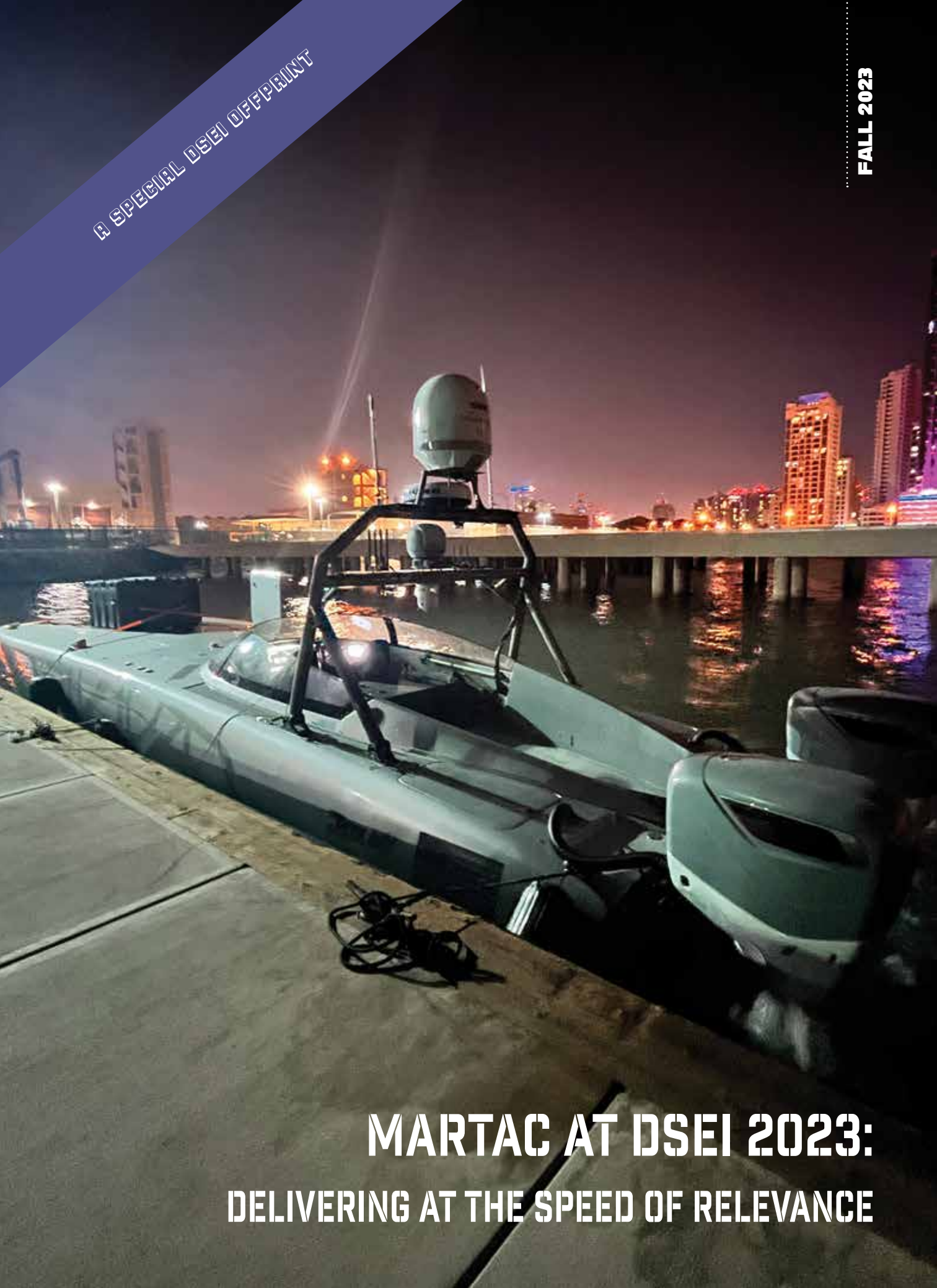
A SPECIAL DSEI OFFPRINT

FALL 2023



MARTAC AT DSEI 2023:

DELIVERING AT THE SPEED OF RELEVANCE

Special offprint - Fall 2023

Designed and published By DIESL
(Paris, France)

