

A Pilot Project for the Operational use of UAVs in Search and Rescue

Proposal to BCSARA, February 3, 2014

Michael Coyle, Coquitlam Search and Rescue

Copyright

Page 002 of 160

Withheld pursuant to/removed as

Copyright

Copyright

Page 004 of 160

Withheld pursuant to/removed as

Copyright

FW: Unmanned Aerial Vehicle program

From: Cunningns, Ian JAG:EX <Ian.Cunningns@gov.bc.ca>, Cunningns, Ian EMBC:EX <Ian.Cunningns@gov.bc.ca>
To: Morrison, Andrew JAG:EX <Andrew.Morrison@gov.bc.ca>, Morrison, Andrew EMBC:EX <Andrew.Morrison@gov.bc.ca>
Sent: March 4, 2015 9:40:42 AM PST
Attachments: ATT00001.jpg, Approved UAV Program Update Broadcast_1_1.pdf

Ian Cunningns

Senior Regional Manager, Southwest Region

Emergency Management British Columbia

14292 Green Timbers Way

Surrey, BC V3T OJ4

CANADA

www.embc.gov.bc.ca

Ph 604.586.4386 Fax 604.586.4334 Cell 604.785.7669

24 Hour Emergency Reporting 1.800.663.3456

This transmission may contain confidential or privileged communication. Any unauthorized distribution, copying, or disclosure is strictly prohibited. Please notify the South West Region Office/sender of any transmission received in error by immediately replying to the sender, and destroy all copies.

From: Colin KENT [mailto:Colin.KENT@rcmp-grc.gc.ca]

Sent: Tuesday, February 24, 2015 12:39

To: Cunningns, Ian JAG:EX

Subject: RE: Unmanned Aerial Vehicle program

Here you go!

Colin

>>> "Cunningns, Ian JAG:EX" <Ian.Cunningns@gov.bc.ca> 2015/02/23 2:54 PM >>>

Thanks Colin, sorry for the delay in getting back to you. Could you send me a copy of the bulletin?

Ian Cunningns

Senior Regional Manager, Southwest Region

Emergency Management British Columbia

14292 Green Timbers Way

Surrey, BC V3T OJ4

CANADA

www.embc.gov.bc.ca

Ph 604.586.4386 Fax 604.586.4334 Cell 604.785.7669

24 Hour Emergency Reporting 1.800.663.3456

This transmission may contain confidential or privileged communication. Any unauthorized distribution, copying, or disclosure is strictly prohibited. Please notify the South West Region Office/sender of any transmission received in error by immediately replying to the sender, and destroy all copies.

From: Colin KENT [mailto:Colin.KENT@rcmp-grc.gc.ca]

Sent: Monday, February 23, 2015 14:07

To: Cunningns, Ian JAG:EX

Subject: Fwd: Unmanned Aerial Vehicle program

Ian - The RCMP has just published a bulletin with respect to UAV's.

So we are good. Thanks.

Colin

>>> Colin KENT 2015/02/23 12:59 PM >>>

Hi Ian - Following up on my previous e mail. Hopefully you are able to shed some light on the use of UAV's.

Regards,

Colin

(C.KENT) Cst.

Rural Section- Marine Ops

Serving Anmore, Belcarra, Indian Arm and Pitt Lake

Office 604-945-1584.

Cell s.16

>>> Colin KENT 2015/02/03 12:09 PM >>>

Hi Ian - I trust all is well!

The attached mail from Mike COYLE Coquitlam SAR refers. I have run this by Insp. MASSIE, the OIC Ops/Support. Insp.

MASSIE is of the understanding that the use of UAV's, by SAR has not been approved by the Province.

Any chance you can shed some light on this for me?

Colin

(C.KENT) Cst.

Rural Section- Marine Ops

Serving Anmore, Belcarra, Indian Arm and Pitt Lake

Office 604-945-1584.

Cell s.16

>>> "Coyle, Michael" <michael.coyle@coquitlam-sar.bc.ca> 2015/01/27 10:19 AM >>>

Hi Colin;

Copyright

Page 007 of 160

Withheld pursuant to/removed as

Copyright



To: All Members "E" Division
From: Criminal Operations Branch

"E" DIVISION BROADCAST

Unmanned Air Vehicle (UAV) Program Update

Copyright

Norm LIPINSKI
Assistant Commissioner
OIC CROPS – CORE
RCMP, "E" Division

2015CP-0173
February 18, 2015

For Review - DRAFT - BN - UAV pilot for GSAR

From: Morrison, Andrew EMBC:EX <Andrew.Morrison@gov.bc.ca>
To: Mohrmann, Ralph JAG:EX <Ralph.Mohrmann@gov.bc.ca>, Duffy, Chris D JAG:EX <Chris.Duffy@gov.bc.ca>, Cunnings, Ian EMBC:EX <Ian.Cunnings@gov.bc.ca>
Sent: April 16, 2015 2:04:14 PM PDT
Attachments: image001.png, DRAFT - BN - UAV pilot for GSAR.docx

Hi All

In response to Coquitlam SAR proposal for a UAV pilot project, this morning I had a quick call with the RCMP (Ron Casey) and BCSARA (Colin) to discuss the proposal. Both RCMP and BCSARA are supportive of a pilot project and if the decision is made to support the Coquitlam SAR proposal, BCSARA is willing to withdraw their proposal/recommendation.

I spent a few minutes this morning and have drafted a BN for our discussion. Any suggestions welcomed.

Thanks

Andrew

Andrew Morrison

Search and Rescue Specialist



Emergency
ManagementBC

14292 Green Timbers Way

Surrey, BC V3T OJ4

CANADA

www.embc.gov.bc.ca

Phone 604.586.4380

Fax 604.586.4334

24 Hour Emergency Reporting 1.800.663.3456

**MINISTRY OF JUSTICE
Emergency Management BC
BRIEFING NOTE**

PURPOSE: For DECISION by [Fill in name and title.]

ISSUE: Unmanned Aerial Vehicle (UAV) use in Ground Search and Rescue in BC.

DECISION REQUIRED/ RECOMMENDATION:

The decision required is to determine if and the extent EMBC could support a pilot project to determine the use (including liability and funding) of UAV in Ground Search and Rescue.

SUMMARY:

- There is an increased interest in UAV growing within the Ground Search and Rescue Community.
- EMBC has currently received 2 proposals (1 through BCSARA from Coquitlam SAR member and 1 Coquitlam SAR directly).
- Our current understanding (To be confirmed with Transport Canada) is that UAV use with SAR would be considered a commercial use and subject to a number of federal regulations.

BACKGROUND:

The commercial use of UAV has increased in the last number of years including in BC including aerial photos of traffic accidents (RCMP). There has also been a case in Saskatchewan where the RCMP used a UAV fitted with FLIR camera to locate a subject that walked into the wilderness following a motor vehicle accident. This case has been presented to a number of groups and has furthered the idea that UAV could have a benefit to a Search and Rescue operation.

s.13

April 29, 2014 EMBC received a recommendation for a UAV Pilot Project. Various informal discussions took place over the fall of 2014.

January 2015, EMBC responded to BCSARA with a request for prioritization of this recommendation. It was hoped that Ontario Police would have been approved for a project under the NSS NIF program however that project was not approved.

April 6, 2015, EMBC received a formal proposal from Coquitlam SAR for a 1 year pilot project which included responses to a number of questions previously posed including scope, standard operating procedures, insurance coverage and support from the requesting agency (RCMP).

OPTIONS:

- s.13

- Support the Coquitlam SAR proposal of a 1 year pilot to determine the need for UAV in Search and Rescue.
 - Risk – limited within the scope of the pilot.
 - Beyond the pilot, possible financial and liability considerations.
 - Limited data from pilot (one region, one terrain type).
 - Benefit – Operator willing to donate services for the period of the pilot, limited scope, limited workload to establish and oversee.
 - This is the recommended option.
- s.13

OTHER MINISTRIES IMPACTED/CONSULTED:

- RCMP – Consulted and supportive of a pilot project
- BC Search and Rescue Association – Consulted and supportive of a pilot project.
- Transport Canada – not consulted. Consultation required to confirm that Canadian Air Regulations (CARs) would be met within a pilot project.

