, but this year, those we care about most were exposed to additional hazards from the critical service that we provide.

Across the country, MRA teams found ways to adapt to new restrictions of training and operations and kept their promise to the public to help in wilderness emergencies. Some volunteers took on additional duties of helping local health departments with contact tracing efforts to curb the spread of COVID-19 in their communities. The increased risks and sacrifices of time and sweat made by volunteers are rarely front and center, but rest assured that your efforts have kept your communities safe during a trying time.

The second point I want to press is the new leadership and staff for Meridian. Earlier this year, the MRA put out a call for editors to assist with writing content as well as sponsorships. This summer, a small corps of volunteer writers met via video conference to discuss goals and expectations for the publication. I was selected to head up this troupe as Lead Editor. As we move forward, you can expect to see more articles in Meridian about the achievements of MRA teams across the country. It is our goal to share the experiences of MRA teams in their efforts in alpine rescue, search and rescue, and other endeavors for your enjoyment as well as your education. The MRA contains a wealth of experience that can provide incalculable benefits in their publication for team members to read about. We are proud and excited to bring these stories to you.

Team leaders, if you have an epic mission, breakthrough in training, research development, or any other story involving your team or members that you feel deserves to be highlighted and could provide benefits to your fellow teams, do not hesitate to bring it to our attention. I will also be in touch with regional chairs to learn more about their groups and the stories they have to tell.

I am excited for this new chapter of Meridian, and to continue service with the Mountain Rescue Association. It is an honor and a pleasure to be part of this organization, and to tell the stories of its teams.

Best,

Rick Lindfors-Ackerman
Meridian Lead Editor
Eugene Mountain Rescue
Pacific Northwest Search Dogs

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