

Paper #7-6

SEARCH AND RESCUE OPERATIONAL SUPPORT AND LIMITATIONS

Prepared for the
Technology & Operations Subgroup

On March 27, 2015, the National Petroleum Council (NPC) in approving its report, *Arctic Potential: Realizing the Promise of U.S. Arctic Oil and Gas Resources*, also approved the making available of certain materials used in the study process, including detailed, specific subject matter papers prepared or used by the study's Technology & Operations Subgroup. These Topic Papers were working documents that were part of the analyses that led to development of the summary results presented in the report's Executive Summary and Chapters.

These Topic Papers represent the views and conclusions of the authors. The National Petroleum Council has not endorsed or approved the statements and conclusions contained in these documents, but approved the publication of these materials as part of the study process.

The NPC believes that these papers will be of interest to the readers of the report and will help them better understand the results. These materials are being made available in the interest of transparency.

The attached paper is one of 46 such working documents used in the study analyses. Appendix D of the final NPC report provides a complete list of the 46 Topic Papers. The full papers can be viewed and downloaded from the report section of the NPC website (www.npc.org).

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Topic Paper

(Prepared for the National Petroleum Council Study on Research to Facilitate Prudent Arctic Development)

7-6	Search and Rescue Operational Support and Limitations
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SUMMARY This topic paper could have been included in the Safety/Evacuation, Escape and Rescue Chapter of the EP Technology Sub-Group, but given that the bulk of Search and Rescue support is derived from aviation and marine assets associated with operational logistics. The intent of this topic paper is to inform the reader on the planning and support premises, capabilities and incremental technical improvement/advancement recommendations to enhance current SAR support operations.	

PURPOSE

To provide information that promotes a greater understanding of Search and Rescue challenges and limitations in the Arctic.

BACKGROUND/ONGOING RESEARCH

- Search and Rescue Core Documents
 - U.S. National SAR Plan – effective use of civil SAR to meet humanitarian, national, international and legal obligations (National Search and Rescue Plan of the United States, 2007)
 - National Response Framework – How the U.S. responds to emergencies across all levels of government and nongovernment organizations (NRF, 2008)
 - International Aeronautical and Maritime Search and Rescue Manual (IAMSAR) – Relevant conventions, standards and recommendations from the International Civil Aviation organization and the International Maritime Organization, published every three years. (IAMSAR Manual, 2013)
 - U.S. National SAR Supplement to the IAMSAR Manual – Provides guidance to federal, military and civilian agencies that support civil SAR operations regarding implementation of National SAR Plan and IAMSAR Manual. (USS, 2000).
- National Search and Rescue Plan supported by various agencies in Alaska.
 - Maritime search and rescue – USCG RCC, based in Juneau, AK

- Aviation search and rescue – Air Force RCC, based in Anchorage, AK
- Land search and rescue – AK State Troopers, based in Anchorage, AK
- National Park Land search and rescue – National Park Service, based in Anchorage, AK
- Cooperation among arctic nations. Ongoing annual Arctic SAREX (SAR Exercise) among participating arctic nations (Russia, U.S. Canada)
 - Builds a framework for international cooperation for humanitarian SAR
 - Arctic Sustainment Package – air deployable shelter/makeshift hospital to increase medical capability and survivability until helicopter support arrives.
- The harsh arctic environment limits search and rescue capability in the northern latitudes. Climatic data locations within the Arctic Circle:
 - Temperature extremes within the Arctic Circle range from -90 degrees F to +90 degrees F.
 - Daylight extremes range from constant daylight for months in the summer to long periods of nighttime when the sun does not rise for 9 weeks.
 - Overcast 70 percent of the time this area in the arctic is overcast. Sea fog is prominent and moves around the Arctic Ocean, reducing visibility to near-zero.
 - Pack ice eliminates open water around the north coast of Alaska 8-9 months per year, severely limiting vessel shipping.

DISCUSSION/POTENTIAL AREAS OF FURTHER RESEARCH

- USCG Cutter Healy (WAGB-20) – Ice-class 420-foot research and SAR support platform; helideck, hangar and fuel-equipped vessel. Capable of landing HH-60 and smaller helicopters. Evaluate the vessel for a larger role in support of offshore SAR in the arctic.



