



Rescue 21: Notification of Communication Outages

Report to Congress
July 18, 2023



U.S. Coast Guard

Foreword

July 18, 2023

I am pleased to present the following report, “Rescue 21: Notification of Communication Outages,” prepared by the U.S. Coast Guard.

The Don Young Coast Guard Authorization Act of 2022 directed the submission of the Coast Guard’s plan to notify mariners of radio outages in the Seventeenth Coast Guard District.

Pursuant to Congressional requirements, this report is provided to the following members of Congress:



The Honorable Maria Cantwell
Chair, Senate Committee on Commerce, Science, and Transportation

The Honorable Ted Cruz
Ranking Member, Senate Committee on Commerce, Science, and Transportation

The Honorable Sam Graves
Chairman, House Committee on Transportation and Infrastructure

The Honorable Rick Larsen
Ranking Member, House Committee on Transportation and Infrastructure.

I am pleased to answer any questions you may have, or your staff may contact my Senate Liaison Office at (202) 224-2913 or House Liaison Office at (202) 225-4775.

Sincerely,

A handwritten signature in blue ink that reads "L L Fagan".

Linda L. Fagan
Admiral, U.S. Coast Guard
Commandant



Rescue 21: Notification of Communication Outages

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I. Legislative Language

This report responds to the language set forth in Section 11321(c) of the Don Young Coast Guard Authorization Act of 2022 (Pub. L. No. 117-263), which reads:

SEC. 11321. NOTIFICATION OF COMMUNICATION OUTAGES

- (a) **UPGRADES TO RESCUE 21 SYSTEM IN ALASKA.** —Not later than August 30, 2023, the Commandant shall ensure the timely upgrade of the Rescue 21 system in Alaska so as to achieve 98 percent operational availability of remote fixed facility sites.
- (b) **PLAN TO REDUCE OUTAGES.** —
- (1) **IN GENERAL.** —Not later than 180 days after the date of enactment of this Act, the Commandant shall develop an operations and maintenance plan for the Rescue 21 system in Alaska that anticipates maintenance needs so as to reduce Rescue 21 system outages to the maximum extent practicable.
- (2) **PUBLIC AVAILABILITY.** —The plan required under paragraph (1) shall be made available to the public on a publicly accessible website.
- (c) **REPORT REQUIRED.** —Not later than 180 days after the date of enactment of this Act, the Commandant shall submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives a report that—
- (1) contains a plan for the Coast Guard to notify mariners of radio outages for towers owned and operated by the Seventeenth Coast Guard District;
- (2) addresses in such plan how the Seventeenth Coast Guard will—
- (A) disseminate updates regarding outages on social media not less frequently than every 48 hours;
- (B) provide updates on a publicly accessible website not less frequently than every 48 hours;
- (C) develop methods for notifying mariners in areas in which cellular connectivity does not exist; and
- (D) develop and advertise a web-based communications update hub on AM/FM radio for mariners; and
- (3) identifies technology gaps that need to be mitigated in order to implement the plan and provides a budgetary assessment necessary to implement the plan.

II. Background

Rescue 21 is the Coast Guard's fully integrated command, control, and search and rescue (SAR) communications system used to monitor international Very High Frequency – Frequency Modulated (VHF-FM) distress frequencies, coordinate SAR operations, and communicate with commercial and recreational vessels. Rescue 21 provides short range communications between Coast Guard assets performing a variety of missions other than SAR, including Maritime Safety, Maritime Law Enforcement, Homeland Security, and Marine Environmental Protection. Uninterrupted Rescue 21 system availability is required for the Coast Guard to comply with the International Maritime Organization's Safety of Life at Sea treaty.

Since 2018, widespread VHF-FM outages within the Rescue 21 Alaska system baseline caused by factors like harsh weather and remote geography negatively impacted radio communications coverage throughout the Southern Alaska region. Additionally, obsolete hardware and network infrastructure led to decreasing system availability and performance.

