



2019

ARC Acoustic Releases For Ropeless Fishing



Freedom To Fish &
Freedom To Migrate



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Made in Monterey Bay CA, USA

Desert Star
Systems LLC



lobster or crab fishers.

The emerging ropeless fishing industry, already established commercially in Australia since the 2013 season, holds the promise of reliable access to the resource by effectively mitigating the risk to whales and other migrating marine animals. And in 2018, great strides were made towards to the establishment of this new fishing method in North America.

Following the entanglement of seventeen North Atlantic Right Whales in 2017, the Canadian Federal Government enforced large closures in 2018 but also pushed hard to evaluate ropeless fishing as a possible solution. This initiative was complemented by work in the U.S. and New Zealand. The overall scale of the effort has been remarkable. Our company alone was contracted to provide over 60 acoustic releases to 13 fishers across six fisher's associations. In North America, sea trials spanned the region from Cape Cod Bay to the Bay of Fundy, Nova Scotia and up to the Gulf of St. Lawrence. By my estimate, these still ongoing tests may ultimately involve some 700 deployment and recovery cycles of our ARC-1 'acoustic release'.

This 2019 brochure provides examples of the work, which I joined on numerous vessels. While there were many outcomes, I think you will find one simple truth. That the ARC-1 and associated boat electronics is not a one-size-fits all straightjacket, but rather a flexible and reliable tool that allows you to remove the end lines from the water column in a way that works best for you!

This technology shouldn't be a requirement for all fishers. It should simply be a new way to fish, yes one with new complexities but also one with new opportunities for access. But, a big step still lies ahead. Now that the technology has been tested extensively in North American waters, it's time for government to keep the momentum and define the rules by which ropeless fishers will be allowed to fish safely, side by side with the migrating animals.

Our company will support this effort, and we are looking forward to seeing your first commercial ropeless fishing in 2019.

- Marco Flagg,
CEO
Desert Star Systems LLC



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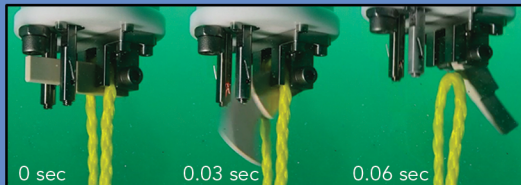
Funding Organizations: Canada
Department of Fisheries and
Oceans (DFO). Atlantic Fisheries
Fund (AFF). International Fund for
Animal Welfare (IFAW).
Government of New Zealand

Fisheries Associations: Acadian Crabbing Association (ACA). Cold Water
Lobster Association (CWLA). Grand Manan Fishers Association (GMFA).
Massachusetts Lobstermen's Association (MLA). California Dungeness Crab Working Group

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The Fusible Link Release Mechanism



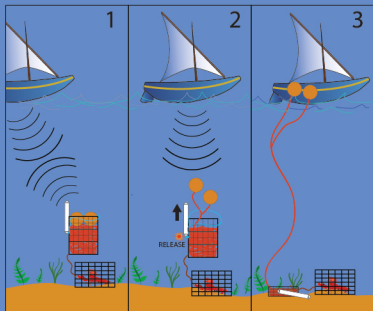
Key to the ARC system is a simple, fast-acting and highly reliable fusible link release mechanism (US Patent 7,138,603 B2). The release mechanism uses only a single moving part, a loosely hinged lever. All parts are made from non-corrodible titanium and Delrin materials. In Australia, ARC-1 systems going on their 7th lobster fishing season in 2019 show no signs of functional degradation.

The ARC-1 or ARC-2 can be used with a variety of release bags or cages to meet your requirements. In 2018, Canadian and U.S. pilot fishers experimented with a small rigid opening bag for ease of single-operator use in Cape Cod bay, larger floating bags with a capacity of up to 300 fathoms of rope for deep water fishing in Nova Scotia, and cages mounted on heavy steel sleds to deal with strong tidal currents in the Bay of Fundy. As with any of your fishing gear, you gradually optimize your design to minimize snags and maximize performance.



Release bag for lobster trawls in Nova Scotia (CWLA), set to float 1-2 fathoms above anchor to minimize whale entanglement hazard

Small bag for Cape Cod Bay shallow water lobster fishery (MLA). Rigid top frame clips into holder under winch for refill.



Operation At Sea



Deployment: Deployment is faster and easier than traditional trawls because the long vertical lines aren't paid out and aren't in the way of the navigating boat. The rope and float stored in a bag on a short stub line goes in first, the end bag slides off the deck following the last anchor. Without vertical lines in the water column, trawls and singles can be set more tightly and gear conflict is reduced.