- Extensive instrument meteorological conditions (IMC) exist in the arctic, requiring SAR aircraft to operate under Instrument Flight Rules (IFR) or marginal Visual Flight Conditions. Currently, no all-weather IFR helicopter SAR assets are based on the North Slope of Alaska. Further research is needed to determine a successful strategy to acquire night vision goggle (NVG) all-weather IFR capable SAR aircraft for basing in the U.S. arctic.

- Limited infrastructure. Few weather reporting and ground-based instrument approaches in the arctic region, restricting options for IFR recovery. Long distances to remote locations are frequently required of SAR aircraft. Fuel support is lacking throughout the arctic region, limiting aircraft range and capability. Air Traffic Control radar coverage and communication capability are extremely limited in the arctic, which impairs IFR services available to SAR aircraft.
- FAA-approved offshore approaches offer SAR helicopters the ability to safely descend overwater and fly an instrument approach to the site.
 - Helicopter Enroute Descent Areas (HEDAs) permit helicopters to operate IFR offshore and descend safely to Visual Flight Rule (VFR) conditions at 400 feet above the water (FAA Advisory Circular 90-80B).
 - Offshore Approach Procedures (OSAPs) permit helicopters to fly an Instrument Flight Rules Approach to an offshore vessel with weather conditions down to ¾ mile visibility and 200 foot ceiling (FAA Advisory Circular 90-80B).
 - Platform Approach System – fully coupled “hands-off” approach to platform that reduces cockpit workload by 60 percent (Sikorsky Press Release). This new system is state-of-the-art and should be further explored for SAR feasibility in the arctic region.
- Research the practicability of increasing footprint of Automatic Dependent Surveillance-Broadcast (ADS-B) and ATC communication coverage in the arctic. This will permit safer IFR operations in uncontrolled international airspace. Currently, this airspace is becoming more and more congested with other operators performing offshore work and an increasing number of unmanned aerial flights in the region (Federal Aviation Administration).

RECOMMENDATIONS

- Exploit advanced technology whenever possible with today’s modern SAR aircraft.
 - Two-way text capability will allow SAR assets to receive crash position updates and provide mission tracking status updates to Rescue Coordination Centers. One unit that provides this ability is the MMU-II Mission Management Unit from Honeywell Aerospace.
 - XM Satellite Aviation Weather service provides satellite imagery, winds aloft, freezing level and airport current weather and forecasts directly to the cockpit. Currently no satellite coverage exists in the arctic, work with commercial vendors to offer coverage to arctic areas.
 - Satellite communications (SATCOM) are essential for arctic operations. Many vendors provide SATCOM service for clients and this should be standard equipment on all SAR platforms. (EMS Aviation)
 - Asset tracking provides near real-time position reporting enhancing situational awareness and SAR coordination. This capability should be a standard best-practice for SAR aircraft in the arctic. Sky Connect Tracker

and Spidertracks are two options that have a proven track record in the arctic.

- Aircraft radar is essential equipment for SAR aircraft performing the specialized Instrument Approaches, or Offshore Approach Procedures (OSAPs).
- Forward-looking Infrared Radar (FLIR) is a valuable tool for SAR aircraft to determine wreckage and survivor locations in darkness and poor visibility conditions. It also enhances aircrew situational awareness throughout all flight regimes.
- Area Navigation (RNAV) certification provides the ability for IFR point-to-point navigation without being limited to ground-based navigation aids.
- Increase the number of all-weather SAR aircraft based in the arctic
 - Provide incentives to boost production numbers of new factory manufactured advanced all-weather SAR aircraft
 - Provide incentives to increase aircrew training throughput for these aircraft to provide a sufficient talent pool
- Invest in aviation infrastructure in the arctic. It is important to base an all-weather capable fixed- and rotary-wing aircraft above the Arctic Circle to meet increasing SAR requirements and provide an adequate SAR response, year-round.
- Existing Data Buoys that are deployed at ice out can should be retrofitted with Automatic Dependent Surveillance-Broadcast (ADS-B) and ATC communication capability. This will expand ADS-B and air traffic control communication coverage offshore to enhance traffic awareness and establish communication for low-level IFR aircraft in the arctic.

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