DECISION APPROVED / NOT APPROVED

DATE:

[Name]
[Title]

[Name]
[Title]

Prepared by:
[Name]
[Title]
[Branch]
[Phone Number]

Approved by:
[Name]
[Title]
[Branch]
[Phone Number]

Attachment(s)
[As referenced in the Note.]

Proposal to Pilot a Search and Rescue UAV Project

From: Hobler, Alan ENV:EX <Alan.Hobler@gov.bc.ca>
To: Morrison, Andrew TRAN:EX <Andrew.Morrison@gov.bc.ca>, Newton, Steve TRAN:EX <steve.newton@gov.bc.ca>, Morrison, Andrew EMBC:EX <Andrew.Morrison@gov.bc.ca>
Cc: KSAR EX AI Mole <allan_mole@golder.com>
Sent: March 13, 2016 10:10:02 PM PDT
Attachments: Kamloops SAR - Hummingbird UAV Proposal.docx, UAV Proposal Cover Letter.docx

Hello Andrew.

Kamloops SAR is quite excited about initiating a pilot project for UAVs. As you may be aware we have done some initial trials with encouraging results. Please review the attached cover letter and proposal for details.

Alan

Alan Hobler

President / SAR Manager

Kamloops Search and Rescue

Mobile: s.22

Proposal to EMBC for the integration of UAV technology and services into operations conducted by Kamloops Search and Rescue



Emergency
ManagementBC



January 11, 2016

Mr. Alan Hobler
President, Kamloops Search and Rescue
PO Box 3313
Kamloops, B.C. V2C 6B9

Re: Proposal to EMBC for the integration of UAV technology and services into operations conducted by
Kamloops Search and Rescue

Dear Mr. Hobler,
Copyright

Yours truly,



A handwritten signature in black ink that reads "R Atwood". The signature is written in a cursive style. Below the signature is a horizontal line.

Name: Robert Atwood
Title: President
Address: Hummingbird Drones Inc.
348 Tranquille Rd.
Kamloops, BC V2B 3G6

Page 015 of 160

Withheld pursuant to/removed as

Copyright

March 13, 2016

• • •

Alan Hobler
Kamloops Search and Rescue
Box 3313 Kamloops, BC

Andrew Morrison
Emergency Management BC

Proposal to Pilot a Search and Rescue UAV Project

Kamloops Search and Rescue is requesting to pilot a search and rescue UAV project in their area and is seeking the support of Emergency Management BC. Attached you will find a full proposal of our project.

Kamloops SAR has been working with Hummingbird Drones to test its applicability for search and rescue in the interior region of BC. The initial tests have been quite exciting and we believe there is a strong application for UAVs in search and rescue. Our UAV's specialize in night time operations and the use of infrared imaging. We feel that this region of the province is especially suitable for this type of application because of the sparser vegetation and more open canopy cover than other regions of BC.

Initial night time tests have shown a 90% probability of detection while doing grid searches in forested areas.

Kamloops SAR is optimistic that this pilot project will not only bring quicker resolution to searches but will also improve searcher safety.

Please review our attached proposal and feel free to contact me for further questions.

Alan Hobler
President
Kamloops Search and Rescue

UAV Deployment Review - Held on April 27, 2016

In Attendance: EMBC - Andrew Morrison; RCMP E Div – Travis Pearson; RCMP ARC – Brian Fentimen; RCMP UAV Pilot – Ryan McKenana; Kamloops SAR Manager – Alan Hobler

UAV Deployed – RCMP

Situation:

Task # 170166, April 05, 2016. South Columbia SAR requested by Clinton RCMP to search for despondent male. April 9th Updated information and cell phone ping put this in an area near Savona/Kamloops Lake; Kamloops SAR requested and responded. GSAR, GSAR Dogs and PEP Air searched – focus on searcher safety due to despondent. UAV was requested by RCMP internally, SAR Manager was advised that UAV was requested.

Observations:

- First deployment for RCMP UAV pilot on a SAR task.
 - Recommendation – UAV awareness briefings for GSAR groups, GSAR presentation to UAV Pilots.
- Terrain conducive for UAV operation – Steep terrain, bluffs, Cliffs.
- First assignment was described as ‘over there’ in an area over a large treed area on a windy day (poor images).
 - Specific assignments are better for UAV operations – Cliff, Waterfall, shoreline, open areas etc.
- RCMP pilot was not aware of terrain responding to.
 - Recommendation – SAR Manager provide briefing to UAV pilot to ensure they are properly equipped (PPE) for the environment and have the ability to load necessary maps. Using maps can allow flights to specific areas and waypoints to be created.
 - Preferred Coordinate format is Lat/Long (DDMMSS) and secondarily UTM.
 - RCMP can transfer UAV flight data (GPS tracks, images) to document on the Search status maps.
- UAV pilot will work with SAR Manager/Operations Chief and RCMP IC on assignments.
 - Direction to UAV pilots needs to be limited to ensure effective use of UAV/pilot time.
- Ensure UAV Landing Zone is in a separate area from command; this will be part of safety planning (UAV Pilot and SAR Manager).

Lessons Learned:

- UAV pilots have ‘Duty day’ (amount of time they can work), similar to other pilots (TC Regs).
- UAV pilots and observers can take breaks to extend in some cases.
- Ensure ALL SAR members and other aircraft are aware of UAV operation
 - Where necessary, define separate flight areas.
 - Where necessary, Provide an opportunity to address flight planning
- UAV pilot have a marked operating area and SAR members are to avoid any interruption of the flight operation – unless it is to raise a safety concern.

MEMORANDUM OF UNDERSTANDING

BETWEEN:

**Her Majesty the Queen in the Right of the Province of British Columbia,
as represented by the MINISTER OF TRANSPORTATION AND
INFRASTRUCTURE**

*Emergency Management BC
14292 Green Timbers Way, Surrey, BC V3T 0J4
(the "Ministry")*

AND:

*KamloopsSearch and Rescue Society
P.O. Box 3313, Kamloops, BC V2C 6B9
(the "SAR Group")*

PURPOSE:

A. The purpose of this Memorandum of Understanding (this "MOU") is to evaluate the use of contracted unmanned aerial vehicles ("UAV") in Ground Search and Rescue ("GSAR") in British Columbia.

1. SCOPE

- 1.1 The UAV project will be a 1 year pilot project (the "Pilot Project") to develop:
- a) Performance metrics for operations and costs related to UAV use in GSAR responses;
 - b) Best practices learned including safety and operations; and
 - c) Future recommendations.

2. PROGRAM ACTIVITIES

- 2.1 The SAR Group will:
- a) Provide UAV liaison and familiarisation training to SAR Group members;
 - b) Initiate and carry out GSAR response, including:
 - Initiating call-out of UAV;
 - Acting as liaison between UAV contractors and the Ministry;
 - c) Participate in post incident debriefs with the Ministry regarding UAV use in GSAR;
 - d) Deliver post deployment reports to the Ministry on UAV use in GSAR response, including the following information:
 - EMBC Task, ASE number and RCMP file number for each UAV use;
 - UAV contractor name;