Text written by Robbin F. Laird
Based On Interviews With:

- **Commodore Darron Kavanagh, Royal Australian Navy**
- **Bruce Hanson, Chief Executive Officer, MARTAC Systems**
- **Stephen Ferretti, Chief Marketing Officer, MARTAC Systems**
- **Steven Timmons, MARTAC Systems**

Photos credit © *MARTAC*

Proofreading & Prepress
Pauline Schaltegger

Printing
Imprimerie de Champagne (Langres, France)

Cover Photo
The T38

Power Point Above
The T38

Back Cover Photo
The T24

MARTAC AT DSEI 2023

This fall, MARTAC Systems – Maritime Tactical Systems - will be present at DSEI, Booth H5-338.

INTRODUCTION
CLOSING THE GAP BETWEEN CAPACITIES AND CONOPS

The Role of Maritime Autonomous Systems: Mission Thread Capabilities to Meet the Needs of Modern Warfare

If you are looking at the potential role of maritime autonomous systems from the standpoint of traditional acquisition approaches, the legacy concept of platforms, and are not focused on the priority for software transient advantage in modern warfighting, then you will totally miss what the coming of maritime autonomous systems is all about.

This introduction is based on a discussion about maritime autonomous systems and their role going forward with Commodore Darron Kavanagh, Director General Warfare Innovation, Royal Australian Navy Headquarters. As a nation facing major maritime challenges, there is probably no nation on earth that needs to get this right more than Australia. Threats tend to focus the mind and the efforts.

T-38 operating with the Saudi Navy surface fleet in an Arabian Gulf exercise © Martec

AN INTERVIEW WITH COMMODORE DARRON KAVANAGH, DIRECTOR GENERAL WARFARE INNOVATION, ROYAL AUSTRALIAN NAVY HEADQUARTERS

Maritime autonomous systems don't fit into the classic platform development mode or the sharp distinction between how particular platforms operate or perform and the various payloads they can carry. They are defined by the controlling software and the payloads they can deliver individually or as a wolfpack with the role of platforms subordinated to the effects they can deliver through their payloads. The software enables the payloads to be leveraged either individually, though more likely in combination as a wolfpack or a contributor to a combat cluster.

The discussion focused on mission threads as a way to understand the role and contribution of maritime autonomous systems. What missions does a combat commander need to accomplish? And how can maritime autonomous systems contribute to a mission thread for that combat commander, within the context

of combat clusters?

As CDRE Kavanagh underscored: "One of the issues about how we've been looking at these systems is that we think in terms of using traditional approaches of capability realization with them. We are not creating a defense capability from scratch. These things exist, already, to a degree out in the commercial world, regardless of what defense does. AI built into robotic and autonomous systems are in the real world regardless of what the defence entities think or do.

"And we have shown through various autonomous warrior exercises, that we can already make important contributions to mission threads which combat commanders need to build out now and even more so going forward."

Going beyond replacing platforms to "deliver lethality at the speed of relevance"

Indeed that is really the next point. The use of maritime autonomous systems is driven by evolving concepts of operations and the mission threads within those evolving CONOPS rather than by a platform-centric traditional model of acquisition. CDRE Kavanagh pointed out that traditional acquisition is primarily focused on platform replacement and has difficulty in supporting evolving concepts of operations.

This is how he put it: "We're good at replacing platforms. That doesn't actually require a detailed CONOPS when we are just replacing something. But we now need to examine on a regular basis what other options do we have? How could we do a mission in a different way which would require a different profile completely?"

Put another way, combatant commanders can conduct mission rehearsals with their forces and can identify gaps to be closed. But the traditional acquisition approach is not optimized for closing such gaps at speed through the use of disruptive technologies. The deployment and development of autonomous systems are part of the response to the question of how gaps can be closed or narrowed rapidly and without expensive solution sets.

According to a senior Naval commander, the "gaps" problem goes as follows: "Rehearsal of operations sheds light on our gaps. if you are rehearsing, you are writing mission orders down to the trigger puller, and the trigger puller will get these orders and go, I don't know what you want me to do. Where do you want me to be? Who am I supposed to check in with? What do you want me to kill when I get there? What are my left and right limits? Do I have target engagement authority?