Release: Floats pop-up ahead of the approaching boat in broadcast mode, but in high-current waters individual release is practiced. Aided by ranging distance, the boat is positioned directly above a bag. Upon acknowledge of the skipper's release command floats rise at a speed of 4 knots (1 fathom/sec). Nova Scotia & Grand Manan fishers with a vertical line scope of 2:1 to 3:1 in their bags found floats stay at the surface generally, but submerge near the tidal current peaks of 2-3 knots, when there is a 2-6 minute window to capture a float.



Recovery & Re-Arm: Empty bags are re-armed before refill by placing the 3mm release cord loop in the mechanism and constraining the lever with a new length of fusible wire. The empty bag then is placed under the winch, accepting the end line from the next trawl haul. The tensioned release cord is used to close the bag. This method inverts vertical line top and bottom on each haul. When tapered rope is used for a more compact bag, the end line is fed into a bin first, then transferred quickly into a waiting bag using a fast line hauler. This also eliminates the need to swap the floats from one end to the other on each haul.

Virtual Gear Marking with Ropeless Fisher

Ropeless fishing requires a substitute to surface buoys for both gear conflict avoidance and compliance inspections. This is provided by the free Ropeless Fisher app currently available for Android devices on the Google Play Store.

Key capabilities:

- You can mark your singles and trawls in your present location only.
- You can view them from anywhere.
- You can specify a visibility radius only from within which other fishers can see your gear.
- You can share your individual release codes with inspectors.
- Other fishers (fixed and mobile gear) can see your gear, but only if present within your specified radius. They can map it and see details including when you set the gear and your contact e-mail.
- Inspectors can see all gear in a fishery from anywhere. Only they will see the release codes if provided by you.
- Fisher's associations can request authority over a fishery designator. They can request the banning of any bad actor (space holding practices etc.) within that designator.
- Fishery departments can request access to the app source code for inspection or to use as a starting point for a department authorized version of the app.

Instructions for Ropeless Fisher are available here:

www.desertstar.com/page/rope-less-fisher-app

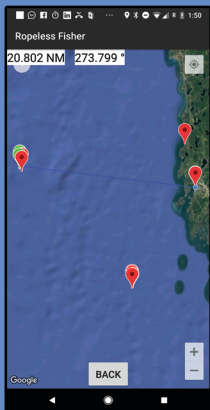
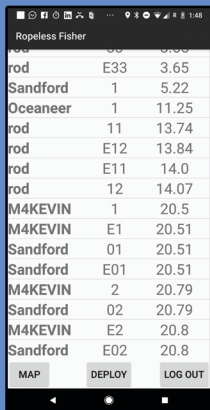
Visit Google Playstore to download the app.

Bottom Left: Ropeless Fisher App List View

Bottom Center: Ropeless Fisher App Map View

Bottom Right: Ropeless Fisher App Map in Use

Right: CWLA Fishing Boat



ARC-1XD

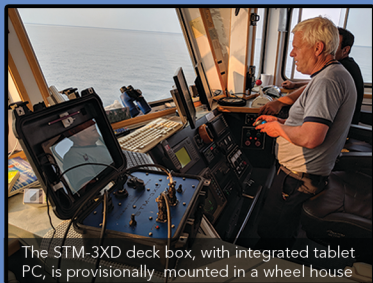
Ranging Release for High-Current Offshore Fishing

ARC-1XD is compatible with pot fishing in most waters up to 150 fathoms / 300m depth, and supports high-current fishing. An acoustic ranging function locates traps, allowing the boat to be placed directly above for speedy recovery once the floats have surfaced and before they might submerge again. The release can also be operated in broadcast mode (see ARC-2XD) for efficient gear recovery in low-current waters.

The ARC-1XD uses corrosion proof titanium hardware and a tough Delrin plastic housing. The replaceable primary batteries last for an annual fishing season including up to 50 release cycles. ARC-1XD is fully serviceable by a local marine technician or by yourself with basic skills. Units in commercial fishing service in Australia for seven years now remain in good condition. Field experience with other Desert Star gear supports a life expectancy of 10-20 yrs with regular service.

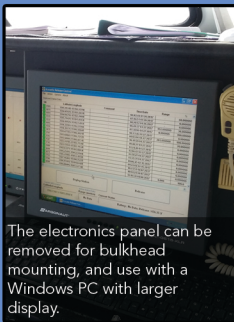


ARC-1XD release mounted on a plastic mesh release bag.



The STM-3XD deck box, with integrated tablet PC, is provisionally mounted in a wheel house

Part #	Qty	Price (USD)
STM-3XDT - Deck Box incl. through-hull & over-the-side transducer, and ARC spare parts & supply kit	1	\$8,000
DB-ARC - surface control software installed on a notebook PC	1	\$2,995
ARC-1XD - Ranging Acoustic Release	1-9	\$1,995
	10-49	\$1,700
	50-99	\$1,600
	100+	\$1,550



The electronics panel can be removed for bulkhead mounting, and use with a Windows PC with larger display.