- UAV technical configuration and specifications;
 - Geographic location(s) of UAV use;
 - Weather conditions at time of UAV use;
 - Date and time of each UAV use;
 - Type of search conducted;
 - Total hours flown;
 - Total distance covered;
 - Any safety issues, incidents or concerns (including comments from other aircraft);
 - Any comments, recommendations or observations by the GSAR Group or UAV contractor on what worked well and areas for improvement; and
 - Rationale for UAV use in each GSAR response.
- e) Deliver a final pilot program report at end of Pilot Project, including:
- Operational debrief summary including summary of deployments/requests;
 - Cost summary for deployments;
 - Safety issues reported;
 - Lessons Learned; and
 - Recommendations on acceptable UAV use and suggestions for inclusion into future policy.
- f) Ensure that all Transport Canada regulations regarding UAV use are complied with.
- 2.2 Prior to using a UAV provided by any contractor, the SAR Group will provide to the Ministry:
- a) The UAV contractor's Special Flight Operations Certificate (SFOC) and Application, approved by Transport Canada; and
 - b) The UAV contractor's certificate of insurance.
- 2.3 Prior to using a UAV for any GSAR response, the SAR Group will notify the Ministry of the UAV use, including brief rationale for UAV use in the GSAR response.
- 2.4 UAV usage for GSAR response will be considered for reimbursement up to a maximum of \$300.00 per hour. The UAV contractor will submit UAV invoices directly to the Ministry, referencing the EMBC Task number and ASE number provided by the SAR Group.
- 2.5 The Ministry's primary contact for this MOU is:

Andrew Morrison, Search and Rescue Specialist
 Emergency Management BC
 14292 Green Timbers Way
 Surrey, B.C. V3T 0J4
 Andrew.morrison@gov.bc.ca
 Ph: 604-586-4380

2.6 The SAR Group primary contact for this MOU is:

Alan Hobler
Kamloops Search and Rescue Society
P.O. BC 3313
Kamloops B.C. V2C 6B9
Alan.Hobler@gov.bc.ca
PH: s.22

2.7 This MOU will be in effect on the final date of signing below.

Signed on behalf of Her Majesty the Queen
in the right of the Province of British
Columbia, as represented by the Minister
of Transportation and Infrastructure on

Nov. 1, 20 16



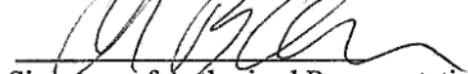
Signature of Authorized Representative of Ministry

Chris Duff
Printed Name

Ex Dir. - Operations
Title

Signed by Kamloops Search and Rescue Society on

Oct 31, 20 16



Signature of Authorized Representative of Kamloops Search and Rescue Society

Alan Hobler
Printed Name

MEMORANDUM OF UNDERSTANDING

BETWEEN:

**Her Majesty the Queen in the Right of the Province of British Columbia,
as represented by the MINISTER OF TRANSPORTATION AND
INFRASTRUCTURE**

*Emergency Management BC
14292 Green Timbers Way, Surrey, BC V3T 0J4
(the "Ministry")*

AND:

*Coquitlam Search and Rescue Society
1300 Pinetree Way, Coquitlam B.C. V3B 7S4
(the "SAR Group")*

PURPOSE:

A. The purpose of this Memorandum of Understanding (this "MOU") is to evaluate the use of contracted unmanned aerial vehicles ("UAV") in Ground Search and Rescue ("GSAR") in British Columbia.

1. SCOPE

- 1.1 The UAV project will be a 1 year pilot project (the "Pilot Project") to develop:
- a) Performance metrics for operations and costs related to UAV use in GSAR responses;
 - b) Best practices learned including safety and operations; and
 - c) Future recommendations.

2. PROGRAM ACTIVITIES

- 2.1 The SAR Group will:
- a) Provide UAV liaison and familiarisation training to SAR Group members;
 - b) Initiate and carry out GSAR response, including:
 - Initiating call-out of UAV;
 - Acting as liaison between UAV contractors and the Ministry;
 - c) Participate in post incident debriefs with the Ministry regarding UAV use in GSAR;
 - d) Deliver post deployment reports to the Ministry on UAV use in GSAR response, including the following information:
 - EMBC Task number, ASE number and RCMP file number for each UAV use;

- UAV contractor name;
 - UAV technical configuration and specifications;
 - Geographic location(s) of UAV use;
 - Weather conditions at time of UAV use;
 - Date and time of each UAV use;
 - Type of search conducted;
 - Total hours flown;
 - Total distance covered;
 - Any safety issues, incidents or concerns (including comments from other aircraft);
 - Any comments, recommendations or observations by the GSAR Group or UAV contractor on what worked well and areas for improvement; and
 - Rationale for UAV use in each GSAR response.
- e) Deliver a final pilot program report at end of Pilot Project, including:
- Operational debrief summary including summary of deployments/requests;
 - Cost summary for deployments;
 - Safety issues reported;
 - Lessons Learned; and
 - Recommendations on acceptable UAV use and suggestions for inclusion into future policy.
- f) Ensure that all Transport Canada regulations regarding UAV use are complied with.
- 2.2 Prior to using a UAV provided by any contractor, the SAR Group will provide to the Ministry:
- a) The UAV contractor's Special Flight Operations Certificate (SFOC) and Application, approved by Transport Canada; and
 - b) The UAV contractor's certificate of insurance.
- 2.3 Prior to using a UAV for any GSAR response, the SAR Group will notify the Ministry of the UAV use, including brief rationale for UAV use in the GSAR response.
- 2.4 UAV usage for GSAR response will be considered for reimbursement up to a maximum of \$300.00 per hour. The UAV contractor will submit UAV invoices directly to the Ministry, referencing the EMBC Task number and ASE number provided by the SAR Group.

2.5 The Ministry's primary contact for this MOU is:

Andrew Morrison, Search and Rescue Specialist
 Emergency Management BC
 14292 Green Timbers Way
 Surrey, B.C. V3T 0J4
 Andrew.morrison@gov.bc.ca
 Ph: 604-586-4380

2.6 The SAR Group primary contact for this MOU is:

Michael Coyle
Coquitlam Search and Rescue Society
1300 Pinetree Way
Coquitlam B.C. V3B 7S4
michael.coyle@coquitlam-sar.bc.ca
PH: s.22

2.7 This MOU will be in effect on the final date of signing below.

Signed on behalf of Her Majesty the Queen
in the right of the Province of British
Columbia, as represented by the Minister
of Transportation and Infrastructure on

Nov 1, 20 16



Signature of Authorized Representative of Ministry

Chris Duffy
Printed Name

Ex. Dir. Operations
Title

Signed by Coquitlam Search and Rescue Society on

Nov 27, 20 16



Signature of Authorized Representative of Coquitlam Search and Rescue Society

Gordon Lyster
Printed Name

NEWS RELEASE

For Immediate Release
2016TRAN0400-002655
Dec. 9, 2016

Ministry of Transportation and Infrastructure
Emergency Management BC

Search and Rescue crews launch UAV pilot in B.C.

COQUITLAM – VICTORIA – Minister of State for Emergency Preparedness Naomi Yamamoto today announced Emergency Management BC's (EMBC) endorsement of a one-year pilot project for the use of unmanned aerial vehicles – “UAVs” or drones – by search and rescue crews in Coquitlam and Kamloops.

UAVs have the potential to be valuable to emergency management personnel. An increasing number of search and rescue and public safety agencies in North America are using these tools to help ensure the safety and security of residents while keeping emergency personnel safe in their jobs.

EMBC will ensure these tools are used in a way that takes into account privacy considerations, as well as ensure that they would be operating within Transport Canada regulations.

In 2016, the Province committed \$10 million in funding that is being distributed by the British Columbia Search and Rescue Association (BCSARA) over a two-year period, based on the proposed Alternative Support Model that was supported by its members. These funding allocations are given according to the needs of the local ground search and rescue teams to replace or update equipment, provide administrative support and pay for new or additional training.

This investment builds on the \$6.3 million the B.C. government is already providing annually to cover ground search and rescue operational costs for deployment, as well as training and equipment costs, and the insurance and liability for the members of the 80 groups serving throughout the B.C. landscape.

Quotes:

Naomi Yamamoto, Minister of State for Emergency Preparedness–

“Search and rescue volunteers demonstrate a steadfast commitment to the safety of families and communities throughout this province. I am proud to support these local heroes and this pilot project which could save many lives.”

Tom Zajac, vice president, Coquitlam Search and Rescue (SAR)–

“We are always looking for new technologies and techniques that will improve our search capabilities or reduce risks for SAR responders. We are looking forward to being part of a joint effort to explore the potential of UAV technology to increase the capacity of SAR teams in British Columbia to operate safely and efficiently.”