"This then allows a better process of writing effective mission orders. so that we're actually telling the joint force what we want them to do and who's got the lead at a specific operational point. By such an approach, we are learning. We're driving requirements from the people who are actually out there trying to execute the mission, as opposed to the war gamers who were sitting on the staff trying to figure out what the trigger pullers should do."

But how to close the gaps?

As CDRE Kavanagh argued: "We need to deliver lethality at the speed of relevance. But if I go after the conventional solution, and I'm just replacing something, that's actually not a good use of my very finite resources. We need to be answering the operational commanders request to fill a gap in capability, even if it is a 30% solution compared to no solution on offer from the traditional acquisition process…."

A T-38 Devil Ray with a MANTAS USV in nested doll configuration

FLEET INTEROPERABILITY: MARTAC'S NESTED DOLLS' APPROACH

AN INTERVIEW WITH BRUCE HANSON CEO, MARTAC SYSTEMS

As the U.S. Navy shifts to a priority emphasis on distributed maritime operations, the opportunity for maritime autonomous systems to play a growing role is opened up. That is for the simple reality that as distributed modular task forces deploy, autonomous capabilities can contribute to the lethality and survivability of the force.

The kill web is a collection of sensors netted with C2, able to pass critical data to the optimal delivery system in order to rapidly achieve the commander's intent. Software technologies are key parts of the way ahead to allow for switching across multiple domains to provide for a secure operational web.

Autonomous USVs can provide wolfpack-deployed ISR or relay systems to enhance the reach and survivability of the fleet in its distributed operational role. They can also provide the ability to move data to other deployed task forces to provide for enhanced integrability to do so.

This is about deploying autonomous USVs in a wolfpack to operate payloads appropriate to the mission assigned to them by the commander of the modular task force. This means that the nature of the payloads onboard the USVs and their ability to work as a mission team are key attributes of how an autonomous system wolfpack can contribute to the survivability of the fleet (situational awareness) and lethality (through target acquisition support).

But the nature of the platform is important to enable such a capability. The focus on autonomous systems may be often described as "platform agnostic," but clearly the platform needs to be viable for the mission sets it carries the payloads for.

Not a simple replica of a manned vessel

So what might such a platform look like? And how might it be built, upgraded, and maintained?

An autonomous USV is not a morphing of a manned vessel into an unmanned one. It is not simply a replica of a manned ship, but rather a vessel operated by robotics or remotely piloted.

MARTAC Systems have built and are upgrading their platforms upon which various payloads are being operated. What MARTAC has delivered is an autonomous USV capability that navies and maritime security organizations can use to build their operational experience for enhanced defense and security capabilities now and to learn how to reshape the force going forward.

The company currently features two boats, one measuring 12 feet in length (Mantas) and the other 38 feet in length (Devil Ray). They have other sizes of boats in process, but the core point is that they have built the boats so that if one can be trained to operate one of them, one can operate the others as well.

Bruce Hanson, MARTAC's CEO, underscores that they have built their boats since 2010 by building vessels of three feet in length so that they could operate several of them to test out systems and capabilities. This also meant that from the ground up, they have focused on how the vessels can operate as a wolfpack.

As he notes: "There is no point in simply looking at one of our boats in isolation. It is about they can operate as a wolfpack, operating in your terms within a broader fleet kill web or mesh approach."

Hanson underscores that "the vessels talk to each other and can adjust to single platform failures or degradation."

As he puts it, "They can operate as a self-healing commando team." The boats are built to provide a scalable fleet of USVs. (...) What you get with the different size vessels are differences in range and payload ranging from 18 to 16,000-pound payloads and ranges from 35 to 1000 nautical miles on vessels from 6 to 60 feet."

The boats are built to interface with customer payloads, as the company has eschewed building their own payloads from the outset. From the beginning, they understood that customers would wish to operate their own payloads, whether that be a U.S. service preference or for allies and partners.

The boats are catamarans. Hanson and his team hold the world speed records for catamarans, and they have applied their real-world experience to building boats to operate as USVs for the maritime and security forces. The boats are built from carbon fiber, are very durable, and are able to operate through waves in high sea states.

