

The Paradigm Shift in Search and Rescue Response During the COVID-19 Pandemic in California

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Abstract

On March 4, a State of Emergency was declared followed on March 19, when the Governor of California issued mandatory stay-at-home orders. Prior to the state mandate on March 16, the San Francisco Bay Area counties issued their own more stringent orders to shelter in place and shut down many businesses. However, the orders exempted essential services including search and rescue. The dilemma...how to provide search and rescue services to the communities we serve and still protect the mostly volunteer search and rescue personnel? This paper discusses how one search and rescue team along with the search and rescue community of the San Francisco Bay area responded to the new paradigm shift, the challenges and changes implemented to respond to a missing person incident, the results of a survey to determine how teams had modified response, and an example of response guidelines during COVID-19.

KEY WORDS: *COVID-19, Shelter in Place, Social Distancing, PPE,*

Introduction

Search and rescue (SAR) services in the state of California are managed by each County with the majority under the Office of the Sheriff. In the San Francisco Bay Area, which include Silicon Valley there are not only volunteer SAR teams in each county, but also specialized resources like dog and mountain rescue teams. The SAR team mostly operates within the county but can be called out for mutual aid (MA) to other counties in California. Additionally, there is an organization called the Bay Area Search and Rescue Council (Young & Cooke, 1995) which was formed to promote and provide a platform for the exchange of ideas, information and training between those organizations providing emergency services to the public in the event of a disaster, catastrophe, or search and rescue within the San Francisco bay area. BASARC was formed in 1990 after a long and protracted missing person search which included resources from every county in the Bay Area including some state and federal resources. The after-action review of that search resulted in the formation of the Council which has been meeting every other month for the past 30 years. In those meetings representatives from each of the nine bay area county SAR teams, local, state and federal parks and State of California specializes

mountain rescue and dog organizations (totally representing about 800 members, come together to discuss training and lessons learned from the previous two months incidents.

The May 2, 2020 meeting was no exception. Within each of the organizations, they were challenged to comply with the restrictions and complicated orders issued to protect the general public and those in emergency services during this COVID-19 pandemic.

This article will site as a baseline, the response to the COVID-19 based on documents prepared by one SAR Team and include additional practices implemented by most of the BASARC teams

Historic Timeline and Literature Review

The World Health Organization (WHO) first reported a cluster of cases of pneumonia in Wuhan, Hubei Province on December 31, 2019. By the end of January 2020, WHO identified the novel coronavirus as COVID-19 and declared public health emergency outbreak. By mid-March the COVID-19 was declared a pandemic (World Health Organization, 2020). The Centers for Disease Control and Prevention (CDC) prepared and issued guidelines starting in mid-February and has continued to issue new and updated guidelines (Centers for Disease Control and Prevention, 2020).

The State of California Response:

The first confirmed case of COVID-19 occurred in late January. On March 4, Governor Gavin Newsom issued a Proclamation of a State of Emergency then on March 19, he issued an Executive Order of the Governor (N-33-20) (State of California, 2020). To summarize N-33-20 was issued to “preserve the public health and safety, and to ensure the healthcare delivery system is capable of serving all, and prioritizing those at the highest risk and vulnerability, all residents are directed to immediately heed the current State public health directives”...and that “all individuals living in the State of California [are] to stay home or at their place of residence except as needed to maintain continuity of operations of the federal critical infrastructure sectors”.