Alan Hobler, Search and Rescue president, Kamloops–

“We have been testing and training with these UAVs for a while now and are very excited to apply this technology to real searches. In some applications UAVs will be a more-effective means of searching terrain that would otherwise be difficult or impossible to search by traditional ground searchers. Searcher safety is paramount for us and now we have a new tool that we can use in places or circumstances that may pose a risk to our searchers.”

Learn More:

BC Search and Rescue Association: www.bcsara.com

PreparedBC: <http://www2.gov.bc.ca/preparedbc>

Basic emergency kit supplies: <http://ow.ly/4nrp3>

Household preparedness and neighbourhood preparedness guides: <http://ow.ly/4nrcso>

Emergency Info BC, B.C.'s official channel for emergency alerts: <http://ow.ly/WCDbj>

Follow on Twitter: [@EmergencyInfoBC](https://twitter.com/EmergencyInfoBC) (twitter.com) and [@PreparedBC](https://twitter.com/PreparedBC) (twitter.com)

Media Contact:

Media Relations
Government Communications and Public
Engagement
Ministry of Transportation and Infrastructure
250 356-8241

Connect with the Province of B.C. at: www.gov.bc.ca/connect

CRSAR UAV Proposal.

From: Daryl Beck s.22
To: Andrew.Morrison@gov.bc.ca, Morrison, Andrew EMBC:EX <Andrew.Morrison@gov.bc.ca>
Sent: April 9, 2017 3:16:25 PM PDT
Attachments: SAR UAV Proposal EMBC April 6 2017.docx

Hi Andrew

Please find attached a revised proposal for our UAV pilot program.

New sections on metrics and an exit interview have been added to this of this update.

I would like to acknowledge the quality work and effort Mike Morellato of Strategic Consultants has provided to guide this proposal. CRSAR certainly appreciates his involvement.

Sincerely

Daryl Beck

CRSAR Vice-President



Emergency
ManagementBC

Integration of UAV Technology into Campbell River SAR Operations

Campbell River Search & Rescue &
Strategic Natural Resource Consultants



Emergency Management BC
14292 Green Timbers Way
Surrey, BC V3T 0J4
Attn: Andrew Morrison

April 6, 2016

Dear Mr. Morrison,

On behalf of Strategic Natural Resource Consultants and Campbell River Search and Rescue, please see the enclosed proposal regarding the integration of unmanned aircraft into SAR operations in Campbell River. With an established UAV program that operates in other critical situations such as a spill response and wildfire scanning, I feel that we are well positioned to assist in this initiative. The Strategic UAV program has the following assets:

- Experienced drone pilots that operate under the Incident Command System in emergency response situations;
- Staff that capture UAV data in high pressure situations under strict time constraints;
- Personnel that have a strong background in GIS and can produce maps on-the-fly in addition to their UAV-related skills;
- Experience flying at night with thermal infrared sensors, a primary tool for search & rescue operations; and
- Redundant UAV systems and cameras, to ensure continuity of operations during critical times.

If you have any questions or require clarification on any part of the attached proposal, feel free to give me a call at 778-980-0654.

Best regards,

Mike Morellato, M.Sc., GISP
UAV Program, Geomatics
Strategic Natural Resource Consultants
www.snrc.ca

Alexander Michaels
Campbell River Search & Rescue
www.crsar.ca

1. Company Summary

Strategic Natural Resource Consultants Inc. (Strategic) is a diversified, inter-disciplinary resource management consulting and contracting firm located in British Columbia with project experience across Western Canada. In business since 2003, we provide high-quality professional and technical solutions to clients, and our personnel are experienced, safe, conscientious and diligent in delivering client-focused results. Our key organizational strengths are:

- Strategic currently employs over 150 full time staff within our five different business lines and has the resources and expertise to take care of whatever needs our clients may have;
- One of the largest natural resource consulting firms in the province and maintain an excellent reputation with government, industry and private clients throughout BC;
- Strategic believes strongly in establishing ongoing partnerships and collaboration with government, private industry, academic institutions, and communities, as a core value throughout the organization, and this would be no different working with Campbell River Search and Rescue.

Strategic's UAV Program, established in late 2014, currently has standing Special Flight Operations Certificates in two Transport Canada regions, and our pilots and crews are fully certified and trained to existing regulations. We have operated in several different environments and with varying workflows for UAV data capture including: professional mapping and survey, live view reconnaissance, night operations, technical videography and still photo capture.

2. Introduction

In recent years, the use of Unmanned Aerial Vehicles (UAVs) for the purposes of emergency response and Search and Rescue (SAR) operations has been realized in many regions across the globe. Drones have largely been touted as another tool in the toolbox for SAR teams, and can be a cost-effective alternative to helicopter-based searches in many circumstances. Other strengths to UAVs are the ability to quickly deploy them, mount different types of sensors (including thermal), and receive real-time information from a live video transmission being sent from the drone's camera.

Campbell River SAR has identified Strategic as a partner for this initiative given their previous experience with incident management, professional mapping, and deploying drones during response situations in a variety of environments. With the potential to improve the efficiency of searches and safety of the search team, Campbell River SAR is interested in exploring this drone integration further.

Strategic has the benefit of a well-established UAV program that can mobilize 5 different drones; this allows us additional options depending on weather conditions, terrain, and provides redundancies when necessary. In addition, we have the following assets to support any operations:

- Data centers
- UAV and mapping software
- Multiple office locations on the island
- Programming capabilities
- Experience working in remote areas
- Cloud systems
- High-speed fiber internet connections
- IT staff
- Data management specialists
- GIS professionals

3. Methods

Campbell River SAR and Strategic will work as a team to rollout specific workflows involving UAVs in an operational content with the following outcomes:

- Live video streaming within daytime search environments using RGB and thermal cameras to assist with live rescue operations and situational awareness.
- Live video streaming within nighttime search environments using thermal infrared (TIR) cameras to assist with live rescue operations and situational awareness.
- Professional mapping services – Strategic commonly stitches orthophotos together with mapping data we have collected from our drones. Where necessary, we can capture an area and provide new maps to SAR personnel to assist with searches.

The specific types of searches that Campbell River SAR and Strategic are planning to explore and test with UAV integration include:

- Night-time searches
- Daytime rescue
- Rope rescue
- Swift water rescue
- Avalanche / out of bounds searches
- Mountain rescue

3a. Team Planning

Our teams envision this project to begin with initial planning and a series of trial sessions, which will integrate with Campbell River SAR's training exercises. The initial goals for this initiative include:

- Establishing what use cases will have the greatest benefit in the context of Campbell River SAR operations and the variety of possible search environments;
- Identifying the strengths and weaknesses of Strategic's UAV program with a focus on staff, equipment, mobilization and other elements;
- Confirm metrics that are approved by EMBC to define criteria for each exercise and how to measure success of UAV integration.

3b. Mobilization Rates

The following table outlines Strategic's rates for UAV services in support of SAR operations. These rates would come into play following successful trials and ultimate approval from Campbell River SAR and EMBC that Strategic has reached an acceptable level of preparedness suitable for live operations.

UAV Services provided by Strategic	<p>2-person team mobilized to an incident, which may include some of all of the following (as necessary):</p> <ul style="list-style-type: none"> • Live thermal infrared scanning • Thermal infrared mapping • Live true color (RGB) scanning • True color (RGB) mapping • GIS services – on site • General spatial awareness and live view support for SAR personnel. <p>Supply drop services and communications enhancement may also be provided at a later date depending on test results.</p>	s.17; s.21 per hour
Travel	-	\$0.52 / km
Per diems	-	Government rate

4. Regulations and Privacy

Strategic is committed to meeting Transport Canada (TC) requirements for commercial drone use for all of our operations. We currently hold a valid Special Flight Operations Certificate issued from Transport Canada that is renewed each year.