The form factor of the boats is such that they can operate from standard navy RHIB launchers and can be configured to fit into various naval standard launch systems as well. The company has its own core software team, which builds the software to operate the vessel, the C2, and the interface with the payloads.

As with all good smaller companies building a focused capability, they control the entire upgrade capabilities of their operating software systems for their boats. The boats come standard with four independent C2 systems, which allows for flexibility in operating the boats dependent on the mission sets. The boats have low/high bandwidth sat com, high bandwidth line of site, low bandwidth line of sight and 4G/5G communications capabilities.

According to Hanson, "We have quite a bit of edge processing on the boat along with cyber protection systems." The boats have a unique dead zone capability as well. This means that boats will stop, slow down, return to base, continue, or do some other response if communications are cut so that the MARTAC boats do not suffer from the "runaway boat" problem that other USVs have demonstrated in various exercises.

An Innovative "Nested dolls" Approach

The control system is designed for handoffs for boat control among operators in the fleet or ashore. The system can allow coalition transfer as well, which would mean that a European nation with a fleet of MARTAC boats in operation could transfer control of those boats for a period of time to a partner or ally for their mission. The boats are built to operate together or separately, dependent upon the mission requirements. But they built the boats with a "nested dolls" approach.

This means that the 38-foot boat can autonomously launch a 12-foot boat to collaborate in the mission as well. The company has a slogan that goes with their company moniker, which is "Beyond Human Capability." What this bluntly means is that the users of the boats need to understand that these boats are not simply imitations of what humans would do if operating them.

Rather, the boats operate differently from how a human could do so if on the boats. What this means, for example, is that the speed of the boats and the turning ratios of the boats are beyond what a human onboard could survive. Getting navies to understand that autonomous systems are not remotely piloted is a challenge as well.

Hanson tells the story of an exercise with the U.S. Navy where the MARTAC representative told the U.S. Navy evaluator that he was going to lunch right in the middle of the live mission. The evaluator commented, "You can't do that—who will run the boat?" "It's Sea State 3+," the MARTAC rep said. "The boat is operating itself. See you after lunch." When he came back from lunch, the boat was performing as expected, and the U.S. Navy evaluator said, "Your boat truly is autonomous!"

Building a robust platform from day one to be autonomous, with appropriate operational software but allowing for flexible customer payloads, is what MARTAC is focused on doing with regard to their USV boats.

The T-24 Devil Ray is the first productionized MARTAC USV

LAUNCHING THE DEVIL RAY T24

MARTAC has been working on autonomous maritime systems for more than a decade. They have worked from the beginning on USVs that worked together rather than simply being lone wolf systems; they operate as wolfpacks.

In the past decade, they developed two workhorse USVs and have taken these worldwide to evolve their capabilities and to work with various navies in shaping the payload-platform combinations which these customers desired. The two systems the MANTAS and the DEVIL RAY have provided two different form factors for a USV. The MANTAS being a 12-foot boat and the DEVIL RAY T-38 a 38-foot boat.

Enter the Devil Ray T24. This is first fully "productized" MARTAC USV, according to Stephen Ferretti of MARTAC. What this means is that the T24 has been built from the ground up to operate as an autonomous maritime system which can carry a variety of payloads already demonstrated on the MANTAS and the DEVIL RAY. The Devil Ray T24 is built with both size and speed to accommodate new and evolving mission threads.
According to Stephen Ferretti, Chief Marketing Officer at MARTAC Systems: "We have built a system which is agnostic with regard to payload. It is designed from the ground up to swap out payloads as desired by the customer and dependent on their operational needs in the particular situation they are facing."

Such a capability when combined with other innovative platforms can create true disruptive change. In short, introducing a productionized T24 can accelerate the kind of change which U.S. and allied force need now, not in some distant future. In fact, one could envisage their role being significant in a sea denial mission in the waters west of Taiwan in enhanced deterrence in the near term.

Devil 59 and Flexrotor

MISSION THREADS AND EUROPEAN EXERCISES:

MARTAC'S 24 FOOT USV AT BALTOPS-23 AND REPMUS 23

Recently, MARTAC announced the launch of their new Devil Ray T24. This is a production USV in the MARTAC line of scalable USVs. It made its first appearance in a major exercise at this year's BALTOPS-23 exercise and will make its next at REPMUS in September 2023. Steven Timmons, from MARTAC, has given us insight about these LIVEX lessons learned.