San Francisco Bay Area Counties Response:

Just prior to the Governor issuing Order N-33-20, the Bay Area counties Health Services issued their more specific orders (San Francisco Health Services, 2020). The highlights:

- People shall self-isolate in their places of residence
- All public and private gatherings of any number of people occurring outside a household or living unit are prohibited
- All travel is prohibited
- Exemptions – all first responders, emergency management personnel, emergency

dispatchers, court personnel, and law enforcement personnel, and others who need to perform essential services are categorically exempt from this Order

Bay Area SAR Team response

Most SAR teams in the Bay Area fall under the Volunteer Services of the Emergency Services Division (ESD) and are currently made up of hundreds of members. The demographics of the teams range from high school aged cadets to those in their 70s and like all volunteer SAR, members are passionate and dedicated to service “so that others may live”. op

The chain of command starts with the volunteer Captain, lieutenants and sergeants who manage the day-to-day activities, training and preparation for searches and other duties as assigned. The volunteer Captain reports to a full-time Sargant who reports up to a Lieutenant and Captain of the ESD. SAR missions are managed using the Incident Command System (ICS), where the incident commander (IC) would be the lead representative from the agency having jurisdiction (AHJ). The rest of the management of the incident would be filling the positions of the deputy IC (the “Search Manager”), Plans, Operations and Logistics Section Chiefs filled by members trained in search management and the Intelligence/Investigations Section Chief filled by both the AHJ and/or SAR members trained in Investigations and Interviewing.

The BASARC teams responded in last few years to sift through the ashes looking for remains in the aftermath of the major fires that spread swiftly in Northern California. Although a daunting task, there were protocols and procedures in place to manage these tasks. However, as the rapid spread of COVID-19 hit the San Francisco Bay area and Orders issued by health and governmental agencies, it became apparent that nobody was prepared for how SAR services would be impacted. There was no time to prepare manuals to deal with a pandemic.

Day to day activities and responding to missing person incident all require SAR personnel working side by side. So, the first order from the sheriff department was that all volunteers need to follow the County Orders and shelter in place so that no volunteer should be placed at risk to contracting the disease. This went along with those who hold full-time jobs and were also directed by their employers to shelter in place. In addition, all schools were closed, which placed an additional burden on parents to stay at home to provide childcare.

Further the departments clarified that until further notice, SAR teams:

- Cannot have in person training or meetings
- Cannot meet in smaller groups
- Would be able to respond to a search for a missing person within County
- Would be able to provide mutual aid for a search outside the county on a case by case basis

At the same time both the County Health Department, and the Sheriff's Office of Emergency Services activated their respective Emergency Operations Centers (EOC). With the activation of EOC's, it was apparent that there weren't enough paid personnel to handle the volume of activities. A decision was made to bring in a limited number of volunteer SAR members to help. Before anyone could enter the EOC they were required to fill out and sign a form with their name, employee/badge number and answer the following questions:

- "Have you been in contact with someone who has been exposed to COVID-19, AKA: Coronavirus in the last 14 days? Yes No
- Have you returned from or been in contact with someone who has travelled internationally in the last 14 days? Yes No
- Have you experienced fever in the last 72 hours? Yes No
- Have you experienced any symptoms such as coughing, difficult breathing, sore throat or general weakness in the last seven days? Yes No

If "Yes" is answered to any of the above questions, you may be sent home. Please advise the front desk and refrain from entering the EOC until screened by staff."

In addition, they must have their temperature taken. If there is indication of a fever, they will be sent home.

Method

Part one – Literature review:

The guidelines published by the CDC were used as the basis to prepare new protocols:

What Law Enforcement Personnel Need to Know about Coronavirus Disease 2019 (COVID-19)

(National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Disease, 2020)

This included a brief description of the disease, the protocols to protect from exposure including social distancing, washing of hands and recommended personal protective equipment (PPE).

People Who Are at Higher Risk for Severe Illness

(National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases, 2020)

Those most vulnerable primarily include people 65 and older and those with underlying medical conditions if not well-controlled.

How to Protect Yourself & Others

(National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases, 2020)

Noted that there is currently no vaccine to prevent COVID-19 therefore the best way to prevent illness is to avoid being exposed to the virus. This includes:

- Washing of hands and the use of hand sanitizers,
- Avoid touching eyes nose and mouth,
- Avoid close contact people who are sick,
- Put distance between yourself and other people outside the home,
- Cover your mouth and nose,
- Cover coughs and sneezes,
- Clean and disinfect frequently touched surfaces

Part two – Questions to consider in preparing for the paradigm shift in protocols for SAR:

All the BASARC teams prepared and executed protocols independently. A set of survey questions was prepared and distributed by the BASARC Chairman Chris Young as part of the agenda for the meeting of May 2.