For daytime operations within nine kilometres of an aerodrome, we often have a Notice to Airmen (NOTAM) filed on our behalf by our primary TC contact as per protocols. For incident management, we often do not have the luxury to give notice of 48 hours notice for our flights, so special consideration from TC is required. Strategic will work with Transport Canada to stay within our regulatory limits, while not sacrificing our ability to provide UAV services on immediate demand.

Strategic also takes privacy concerns seriously, and is committed to avoiding the release any photos or video of persons that were filmed inadvertently during a UAV flight mission for the purposes of search and rescue.

5. Measuring Success of UAV Integration

A two-pronged approach is proposed (both qualitative and quantitative). A web-based survey will be setup and will ask a series of questions to team members following SAR exercises where UAV technology was trialed. Members will be asked to answer ranked responses to a series of questions on the efficacy, timeliness and the perceived added value of UAVs at a given SAR scene. Please see below for the proposed survey questions to be asked (5a) and the quantitative metrics that will be recorded by the UAV crew at a given scenario (5b).

5a. Proposed Survey Questions

Question	Possible Answers
1. Please state your name and role on the team	Open answer (typed response)
2. What time of day was the response?	Daytime (between sunrise and sunset) Nighttime (after sunset) Both
3. Please describe your interaction with the drone services or any UAV data you made use of on site.	Open answer (typed response)
4. Please rate this statement: Overall, the drone added value to the response	1 - Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree
5. Please rate this statement: The UAV had a the positive impact on the subject's well-being during this exercise.	1 - Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree
6. Can you comment on how planning, operations and/or logistics were affected by incorporating the UAV into the response workflow?	Open answer (typed response)
7. Please rate this statement: UAV mapped data had a positive impact on the effectiveness of the Ground Search Teams.	1 - Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree 6 – No maps were produced
8. Please rate this statement: The UAV was effective in improving searcher safety by identifying hazards at the scene.	1 - Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree
9. Based on the recent exercise, would you want to utilize the UAV again for this type of response?	Yes / No
10. Based on your review of the UAV data, do you feel like the video and imagery could useful outside of the response environment (e.g. For training purposes)?	Open answer (typed response)
11. How did the UAV affect your particular role on site?	Open answer (typed response)

5b. Quantitative Metrics

The following list outlines the proposed quantitative metrics that the Strategic UAV team will record to help track the level of success, and work towards continual improvement. Following the initial trials, CRSAR and Strategic will use these indicators and the tracked results to set specific goals for future response.

- Total number of UAV flights necessary for each response.
- Number of situations where UAV callout did not occur due to extreme weather.
- Response time from SNRC callout to operational (ready to fly).
- Total flight times.
- Types of sensors used, and frequency.
- Average turnaround time to provide mapped data to crews.
- Number of delays due to equipment-related issues.
- Number of times at an incident where UAVs were grounded due to extreme weather.
- Average distance that the drone was sent.
- Weather and site conditions.

6. Conclusion

By combining the experience of Campbell River SAR with that of Strategic's UAV program, we trust that we can improve incident efficiency and assist with critical decision-making in the field. Campbell River SAR and Strategic are looking forward to exploring these applications and technology integration, and will collaborate closely to ensure the success of the trial.

Page 036 of 160 to/à Page 038 of 160

Withheld pursuant to/removed as

s.22

Appendix B - Strategic's Unmanned Aerial Vehicles

The following UAVs are used frequently by our pilots for a variety of purposes that help our clients meet their needs. For incident management, our primary units are the Microdrone and the Inspire 1 units.



UAV	Appearance	Details
<p>Microdrone MD4-1000</p>		<ul style="list-style-type: none"> • 40 minutes flight time • Vertical takeoff and landing • Compatible with 4 different cameras (or more if needed). • Used for mapping and separate gimbal control.
<p>Sassin Tech Fixed wing</p>		<ul style="list-style-type: none"> • 40 minutes flight time • Covers more area over a shorter period of time due to flight speed. • Compatible with 3 of our 4 cameras
<p>DJI Inspire 1 (multiple units)</p>		<ul style="list-style-type: none"> • 22 minutes flight time • Vertical takeoff and landing • Built-in live view for videography and static photos.

Appendix C - Strategic's UAV Payloads

The following cameras are used by Strategic's UAV program on a regular basis. We have access to additional cameras if needed, and we use UAVs that allow us the flexibility to swap them for one another.



Camera	Appearance	Details
Sony α6300		<ul style="list-style-type: none"> • Newest model, released in 2016 • 24MP APS-C CMOS sensor • 4K movie resolution • ISO 100 - 25,600
Sony Nex 7 with 18-55mm lens		<ul style="list-style-type: none"> • 24MP APS-C CMOS sensor • 1080p60 HD movie recording • ISO 100-16000 • Zoom lens available when needed
MicaSense Red Edge		<ul style="list-style-type: none"> • 5 distinct spectral bands (Blue, Green Red, Red Edge, NIR) • Access to the "Red Edge" allows for indices not possible with other cameras. • 8 cm/pixel resolution at 120m AGL • Lightweight, increasing flight time
FLIR Vue Pro 640		<ul style="list-style-type: none"> • Thermal imaging (stills and video) • 640 x 512 resolution • We chose the 13mm lens, best for mapping

CRSAR UAV Pilot Signed MOU

From: Alexander Michaels^{s.22}
To: SAR Specialist(EMBC) - Andrew Morrison <andrew.morrison@gov.bc.ca>, Morrison, Andrew
EMBC:EX <Andrew.Morrison@gov.bc.ca>
Sent: May 15, 2018 12:30:44 PM PDT
Attachments: Signed MOU pg3.jpg, Deployment Report.docx, Strategic PreDepartureChecklist-Inspire1.pdf,
Strategic's Post Deployment Checklist.docx, Deployment Checklist.docx, Signed MOU pg1.jpg,
Signed MOU pg2.jpg

Hi Andrew. Please find enclosed a scan of our MOU which has been signed by President Tim Fairbank. The original hard copy has been mailed to you. I am also enclosing:

- CRSAR's Deployment Checklist
- CRSAR's Deployment Report
- Strategic's PreDeparture Checklist
- Strategic's Post Deployment Checklist

CRSAR will use the first two to help guide our decision-making for each task and to consolidate data collection for our final report. Please feel free to make suggestions on how either of these documents can be improved. We may also use some of the information gathered by Strategic for our report.

To date CRSAR and Strategic have held several information sessions with our Executive and Operations branches and further training is being scheduled. These meetings have given us the opportunity to gain an understanding of UAV capabilities and limitations as well as to establish relations with Strategic staff which are good. Recently we have identified several opportunities to possibly deploy UAV resources and are eager to give this technology a try.

So.....do we have a green light to start using these gadgets? Thanks.

Alex Michaels
s.22

2.6 The SAR Group primary contact for this MOU is:

Tim Fairbank - President
Campbell River Search and Rescue
P.O. box 705
Campbell River B.C. V9W 6J3
tim.fairbank@crsar.ca
PH: s.22

2.7 This MOU will be in effect on the final date of signing below.

Signed on behalf of Her Majesty the Queen
in the right of the Province of British
Columbia, as represented by the Minister
of Public Safety Solicitor General on
_____, 20 ____

Signature of Authorized Representative of Ministry

Printed Name

Title

Signed by Campbell River Search and Rescue Society on

_____, 20 ____



Signature of Authorized Representative of Campbell River Search and Rescue Society

Timothy Fairbank
Printed Name



Post UAV Deployment Report

Copyright

Page 044 of 160 to/à Page 046 of 160

Withheld pursuant to/removed as

Copyright

MEMORANDUM OF UNDERSTANDING

BETWEEN:

**Her Majesty the Queen in the Right of the Province of British Columbia,
as represented by the MINISTER OF TRANSPORTATION AND
INFRASTRUCTURE
Emergency Management BC
14292 Green Timbers Way, Surrey, BC V3T 0J4
(the "Ministry")**

AND:

***Cambell River Search and Rescue Society*
P.O. box 705 Campbell River B.C. V9W 6J3
(the "SAR Group")**

PURPOSE:

A. The purpose of this Memorandum of Understanding (this "MOU") is to evaluate the use of contracted unmanned aerial vehicles ("UAV") in Ground Search and Rescue ("GSAR") in British Columbia.