BALTOPS-23 is an exercise that has been held for more than 50 years in Europe. This year's exercise was described by the U.S. Navy as follows: "As in previous years, U.S. Sixth Fleet is partnering with the U.S. Naval research enterprise to bring the latest advancements in emerging unmanned technologies to conduct mine countermeasures (MCM) operations. To forward these efforts, Sailors and Marines are experimenting and integrating with Unmanned Underwater Vehicles (UUVs), Unmanned Aerial Vehicles (UAVs), and Unmanned Surface Vehicles (USVs)."

REPMUS is held in Portugal and led by NATO. This how REPMUS 22 was described: "REPMUS is a Portuguese-led exercise and focuses on capability development and interoperability. REPMUS stands for Robotic Experimentation and Prototyping with Maritime Unmanned Systems. The exercise has been held in Portugal's Troia Bay since 2004. In 2014 the NATO Centre for Research and Experimentation (CMRE) joined REPMUS for the first time. Since 2019 the NATO Maritime Unmanned Systems Initiative (MUSI) has been playing a growing role in the exercise."

A USV contributes to maritime operations in terms of the mission threads which it can perform. In BALTOPS-23, the Devil Ray T24 was tasked to deliver a mine detection USV close to the mine field so that the USV could get into operation much quicker than if it had to get there under its own power. With the ability of the Devil Ray to travel a long distance at speed, the ability to close from the sourcing location of the USV to delivery in the mine field is a crucial enabler of being able to deliver the right platform to the right place at the right time without exposing humans to threats.

But that is not the only mission thread which was performed by the Devil Ray in the BALTOPS-23 exercise. It was tasked to perform a downed pilot personnel rescue mission as well. This USV can provide capability for medevac and other personnel recovery missions leaving capital ships to focus on their core tasks. It is about adding capability to relieve the stress on the Navy's capital ships and to not put them in harm's way to conduct peripheral but essential missions.

At REPMUS23, the Devil Ray will continue its work on supporting counter mine missions as the U.S. Navy looks to be able to now deploy a cluster of smaller UUVs to cover an area of interest much quicker.

Because the USV is payload agnostic, it can be anticipated that other mission threads will guide the Navy in terms of how it will use the Devil Ray. Transport of material in support of expeditionary basing by the Marines or of the delivery of sonobuoys to the area of interest can be anticipated as plausible payloads for delivery by this USV at speed and range.

Precisely because the launch and recovery point for this USV is virtual limitless, from shore, from a base, from a combat ship, from a supply ship, from a commercial ship, or any combination thereof.

This provides not just flexibility but enhanced safety for the capital assets in short supply.

The T-38 Devil Ray is being refueled at sea by a USCG vessel in the 5th Fleet area of operations in 2023

ARABIAN GULF EXERCISE

REFUELING A DEVIL RAY USV AT SEA

Recently, during an exercise in the Arabian Gulf, a MARTAC Devil Ray USV was refueled by a USCG vessel. The production version of the Devil Ray can go more than 1000 nautical miles at normal speed but with refueling it obviously can stay on operations much longer.

And staying on station much longer is what it can do as well. During another recent exercise in the Gulf region, the Devil Ray went more than 1300 nautical miles while operating autonomously more than 90% of its time at sea.

With an ability to be refueled at sea, the Devil Ray USV becomes part of the at sea operational force. It can work with a wide variety of ships such as commercial ships, USCG vessels, all types of naval combat ships, and can empower them with its payload flexibility and with launch point agnosticism. With an ability to hand over command of the USV to various members of a maritime combat cluster, the USV can support a wide variety of assets to a variety of missions.

With the interchangeability of mission sets – ISR, C2, medevac, logistical support, and with a potential to carry weapons, this simple refueling at sea suggests the extent of change which USVs, notably operating as a wolfpacks of various sizes of the USVs – MARTAC currently operates three sizes of their USVs, the 12-foot MANATAS, its new productionized 24-footer or the 38-foot Devil Ray.


MEET US AT DSEI BOOTH H5-338
VISIT US @ HTTPS://MARTACSYSTEMS.COM
A DIESL PUBLICATION