- How has your team retooled to respond to missing person incidents during the COVID-19 shelter in place orders?
- Explain how teams are managing to continue with online training during SAR-questering.
- How are the teams keeping their members engaged?
- And lastly, what are the plans and changes moving forward after the shelter in place orders are lifted?

This BASARC meeting was conducted online with at least one attendee who could speak for each team. Of the with 30 participants who called into the meeting 7 SAR teams were represented. There were a set of protocols and SAR Mission Safety Guidelines developed by one Bay Area team was used as a baseline for the discussion of each question followed by input from others. (National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Disease, 2020) (National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases, 2020) (National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases, 2020) The collection and analysis of the survey was done by Chris Young during the meeting.

Results

A paradigm shift is defined as important changes that happen when the usual way of thinking about or doing something is swapped by a new and different way (Merriam-Webster, 2020)

All teams agreed that their mission had not changed. We still need to respond to missing person incidents. How we respond had certainly changed.

How has your team retooled to respond to missing person incidents during the COVID-19 shelter in place orders?

Each team started with the basic CDC recommendation for shelter in place (SIP) and social distancing. Those who are at higher risk for severe illness must not respond. The following is one SAR Team Member Mission Safety Guidelines developed internally which covers everything from Callout to Sign-out:

SAR Mission Safety Guidelines (Eichinger, Reserve Capt., 2020)

The below notes are meant to be a guideline for future search missions during the current pandemic. As each mission is unique and dynamic, best practices will be determined by the Search Manager, SAR Liaison, and Agency IC

- **Mission Review** – OES Staff has reviewed the mission and determined that it is an appropriate one for SAR Team including COVID-19 precautions
 - Primary Search Managers and designated team members will carry in their vehicle a Hygiene Kit to serve the initial responding searchers before the [logistics] LOGS Van arrives. This kit will contain hand sanitizer, gloves, Lysol wipes, and a temporal thermometer.

- **Team Member Self-Assessment** – after a team member receives a callout message, they will conduct a self-assessment to determine they are good to participant using this checklist:
 - Is the mission right for me based on the latest CDC Guidelines? Do my loved ones believe it is right for me?
 - Am I in good health? Have I experienced any symptoms such as ongoing cough, sneeze, sore throat, general weakness, congestion, difficulty breathing, in the last 7 days?
 - Have I experience a fever in the last 72 hours? Is my current temperature under 100.4 degrees?
 - Have I been in contact with someone who has been exposed to COVID-19 in the last 14 days?
 - Have I returned from or been in contact with anyone who has travelled internationally in the last 14 days?
 - Have I travelled to a current COVID-19 Hotspot in the last 14 days?

- **“Work from Home” Mission Help**
 - Hasty Squad Members who are confident in MP Flyer Production or Map Production and Segmenting (SARTopo, Avenza Maps®), can asap indicate via SLACK and Hasty Email that they will take the lead in assisting the search mission from their home.

- **OES Mission Vehicle Pick up**
 - Hasty Squad Members who are able to travel to OES to pick up mission vehicles (LOGS Van, [Mountain Rescue Group] MRG or [Urban Search and Rescue] USAR, Porta-potties, etc. are to indicate so asap via SLACK. They are to include their name and eta to ICP.