1. SCOPE

- 1.1 The UAV project will be a 1 year pilot project (the "Pilot Project") to develop:
- a) Performance metrics for operations and costs related to UAV use in GSAR responses;
 - b) Best practices learned including safety and operations; and
 - c) Future recommendations.

2. PROGRAM ACTIVITIES

- 2.1 The SAR Group will:
- a) Provide UAV liaison and familiarisation training to SAR Group members;
 - b) Initiate and carry out GSAR response, including:
 - Initiating call-out of UAV;
 - Acting as liaison between UAV contractors and the Ministry;
 - c) Participate in post incident debriefs with the Ministry regarding UAV use in GSAR;
 - d) Deliver post deployment reports to the Ministry on UAV use in GSAR response, including the following information:
 - EMBC Task, ASE number and RCMP file number for each UAV use;
 - UAV contractor name;

- UAV technical configuration and specifications;
 - Specialized equipment used (e.g. Camera, FLIR)
 - Geographic location(s) of UAV use;
 - Weather conditions at time of UAV use;
 - Date and time of each UAV use;
 - Type of search conducted;
 - Total hours flown;
 - Total distance covered;
 - Any safety issues, incidents or concerns (including comments from other aircraft);
 - Any comments, recommendations or observations by the GSAR Group or UAV contractor on what worked well and areas for improvement; and
 - Rationale for UAV use in each GSAR response.
- e) Deliver a final pilot program report at end of Pilot Project, including:
- Operational debrief summary including summary of deployments/requests;
 - Cost summary for deployments;
 - Safety issues reported;
 - Lessons Learned; and
 - Recommendations on acceptable UAV use and suggestions for inclusion into future policy.
- f) Ensure that all Transport Canada regulations regarding UAV use are complied with.
- 2.2 Prior to using a UAV provided by any contractor, the SAR Group will provide to the Ministry:
- a) The UAV contractor's Special Flight Operations Certificate (SFOC) and Application, approved by Transport Canada; and
 - b) The UAV contractor's certificate of insurance.
- 2.3 Prior to using a UAV for any GSAR response, the SAR Group will notify the Ministry of the UAV use, including brief rationale for UAV use in the GSAR response.
- 2.4 UAV usage for GSAR response will be considered for reimbursement up to a maximum of \$300.00 per hour. The UAV contractor will submit UAV invoices directly to the Ministry, referencing the EMBC Task number and ASE number provided by the SAR Group.
- 2.5 The Ministry's primary contact for this MOU is:

Andrew Morrison, Search and Rescue Specialist
 Emergency Management BC
 14292 Green Timbers Way
 Surrey, B.C. V3T 0J4
 Andrew.morrison@gov.bc.ca
 Ph: 604-586-4380

MEMORANDUM OF UNDERSTANDING

BETWEEN:

**Her Majesty the Queen in the Right of the Province of British Columbia,
as represented by the MINISTER OF TRANSPORTATION AND
INFRASTRUCTURE
Emergency Management BC
14292 Green Timbers Way, Surrey, BC V3T 0J4
(the “Ministry”)**

AND:

***Cambell River Search and Rescue Society*
P.O. box 705 Campbell River B.C. V9W 6J3
(the “SAR Group”)**

PURPOSE:

A. The purpose of this Memorandum of Understanding (this “MOU”) is to evaluate the use of contracted unmanned aerial vehicles (“UAV”) in Ground Search and Rescue (“GSAR”) in British Columbia.

1. SCOPE

- 1.1 The UAV project will be a 1 year pilot project (the “Pilot Project”) to develop:
- a) Performance metrics for operations and costs related to UAV use in GSAR responses;
 - b) Best practices learned including safety and operations; and
 - c) Future recommendations.

2. PROGRAM ACTIVITIES

- 2.1 The SAR Group will:
- a) Provide UAV liaison and familiarisation training to SAR Group members;
 - b) Initiate and carry out GSAR response, including:
 - Initiating call-out of UAV;
 - Acting as liaison between UAV contractors and the Ministry;
 - c) Participate in post incident debriefs with the Ministry regarding UAV use in GSAR;
 - d) Deliver post deployment reports to the Ministry on UAV use in GSAR response, including the following information:
 - EMBC Task, ASE number and RCMP file number for each UAV use;
 - UAV contractor name;

- UAV technical configuration and specifications;
 - Specialized equipment used (e.g. Camera, FLIR)
 - Geographic location(s) of UAV use;
 - Weather conditions at time of UAV use;
 - Date and time of each UAV use;
 - Type of search conducted;
 - Total hours flown;
 - Total distance covered;
 - Any safety issues, incidents or concerns (including comments from other aircraft);
 - Any comments, recommendations or observations by the GSAR Group or UAV contractor on what worked well and areas for improvement; and
 - Rationale for UAV use in each GSAR response.
- e) Deliver a final pilot program report at end of Pilot Project, including:
- Operational debrief summary including summary of deployments/requests;
 - Cost summary for deployments;
 - Safety issues reported;
 - Lessons Learned; and
 - Recommendations on acceptable UAV use and suggestions for inclusion into future policy.
- f) Ensure that all Transport Canada regulations regarding UAV use are complied with.

2.2 Prior to using a UAV provided by any contractor, the SAR Group will provide to the Ministry:

- a) The UAV contractor's Special Flight Operations Certificate (SFOC) and Application, approved by Transport Canada; and
- b) The UAV contractor's certificate of insurance.

2.3 Prior to using a UAV for any GSAR response, the SAR Group will notify the Ministry of the UAV use, including brief rationale for UAV use in the GSAR response.

2.4 UAV usage for GSAR response will be considered for reimbursement up to a maximum of \$300.00 per hour. The UAV contractor will submit UAV invoices directly to the Ministry, referencing the EMBC Task number and ASE number provided by the SAR Group.

2.5 The Ministry's primary contact for this MOU is:

Andrew Morrison, Search and Rescue Specialist
 Emergency Management BC
 14292 Green Timbers Way
 Surrey, B.C. V3T 0J4
 Andrew.morrison@gov.bc.ca
 Ph: 604-586-4380

2.6 The SAR Group primary contact for this MOU is:

Tim Fairbank - President
Campbell River Search and Rescue
P.O. box 705
Campbell River B.C. V9W 6J3
tim.fairbank@crsar.ca
PH: s.22

2.7 This MOU will be in effect on the final date of signing below.

Signed on behalf of Her Majesty the Queen
in the right of the Province of British
Columbia, as represented by the Minister
of Public Safety Solicitor General on

MAY 30TH, 2018



Signature of Authorized Representative of Ministry

WS Bates

Printed Name

Asst Dir Operations

Title

Signed by Campbell River Search and Rescue Society on

May 30TH, 2018



Signature of Authorized Representative of Campbell River Search and Rescue Society

Timothy Fairbank

Printed Name

Re: FW: FW: [BOARD] For Distribution: GSAR access to RCMP UAV/Drone

From: Harmail SANDHU <harmail.sandhu@rcmp-grc.gc.ca>
To: Andrew EMBC:EX Morrison <Andrew.Morrison@gov.bc.ca>, Mike Francis <Michael.a.FRANCIS@rcmp-grc.gc.ca>, Morrison, Andrew EMBC:EX <Andrew.Morrison@gov.bc.ca>
Cc: RichardEMBC:EX Laing <Richard.Laing@gov.bc.ca>, Baltej S. DHILLON <Baltej.Dhillon@rcmp-grc.gc.ca>, Lavinder MANGAT <lavinder.mangat@rcmp-grc.gc.ca>, Laing, Richard EMBC:EX <Richard.Laing@gov.bc.ca>
Sent: June 22, 2018 12:35:03 PM PDT
Attachments: GSAR UAV Reference_3.pdf

Hi Andrew,

Mike Francis is the new Manger of Advanced Radio Control Systems in E Div. I just spoke to Mike, he'll have a look at the attachment and provide some feedback. We are looking at setting up a teleconference during the first week of July, I'll be in touch to coordinate same.