To address these performance issues, the Coast Guard continues to modernize technology at remote fixed facility (RFF) sites to enhance communication capabilities. This modernization effort will upgrade microwaves and generators, standardize radio equipment at all Rescue 21 Alaska RFFs, and perform other system enhancements to improve operational availability. These modernization efforts will result in a more easily supported system with enhanced communication capabilities between the Coast Guard and the maritime public. To date, the Coast Guard replaced 17 of 18 microwave links and 18 of 23 generators. Replacement of legacy hardware at each Alaska RFF is expected by the fourth quarter of fiscal year (FY) 2023.

III. Report

Mariner Notification

The Coast Guard's Seventeenth District (D17) currently announces VHF outages through Broadcast Notice to Mariners (BNM), Local Notice to Mariners, and email user groups that include:

- Local news outlets;
- Pilots associations;
- Tug and barge companies;
- Fishing groups and associations;
- Borough assemblies;
- Sportsman's groups;
- Alaska Fish and Game; and
- Local harbor masters.

Coast Guard Command Centers also notify the maritime public by broadcasting outages over VHF-FM through adjacent RFFs to reach mariners at sea. Additionally, the Coast Guard transmits outage information through Automated Identification System (AIS) technology.

Beginning April 1, 2023, the D17's Sector Command Centers began providing links to the RFF outage information on their social media sites. D17 is updating Standard Operating Procedures to ensure social media sites are updated with a link to the respective public-facing webpage for outage information within 48 hours of a casualty for any impacted ports¹.

Methods for notifying mariners of outages in areas with limited cellular connectivity include the following services provided by D17's Sector Command Centers:

- Broadcast outage information via VHF on adjacent RFFs;
- Create and release a BNM;
- Ensure the Coast Guard's Communications Command is broadcasting information on Navigational Telex; and
- Coordinate with District Seventeen to release an AIS message.

D17 Sector Command Centers also coordinate with local radio stations to widely broadcast the Homeport webpages, with the latest Rescue 21 and other communications outage information available for mariners.

Technology Gaps and Implementation Plan

The Coast Guard is conducting a three-phase, multi-year modernization of Rescue 21 Alaska (see Figure 1, page 5). Since FY 2020, Phase 1 improved power generation and microwave data links,

¹ Social media resources for outages include: Coast Guard District Seventeen, <https://www.facebook.com/USCGAlaska/>, Coast Guard Sector Southeast Alaska, <https://www.facebook.com/SectorJuneau/>, and Coast Guard Sector Western Alaska, <https://www.facebook.com/U.S.CoastGuardSectorAnchorage/>

and the Coast Guard anticipates completing these projects in the fourth quarter of FY 2023. Phase 2 includes modernization of radio base station equipment at many remote tower sites. Current efforts include replacement of end-of-life radios with an internet protocol (IP) capable solution, which enables remote management and troubleshooting, and will result in increased operational availability and reduced downtime by allowing significant troubleshooting activities to occur without traveling to the remote site.

The Coast Guard estimates the total cost of Phase 2 to be \$18.6 million, and the Service is working to identify future year funding for this phase as part of the annual budget review process and subject to available resources, which is intended to reach the 98 percent availability requirement for this system.