- **ICP Set Up**
 - **Full Team ICP** - the guidelines to follow are targeted for a Full Team ICP. For Hasty Squad missions, we will use similar guidelines, but scaled back according to the smaller ICP set up.
 - **Safety Officer** – a team member will be assigned as Safety / Health Officer to oversee our Mission Safety Guidelines. In addition to the normal duties during a search mission, the Safety Officer will have these duties;
 - Ensure that a Sanitation Station is set up
 - Ensure that team members wear a face mask / covering
 - Ensure that a Temperature Check and Health Screening Questionnaire are completed for each team member
 - Ensure that proper social distancing is maintained as best as possible through search operations.
 - Assist in ensuring the remaining Mission Safety Guidelines are completed.
 - **Sign-In Table** and Searcher Staging area will maintain social distancing.

- **When you arrive at ICP;**
 - Team members who arrive at ICP and park in the designated parking area, must complete the following 4 items before heading to Sign-in Table;
 - As you leave your vehicle with your gear, ensure that you are **wearing a face mask or face covering**. Do so throughout the search mission. A limited supply of masks may be available to issue as well.
 - Head to the Sanitation Station and **wash and/or sanitize your hands**. Do so again frequently throughout search operations including anytime you return from the field.
 - Complete a **Temporal Temperature Check** - the designated Safety Officer for the search will take your temperature using Temporal Thermometer and record it. A team member with a temperature of 100.4 degrees or more may not participate in the mission.

- Complete a **Health Questionnaire Form** – the Safety Officer will complete a Health Screening Questionnaire with each team member. Any items marked with a “yes” will confidentially be reviewed by the SAR Liaison.
- **ICP Guidelines**
 - **ICP gathering** - we wish to limit the number of team members within the ICP to avoid gathering / grouping. ICP staff will as best as possible maintain social distancing. Briefings will be made in small team member units and/or over speaker.
 - **ICP areas** - PLOPS, OPS, Plans, Debrief, Download, Radio Issue, Medical, etc. will maintain social distancing both in spacing and limit two team members per function.
 - **Wipe down** - Field Radios will be wiped down before and after issue using a sanitizing sheet. Other commonly touched surfaces through ICP (ex: keyboards) will also be wiped down before and after use. A **micro disinfectant sheet dispenser** will be centrally placed within ICP for team member use.
- **Field Assignments**
 - **Interviews** – our first preference for Intel Interviews with the MP family or RP will be made over the phone or Video Conferencing. If this is not feasible due to the dynamic of the search mission then we wish the interview to be conducted at ICP under controlled conditions. If this is not possible then we would conduct the interview outside the RP residence in open air with proper spacing like a porch, patio, or near-by park bench.
 - **Residence Search** – a search of the interior of the MP residence will be conducted only if it is critical to the mission. Team members entering the residence will be gloved and masked and limited to 2 members using social distancing.
 - **Ground Teams** – ground pounders will use proper social distancing. Ground teams are asked to re-wash their hands before entering ICP for rehab, debrief, and re-assignment.
 - **Driving Assignments** – we wish to have single person driving assignments with frequent check-ins. If available, a second single occupant driver will follow to work a driving assignment together.
 - **Transports** – if a field assignment requires transport, it is preferable that each team member individually self-transport. The 15 Passenger Van can be used, but with a 4-person limit (including the driver) with social distancing.

- **Missing Subject Located**
 - When a missing subject is located the find-team will maintain proper social distancing and notify ICP. Voice commands will be used in effort to determine the subject's [level of consciousness] LOC, [airway, breathing, circulation] ABC, and condition. [Evaluate environment, number of patients, additional resources, mechanism of injury, extrication, spinal] ENAMES.
 - If no urgent or exigent medical condition is found, then the find-team will maintain verbal contact but maintain social distance. The Agency IC will recover the MP.
 - If a medical condition is suspected, then the priority preference would be to allow local Fire Rescue to provide the needed medical care before SAR members go hands-on with proper PPE.