Regards,

Harm

Sgt. Harm Sandhu
RCMP - E Division HQ
Operational Readiness & Response
T: 778-290-5259

>>> "Morrison, Andrew EMBC:EX" 2018/06/22 10:10 AM >>>

Hi Harm

My first question and its an easy one. In 2016, I worked with Brian Fentiman to develop the email below and attachment to share with GSAR. At that time UAV for SAR was new so we thought it best to explain RCMP procedures as SAR would be able to help educate members on process.

Could we find out who the RCMP contact for UAV is so we can work on an update for GSAR groups. Brian's title was - Mgr. Advanced Radio Control Systems, RPAS Coordinator, E Div. RCMP - British Columbia

Thanks

Andrew Morrison | Search and Rescue Specialist
[Emergency Management BC](#)
14292 Green Timbers Way
Surrey, B.C. CANADA V3T 0J4
Ph: 604-586-4380

24 Hour Emergency Reporting: 1 800 663-3456
Follow us on Twitter [@EmergencyInfoBC](#) and [@PreparedBC](#)

----- Forwarded message -----

From: Morrison, Andrew TRAN:EX [mailto:Andrew.Morrison@gov.bc.ca]

Sent: Thursday, March 03, 2016 3:33 PM

To: TRAN EMBC OPERATIONS REGIONAL STAFF ALL; 'board@bcsara.com'

Subject: [BOARD] For Distribution: GSAR access to RCMP UAV/Drone

Good Afternoon,

As most are aware the RCMP have been using UAV for traffic accident reconstruction for a few years, these units will now be available to support Search and Rescue incidents. The attached information sheet provides information on the RCMP UAV services available. SAR groups who want to meet their local UAV pilots to arrange a demo/training are asked to contact their local detachment to make connection with their local RCMP UAV pilots.

The activation of this resource would be the same as requesting any RCMP resource:

1. SAR Manager & RCMP Incident Commander deem UAV required
2. RCMP IC (through RCMP processes) contacts RCMP E Division OCC for pilot assignment
3. SAR Manager includes in updates to ECC that RCMP UAV is being requested
4. RCMP UAV pilot will work with SAR Manager and RCMP IC for task assignment and safety planning.

NOTE:

- Within 5 days of any tasking of a RCMP UAV on a SAR event, a debriefing conference call will be arranged to review:
 - Activation Procedures
 - Task assignments
 - Safety procedures/concerns
 - Other items of note
- Debrief Participants: RCMP IC, SAR Manager, EMBC SAR Specialist, RCMP RPAS (UAV) Coordinator, others as required.

EMBC continues to work on other processes for SAR groups to utilize UAV's during responses (E.G. Prov Ministry UAV's and Contractors) and will send updated information as it becomes available.

Thank you

Andrew Morrison | Search and Rescue Specialist

Emergency Management BC

14292 Green Timbers Way

Surrey, B.C. CANADA V3T 0J4

Ph: 604-586-4380

24 Hour Emergency Reporting: 1 800 663-3456

Follow us on Twitter @EmergencyInfoBC and @PreparedBC



E Division RCMP RPAS Support

s.16

Copyright

Pilot project

From: William <bimus@bsfree.ca>
To: Morrison, Andrew Tran:Ex <andrew.morrison@gov.bc.ca>, Morrison, Andrew
EMBC:EX <Andrew.Morrison@gov.bc.ca>
Sent: November 15, 2018 9:43:48 AM PST
Attachments: revised drone presentation copy copy.pptx, ATT00001.txt, Burns Lake UAV Policy
and Procedure 2.pdf

Hi Andrew:

Just a note to send you a copy of the PowerPoint that we are showing in Terrace this weekend. I am sending you also a copy of our policy and procedures. This is a copywriter protected , so please to not share.

Thanks

DRONES FOR SEARCH & RESCUE

- Moving Technologies Forward

BURNS LAKE SEARCH AND RESCUE

Page 057 of 160 to/à Page 066 of 160

Withheld pursuant to/removed as

Copyright

William Imus

2018



Burns Lake Search and Rescue

UAV Flight Policy & Procedures

SFOC #BURNS LAKE SEARCH AND RESCUE SOCIETY

BURNS LAKE SEARCH AND RESCUE SOCIETY

Page 069 of 160 to/à Page 111 of 160

Withheld pursuant to/removed as

Copyright

UAV pilot Docs

From: Morrison, Andrew EMBC:EX <Andrew.Morrison@gov.bc.ca>
To: Foss, Ian EMBC:EX <Ian.Foss@gov.bc.ca>
Sent: February 19, 2020 8:55:11 AM PST
Attachments: Updated proposal, Proposal to Pilot a Search and Rescue UAV Project

Andrew Morrison | Search and Rescue Specialist

Emergency Management BC

14292 Green Timbers Way

Surrey, B.C. CANADA V3T 0J4

NOTE NEW PHONE #: 236-468-1784

24 Hour Emergency Reporting: 1 800 663-3456

Follow us on Twitter [@EmergencyInfoBC](#) and [@PreparedBC](#)

Updated proposal

From: Coyle, Michael <michael.coyle@coquitlam-sar.bc.ca>
To: Andrew Morrison <andrew.morrison@gov.bc.ca>, Darren Timmer
<Darren.Timmer@coquitlam-sar.bc.ca>, Morrison, Andrew EMBC:EX
<Andrew.Morrison@gov.bc.ca>
Sent: April 13, 2016 6:45:29 PM PDT
Attachments: CoquitlamSARUAVProposalrev2.pdf
Attached is the updated UAV pilot program proposal

--

Michael Coyle, "Coq 67"
Coquitlam Search and Rescue
<http://www.coquitlam-sar.bc.ca/>



Coquitlam Search and Rescue

Unmanned Aerial Vehicle Proposal

April 2016

Copyright

Page 115 of 160

Withheld pursuant to/removed as

Copyright

RE: UAV (Drone) use in SAR

From: Mole, Allan EMBC:EX <Allan.Mole@gov.bc.ca>
To: Foss, Ian EMBC:EX <Ian.Foss@gov.bc.ca>
Sent: August 27, 2020 9:39:38 AM PDT

Just went through this with Grand Forks and called Andrew after the conversation to discuss and confirm.

- Not out of the pilot phase
- Not interested in another pilot
- Capability would be needs based once the pilot is finalized
- It's available now through RCMP across the province, MOTI, FLNRORD, and GSAR through MA – request approval from the RDM
- Not a silver bullet – since 2016 no found subjects but has it's uses

Next steps

- Engage with pilot project participants to let them know a request for their final reports will be coming
- Take in the final reports and review
- Create POG to describe when it can be used and for what
 - Searching with visual camera vs searching with IR camera
 - High def mapping
 - Grid searching vs searching high hazard or technical areas
 - Continuing data collection to determine POD based on factors – elevation, canopy density, thermal gradient, air speed
 - Contractor model vs GSAR Groups who hold the licenses – one will be impacted more by volunteer attrition, one requires there to be a sustainable market for services
 - Hybrid model where GSAR Groups have spotters to reduce reliance on a full contract crew
 - Who holds the data generated
 - Standard file types, sizes
 - Equipment standards
- Amend Annex 2.12 as necessary
- Create / amend policy as necessary
- Assess disbursement implications

Allan Mole, A.Sc.T | Search and Rescue Specialist

[Emergency Management BC](#)

1255-D Dalhousie Drive

Kamloops, B.C. CANADA V2C 5Z5

Phone: 250-312-6656

24 Hour Emergency Reporting: 1 800 663-3456

Follow us on Twitter [@EmergencyInfoBC](#) and

[@PreparedBC](#)

*Acknowledging that we are
conducting our operations on the
traditional territory of the Tkemlúps
te Secwépemc people*

From: Foss, Ian EMBC:EX <Ian.Foss@gov.bc.ca>
Sent: August 27, 2020 09:29
To: Mole, Allan EMBC:EX <Allan.Mole@gov.bc.ca>
Subject: FW: UAV (Drone) use in SAR

I guess it was inevitable this was coming up. We will need to chat with Andrew to sort out where this is sitting.
Ian

From: Squamish SAR Operations <operations@squamishsar.org>
Sent: August 27, 2020 9:15 AM
To: Foss, Ian EMBC:EX <Ian.Foss@gov.bc.ca>
Subject: UAV (Drone) use in SAR

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Hi Ian,

I am looking for some information about UAV use in SAR. I know the history of the trials with Coquitlam and (? Kamloops?)...