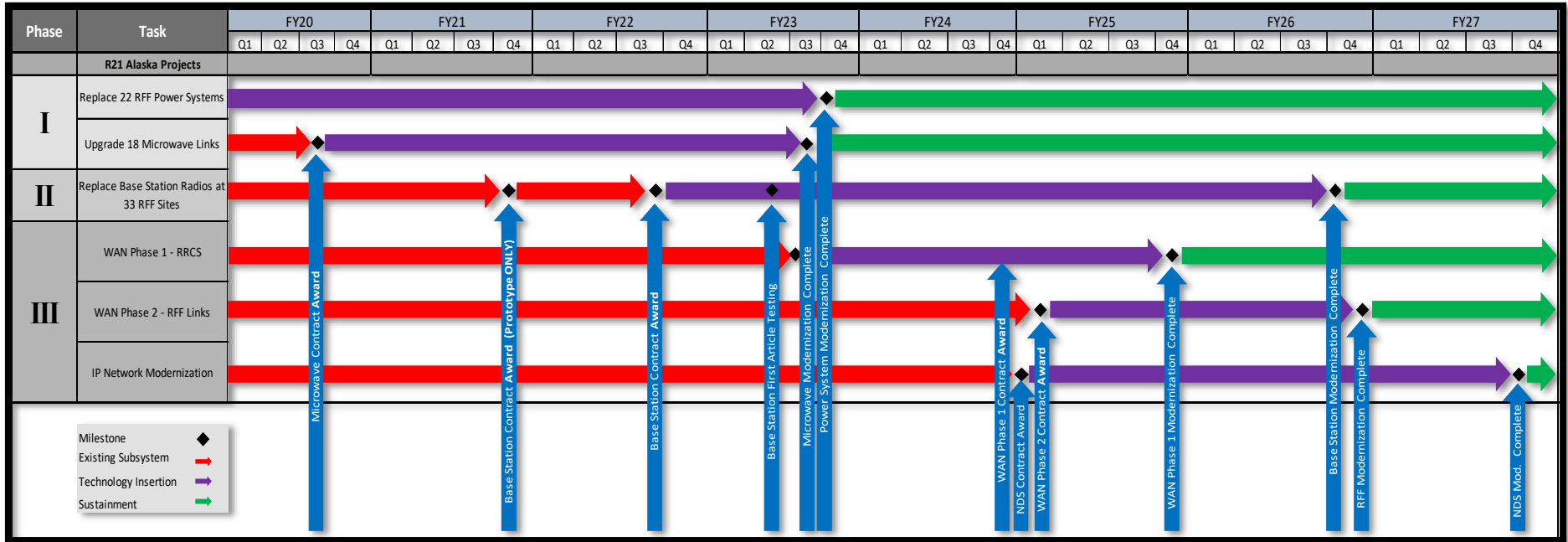
Phase 3 will modernize obsolete routers and switches with a wide area network (WAN) to enhance remote management and troubleshooting capabilities and replace the circuit-based echo system with an IP-based Network Delay System. The Coast Guard continues to refine cost estimates associated with Phase 3.

Even as the Coast Guard continues its efforts to modernize the footprint of Rescue 21 Alaska and provide more reliable and resilient SAR services, it commenced preliminary steps to replace this legacy capability with a next generation system and is documenting requirements and assessing potential technology solutions.

Technologies include automated AIS notification of outages to mariners in areas in which cell connectivity does not exist and land-based AIS transmission capabilities to mitigate outages and raise awareness to mariners.

In addition, the Coast Guard has partnered with the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) to explore an additional means to monitor and relay VHF-FM distress alerts: via commercial on-orbit satellites. DHS S&T is negotiating work that would develop a feasibility study, a concept of operations, and a cost estimate for service. Based upon favorable results, DHS S&T will then test and evaluate the capability in close coordination with the Coast Guard, and the Coast Guard will provide updates as those tests are finalized.

Figure 1: Rescue 21 Alaska Modernization Timeline*



*This timeline is notional and subject to the annual budget process and available resources.

IV. Conclusion

The Coast Guard invested \$32 million in Rescue 21 Alaska hardware and power generation units. While the existing equipment was a leading cause of failure and the focus of modernization efforts, the Coast Guard will continue to improve reliability and resiliency of the system across Southern Alaska.

Future technologies like satellite-based messaging, high frequency communications, and cellular capabilities are being explored to enable the Coast Guard to receive, monitor, and promptly act upon distress alerts to accomplish its SAR mission. These technologies will help mitigate the challenges inherent to operations in the Arctic and Alaskan areas of operation – harsh weather, geographic constraints, remote locations of fixed infrastructure – to better support mariner safety.

Appendix: Abbreviations

Abbreviations	Definition
AIS	Automated Identification System
BNM	Broadcast Notice to Mariners
D17	Coast Guard District Seventeen
DHS	Department of Homeland Security
FY	Fiscal Year
IP	Internet Protocol
RFF	Remote Fixed Facility
SAR	Search and Rescue
S&T	Science and Technology Directorate
VHF-FM	Very High Frequency – Frequency Modulated
WAN	Wide Area Network