- **Check Out**
 - Team members are asked to wash their hands before leaving for home.
 - Used gloves, masks, micro sheets, etc. will be disposed in a red bio trash bag.
 - Team members to consider changing out of uniform / boots and into different clothing before getting back into auto to head home. “

When considering the selection of the incident command post (ICP) location it is requested of the AHJ that it include restrooms with hot water sinks. Planning to go for a second call out within the team or calling for MA the ICP needs to be large enough to accommodate for social distancing (e.g. schools, places of worship, large public parking lots are ideal for this purpose)

Designated team members (who usually arrive first on scene for search missions) will carry in their vehicle a small sanitation kit containing hand sanitizer, Lysol™ spray, sanitizer wipes, temporal thermometer, gloves, face masks and team paperwork (See Figure 1)

- All teams have shifted to online trainings using conferencing platforms like Zoom, Webinar or Google Meet either under personal or team accounts. Some are taking advantage of the breakout rooms on the Zoom platform. Subjects include:
 - o Frequent focus sessions on navigation, phone apps, GPS, SARTopo, search management, mountain rescue, psychological first aid
 - o Helpful tips, training, resources for COVID-19 pandemic.
- Team members are encouraged to send out links via internal emails, social media or group chat platforms about free online SAR related trainings.
- Classes that were underway like Emergency Medical Responder completed the lectures portion. Videos were produced showing the skills demonstration done properly so student can practice on their own. The final written and skills testing will be completed upon lifting of the SIP. It was also noted that the American Red Cross has extended the expiration dates of current certifications until such time as SIP is lifted

How are the teams keeping their members engaged?

- All Teams recognized the need to keep their members engaged during the SIP and it is difficult to maintain comradery and a sense of community. Communication is the key. Some of the methods used:
 - o Frequent team updates via Captain's Note Team Email
 - o Everyone has been affected differently during the SIP. So some teams have initiated welfare checks – like the old “phone trees” team members calling team members just to say hello and see how they are fairing
 - o Team wide puzzles, quizzes, top ten lists, trivia
 - o SAR Book Club – weekly Zoom chat on SAR related books
 - o Team Wide Food Drive that members can rally behind – one team's efforts resulted in 70 cars stopping by that filled 6 barrels, \$2700 in cash, which equalled over 12,000 meals.
 - o Team Member Concerts – each Friday night has been live SAR concert with up to 45-50 team members watching online
- Many teams have the monthly or bi-monthly trainings online and have noted that participation is in the high 80% of the full team membership
- Interestingly, all teams are still recruiting with online orientations. Others are completing academies and first-aid trainings as far as they can go online. It is expected that they will complete the in-person training once the SIP is lifted

What are the plans and changes moving forward after the shelter in place orders are lifted?

- For All team their Sheriff's departments have not given SAR any indication or insight to future dates or guidelines about a re-start. They are too busy with the pandemic

- Training staff are making plans for future trainings with groups of 30 and less. Examples:
 - o Mock Search – would have an ICP with 30 and less, Division A, B, and C with all less than 30 and still conduct a Mock Search.
 - o Also, we are looking to conduct several two hour trainings for groups of 30 or less and have an online sign up for specific time periods. For example, one DSAR training for a Saturday Group 1 (0800-1000), Group 2 (1030-1230) and Group 3 (1300-1500) with 30 in each group we can train up to 90.
 - All the SAR teams will continue with online trainings and it will be a slow start for in person trainings with perhaps more outdoor venues for map and compass/GPS or conditioning hikes with other field exercises.
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Discussion

Discussion of the responses to the original agenda questions

One of the missions of BASARC is to provide a forum for the exchange of ideas. In the response to the questions it was easy to see that all the teams in the Bay Area had come up with the same solutions with a few variables that may have been unique to their own organization. It is therefore easy to speculate that the majority of those involved in SAR with the same restrictions enforced in their jurisdiction have come up with the same solutions. Those in more rural areas may not need to be as restrictive.