The through-hull transducer can project a signal to a deep ARC (50-150 fathoms), or as mounted on a boat stabilizer here and pointed forward, broadcast signals to ARC releases ahead of the approaching boat.

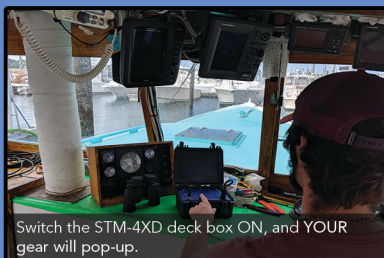
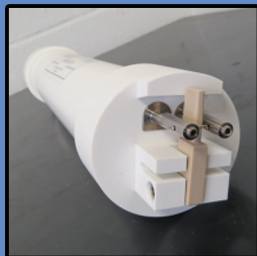
ARC-2XD

Low-Cost Broadcast Release for Efficient Trap Recovery in Low-Current Waters

ARC-2XD is optimized for quick and efficient recover of numerous traps in areas with low currents. Its simplicity makes it particularly useful for single-operator boats.

The releases are triggered by the deck unit through repeat-transmissions code common to all your gear (fisher specific), rather than an individual code for each device. Thus, head gear pops up ahead of the approaching boat. A factory programmed blackout phase prevents release trigger for a set period such as one day to allow simultaneous recovery and re-deployment of traps. The STM-4 deck box is simple and is controlled via an ON/OFF switch. You can use the STM-4 with the through-hull transducer pointed forward to trigger your gear ahead of the approaching boat. Or, dunk the over-the-side transducer.

The broadcast release mode (which is also available when operating the ARC-1XD) is more efficient for servicing a large number of traps quickly where low current conditions permit. The ARC-2XD is a sealed unit and its internal battery is charged, not replaced. As such, serviceability is limited and available only at the factory.



Switch the STM-4XD deck box ON, and YOUR gear will pop-up.



The over-the-side transducer operates in all directions, and is a useful option for shallow water.

Part #	Qty	Price (USD)
STM-4XD - Deck Box inclu. through-hull & over-the-side transducer	1	\$4,000
MCU-5XD - battery charger for ARC2-XD. Nominal charge time 12hrs	1	\$1,000
ARC-2XD Broadcast Acoustic Release	1-9	\$1,000
	10-49	\$850
	50-99	\$800
	100+	\$775

Economics of Ropeless Fishing

In broad terms, the expense and economics of ropeless fishing is comparable to the acquisition of a large pickup-truck like a Ford F-250. A fisher operating 21 trawls, as is typical in Nova Scotia, needs 42 releases (two per trawl) plus boat electronics, for a total of U.S. \$82,395. Quite comparable to a top of the line Ford truck. One might expect to get 10-20 years of service out of the releases depending on your use, similar to a vehicle. At a conservative ten years of use (perhaps one suffers a lot of loss to ground trawlers or similar), the annual cost of ownership for the equipment set is \$8,240 or about \$10,000 including estimated maintenance and battery change costs.

Offshore Nova Scotia fishers might generate a total revenue of about U.S. \$350,000 per year. That means the cost to engage in ropeless fishing is around 3% of gross revenue. Now compare this cost to the benefits one might gain from ropeless fishing. This might include reliable access to the fishing resource, a reduced risk of catch being poached or gear tempered with, lower risk of losses or damage from boat strikes, or heavy weather. There are many ways ropeless fishing can benefit business - Australian users of the ARC Acoustic Release certainly agree!

Specification	ARC-1XD	ARC-2XD
Size	533mm L x 62mm D	394mm L x 70mm D
Depth Rating	300m	300m
Battery Type	Replaceable (4 x 'AA' Alkaline plus 1x Tadiran TL-5930/F Lithium)	Rechargeable Li Ion (4 x ICR18650, 3.7V 10.4 Ah)
Battery Endurance	1 year w/ 50 releases	2 year w/ 50 releases
Acoustic Ranging	Yes	No
Individual Release	Yes	No
Broadcast 'Release All' with Fisher Specific Code	Yes	Yes
Release Mechanism	Fusible Link, 36 kg load tested	Fusible Link, 36 kg load tested
Hardware	Titanium & Delrin	Titanium & PVC
Serviceable	Yes	Limited Factory Service
Warranty	1 Year	3 Years
Service Life Expectancy - (Eng. Est.)	10+ Years	3-10 years (limited by Li Ion battery life)