I can't find anything in the POGs about it and have a company here in Squamish who ha reached out saying that they are willing to help if we ever need it, etc. They are a professional company that does work with companies already and are TC certified, etc.

Basically, I just want to get the information up front about where things are at with this and the ability to use private companies such as these in SAR work for those situations where they might be useful. I do think it has a fairly limited scope but possibly some that are appropriate for our area.

I assume that it is still in some form of 'non-approval' stage since it isn't in the POGs but I also know that we have used one a couple of times when we had rock-falls to go look for people without putting our SAR people under an unstable slope. So what would be the process if these sorts of things come up again if there isn't a full approval of involving professional operators at this stage.

Thanks for any information you can provide.

Landon

—

Landon James

Director, Operations - Search and Rescue Manager

Squamish Search and Rescue Society

UAV Pilot Project Summary Report

Michael Coyle, Coquitlam Search and Rescue
August 16, 2021



Copyright

Page 119 of 160

Withheld pursuant to/removed as

Copyright

Copyright

Copyright

Copyright

;

Note: ;

Page 123 of 160 to/à Page 126 of 160

Withheld pursuant to/removed as

Copyright

Copyright

s.16

Page 128 of 160 to/à Page 129 of 160

Withheld pursuant to/removed as

Copyright

Re: UAV Project Deadline

From: Alexander Michaels s.22
To: Laing, Richard EMBC:EX <Richard.Laing@gov.bc.ca>
Cc: Mole, Allan EMBC:EX <Allan.Mole@gov.bc.ca>, Tim and Sheila Fairbank s.22
Sent: September 8, 2021 7:36:09 PM PDT
Attachments: Drone Report Final As a Word Doc.docx

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Hi Rick. I sent it to Jen Zimmerman Regional Director and Alan Mole SAR Specialist as requested on August 13th. Mr. Zimmervan has advised that the report is acceptable (it addresses all your deliverables) and that CRSAR can continue to activate drones on task as a continuation of our Pilot Project pending a decision on the general use of drones by SAR groups later this year.

I'm guessing that you'd like a copy of the report too so please find one attached. Thanks.

On Wed, Sep 8, 2021 at 11:11 AM Tim and Sheila Fairbank s.22 wrote:

Did you not receive a copy, Rick? We sent it off to various EMBC addresses a few weeks ago. Ask around the office, and if you come up empty, I will search my email (not my area of expertise) and see if I can dig it up.

On Wed, Sep 8, 2021 at 11:08 AM Laing, Richard EMBC:EX <Richard.Laing@gov.bc.ca> wrote:

Greetings

This is a second reminder that we are waiting on your final report on the UAV Pilot Project.

The deliverables requested are:

A final pilot program report, including:

- Operational debrief summary including summary of deployments/requests
- Cost summary for deployments
- Safety issues reported
- Lessons Learned

Recommendations on acceptable UAV use and suggestions for inclusion into future policy.

Please advise as soon as possible.

Thanks,

Rick

Richard Laing

Emergency Management Technician

VOIPs.17

--

Alexander Michaels

s.22



Campbell River Search and Rescue

Unmanned Aerial Vehicle (UAV) Pilot Project Report

Copyright

Page 133 of 160 to/à Page 157 of 160

Withheld pursuant to/removed as

Copyright

MEMORANDUM OF UNDERSTANDING

**Her Majesty the Queen in the Right of the Province of British Columbia,
as represented by the MINISTER OF TRANSPORTATION AND INFRASTRUCTURE
Emergency Management BC
14292 Green Timbers Way, Surrey, BC V3T 0J4
(the “Ministry”)**

AND:

**Burns Lake Search and Rescue Society
556 5 Ave, Burns Lake BC, V0J1E0**

PURPOSE:

A. The purpose of this Memorandum of Understanding (this “MOU”) is to evaluate the use of Search and Rescue owned and operated unmanned aerial vehicles (“UAV”) in Ground Search and Rescue (“GSAR”) in British Columbia.

1. SCOPE

- 1.1 The UAV project by Burns Lake Search and Rescue Society (BLSAR) will be a 1 year pilot project (the “Pilot Project”) to develop:
- a) Performance metrics for operations and costs related to UAV use in GSAR responses;
 - b) Best practices including safety and operations; and
 - c) Future recommendations.

2. PROGRAM ACTIVITIES

2.1 BLSAR will:

- a) Provide UAV liaison and familiarisation training to SAR Group members;
- b) Participate in post incident debriefs with the Ministry regarding UAV use in GSAR;
- c) Deliver post deployment reports to the Ministry on UAV use in GSAR response, including the following information:
 - EMBC Task, ASE number and RCMP file number for each UAV use;
 - UAV technical configuration and specifications;
 - Geographic location(s) of UAV use;
 - Weather conditions at time of UAV use;
 - Date and time of each UAV use;

- Type of search conducted;
 - Total hours flown;
 - Total distance covered;
 - Any safety issues, incidents or concerns (including comments from other aircraft);
 - Any comments, recommendations or observations by BLSAR on what worked well and areas for improvement; and
 - Rationale for UAV use in each GSAR response.
- d) Deliver a final pilot program report at end of the Pilot Project, including:
- Operational debrief summary including summary of deployments/requests;
 - Cost summary for deployments;
 - Safety issues reported;
 - Lessons learned; and
 - Recommendations on acceptable UAV use and suggestions for inclusion into future policy.
- e) Ensure that all Transport Canada regulations regarding UAV use are complied with.

2.2 Prior to using a UAV, BLSAR will provide to the Ministry:

- a) BLSAR Special Flight Operations Certificate (SFOC) and Application, approved by Transport Canada; and
- b) BLSAR certificate of insurance.

2.3 Prior to using a UAV for any GSAR response, BLSAR will notify the Ministry of the UAV use, including brief rationale for UAV use in the GSAR response.

2.4 UAV usage for GSAR response will be considered for reimbursement up to a maximum of \$ 300.00 per hour. BLSAR will submit UAV invoices directly to the Ministry, referencing the EMBC Task number and ASE number provided BLSAR.

2.5 The Ministry's primary contact for this MOU is:

Andrew Morrison, Search and Rescue Specialist
 Emergency Management BC
 14292 Green Timbers Way
 Surrey, B.C. V3T 0J4
 Andrew.morrison@gov.bc.ca
 Ph: 604-586-4380

2.6 Burns Lake Search and Rescue's primary contact for this MOU is:

William Imus
 28540 Colleymount Rd.
 Burns Lake, B.C.
 V0J 1E2

2.7 This MOU will be in effect on the final date of signing below.

Signed on behalf of Her Majesty the Queen in the right of the Province of British Columbia, as represented by the Minister of Transportation and Infrastructure on

_____, 20 _____

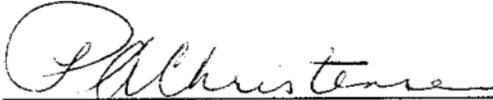
Signature of Authorized Representative of Ministry

Printed Name _____

Title _____

Signed on behalf of Burns Lake Search and Rescue Society on

June 25, 20 18



Signature of Authorized Representative of Burns Lake Search and Rescue Society

Printed Name Patricia Christensen

Title Chair