Safety has always been the number one priority in SAR. The COVID-19 pandemic created new obstacles to preserving searcher safety. The implementation of some of the solutions found in the survey have yet to be tested during a real-life missing person incident. Time will tell and it is expected that other unique solutions present themselves to questions no one has thought about at this time

SAR is all about people working together. When we can't get together it's hard to stay enthusiastic and engaged. Communication amongst team members has evolved to embrace solutions often found in the business world. Training has shifted to online solutions using cloud-based conferencing tools like Zoom and GoToMeeting and it is expected this trend will continue long after the SIP orders are lifted. Some of the solutions to keep team members engaged have been very creative, humorous and even educational.

Other discussions from the BASARC meeting of May 2:

At the end of every BASARC meeting there is a discussion of lessons learned from MA and individual SAR team missions since the previous meeting. During this meeting there were six incidents. Most resolved early while ramping up resources. However, there were a few points related to COVID-19:

- One team search for an elderly walkaway had the added complication that his spouse was at home with COVID-19. Fortunately, the missing subject was found before the need to expose team members.
- Some team’s express concerns about “optics”. Optics is the public’s perception that team members on a search mission are not following the County orders and calling to complain to the Sheriff’s Department.
- Another team noted that during two missing person incidents, they were surprised to see local fire department and additional LE personnel arrive on scene to assist. Additionally, both fire and LE launched drones. Although we have used fire and LE as ground force multipliers, it was unusual to have close multiple agencies involved in UAV support and the management of the missing person incident. This created a unified command system with LE continuing as the unified command IC.

Additional thoughts on managing a missing person incident

Since the meeting there have been some offline discussions on the management of a missing person incident. One team has decided to limit their initial call out to 20 volunteers. The rationale still follows the safety criteria to limit exposure and still have enough personnel to evaluate the situation and make recommendations on further callout for resources. The assignment distribution will be as follows (Figure 2: Revised assignments and standard required personnel to perform) (Eichinger, Reserve Capt., 2020):

ASSIGNMENT	PERSONNEL
Unified command IC (Fire, LE, Drone)	LE
Search manager	1
Plans, Logistic, Operations, (PLOP)	1
Intelligence/investigations - interview team to talk to the reporting parties or family members,	2
Secure the point last seen (vehicle, house, campsite, trail entry)	LE
Full Time Safety COVID-19 officer	1
If it’s an urban search assign teams to search the residence,	LE
Start trail searches (linear assignments) or	2-3
Road patrols,	4-1/car in pairs
Started trailing dog	1- handler 1- flanker dog
IT/logs/flyer/computers (in log van one arrives)	1
On scene radio dispatch include Meister	1
Standby member	1
Total	20

Figure 2: Revised assignments and standard required personnel to perform

Another search planning tactic currently being used by a few of the teams in the San Francisco Bay area is the virtual search management model. Management personnel are staying home and using search management software like SARTopo to write assignments, mark-up and attached maps all while ground team members are in route. Once on scene team assignments and maps are downloaded to mobile phones using applications like Avenza Map.

Other paradigm shift considerations:

- A Type III search assignment in a straight-line grid – searchers can be no closer together than 6 foot and must be wearing PPE.
- Safety officer – Although the safety officer's function is well defined in ICS (e.g. checking ropes and anchors before allowing personnel to go over the cliff), this new responsibility is not well defined. Policing and enforcing the Mission Safety Guidelines will require training. The safety officer will need to be more vigilant, make sure personnel do not inadvertently bypass check-in, forget to don their PPE or practice social distancing.
- Single driver safety – needs to be extra vigilant to prevent accidents on urban roads. Follow car needs to maintain extra reaction time distance. It was also suggested to mark POVs with magnetic signs or other markings denoting SAR personnel.
- When transporting teams to their assignments using a 16 passenger van the maximum number of people, including the driver, should be 4 in order to maintain social distancing. Considerations may be made to add additional personnel if the length of time in the vehicle is short.
- Virtual search management considerations – although SARTopo can be used off-line, if used virtually it will need some sort connectivity to download assignments and maps to be printed or uploaded to Avenza. Users may need to stop to download before cell coverage drops off.

Limitations

This paper represents one SAR team's look at the paradigm shift in the beginning of the COVID-19 pandemic with additional input from other teams around the San Francisco Bay Area.

Conclusion

The overall mission of SAR is to serve the community and be ready at any time to search for missing persons. One of the key goals has always been safety of our personnel. No one anticipated the changes needed to manage a missing person incident or to maintain the training levels necessary to accomplish the mission. This article represents the paradigm shift of the SAR team of the San Francisco Bay Area to the COVID-19 pandemic and the specific changes that were made along with best practices discussed.

As of this writing the SIP and social distancing orders have not changed. There's no idea when it will be lifted. It is anticipated that it will be a gradual lifting which could take months. It is obvious that nothing will be the same until such time as a vaccine is developed for the COVID-19 which again is anticipated to take months.

Future research and surveys of the best practices will need to be conducted over the next several months. Then at some future point in time perhaps 2 to 3 years a look back will need to be made to determine if the adjustments and best practices were necessary. It is hoped that none of us will have to go through a pandemic such as this that generated so much change in our day-to-day activities.

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About the author

Christopher S Young has been active in Search and Rescue since 1981, managed searches since 1986, is the past reserve Captain for the Contra Costa County Sheriff's Search and Rescue Team and serves as chairman of the Bay Area Search and Rescue Council, Inc. (BASARC). Chris is a retired Instructor for the POST "Direction and Control of the Search Function Course" for the State of California Office of Emergency Service for 25 years, is currently an Instructor Trainer for the "Managing the Lost Person Incident" and "Urban Search Management" (developed by Chris) for the National Association for Search and Rescue (NASAR), he is also an Instructor Trainer in Emergency Medical Response and first aid for the American Red Cross since 1972, as well as specialized topics in Search Management, including Search Management in the Urban Environment, and Investigation and Interviewing in SAR. Chris has also written, published and presented search management papers at the National Association for Search and Rescue conferences, the Canadian National Search and Rescue Secretariat SARSCENE conferences, the William Syrotuck Symposiums on Search Theory and Practice, the Canadian Coast Guard College, the Provincial Sûreté Du Québec Police, the Ontario Provincial Police, the New Zealand National SAR Conference, the Icelandic International Search and Rescue Conference, Norwegian Frivillige Organisasjoners Redningsfaglige Forum (FORF) Seminar and several State Search and Rescue conferences. He is also co-author of the book "**Urban Search – Managing Missing Person Searches in the Urban Environment**", published 2007 by dbS Publications as well as a contributing author on several other books for search and rescue. Additionally, Chris is a Level 1

law enforcement reserve with the Sheriff's Dept and the City of Danville and is an EMT 1 Instructor. Chris holds a Master of Science Degree in Construction Management and works as a Senior Project Manager for a large general contractor based in San Francisco and is responsible for overall management of multi-million dollar ground up commercial, high rise, hospital, educational and hotel projects.

Abbreviations

2019-nCoV	Coronavirus Disease 2019
ABC	Airway, Breathing and Circulation
AHJ	Agency Having Jurisdiction
BASARC	Bay Area Search and Rescue Council
CDC	Centers for Disease Control
COVID-19	Coronavirus Disease 2019
EOC	Emergency Operations Center
ENAMES	Environment, Number of patients, Additional resources, Mechanism of injury, Extrication, Spinal precautions
ESD	Emergency Services Division
GAR	Green Amber Red
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
LE	Law Enforcement
LOC	Level of Consciousness
LOGS Van	Logistics Van
MA	Mutual Aid
MRG	Mountain Rescue Group
OES	Office of Emergency Services
ORMA	Operational Risk Management
PLOPS	Plans, Logistics, Operations
POV	Personal Owned Vehicle
PPE	Personal Protective Equipment
SAR	Search and Rescue
SARS	Severe Acute Respiratory Syndrome
USAR	Urban Search and Rescue
WHO	World Health Organization's

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