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CAKAP TAKTIK MARITIM

PUSTAKMAR





PRESENTED the 45th edition of Cakap Taktik Maritim for 2017. We have exclusively found the good and interesting articles for your reading pleasure in this issue. The contributions from The Navy People was always on the good path. We hope these articles can provide you valuable insights and are thought provoking.

In the development of our warfare skills, we are likewise making tangible progress. The conduct of six Basic Tactical Training, one Integrated Tactical Training and Combined Tactical Training all in yearly basis was a

good practise of our ability and responsibility to maintain warfare knowledges and familiarization especially to our your generation. Despite a minimization of a budget by higher authority, we are able to maintain a good conduct of another programs as well. *Ceramah Maritim, Bengkel Pegawai Kanan, Bengkel Peperangan* and *Bengkel Doktrin Peperangan* still progressing as scheduled.

As you can see we are absolutely making good progress against our targets, we have set ourselves a challenging road ahead although I am confident that through our highly professional and motivated workforce and by working together with other unit, PUSTAKMAR will continue bringing the absolute ROI for the Navy. Once again my profound gratitude and appreciation for your continuous support and contribution to CAKAP TAKTIK MARITIM. We wish you every success and enjoy reading.

“Strive for victory”



**CAKAP TAKTIK
MARITIM**
45th edition
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TACTICAL AND STRATEGIC CONTRIBUTION

The wider MAF warfare community is strongly encouraged to submit articles to this publication on issues relating to maritime warfare, which are tactical in nature. To ensure the maximum number of articles you are requested to write about 1000 words. Illustrations are most encouraged. Contact the Editorial Team for advice at Tel: 05-6817853 or Fax: 05-6817868



Their flight can be controlled either autonomously based on programs that are pre-installed to onboard computers or by real-time remote control of a pilot on the ground or in another vehicle.



Utilization Of Unmanned Aerial Vehicles In Royal Malaysian Navy

Cdr Hairulnizam bin Hassin RMN

UNMANNED Aerial Vehicle also familiarly called as UAV, Drone, and Remotely Piloted Vehicle is unpowered aircraft including airplanes and helicopters (Khusyairi, 2009). UAV is designed to operate with no human pilot on board and can be remote controlled from certain distances or fly alone based on pre-programmed flight plans or more complex dynamic computerization systems. It is a system consists of three main systems, which is the aircraft, the Ground Control Station and the operator. There are many types of UAV that are varies in shapes, size, configurations, and characteristics. This UAV type depends on what operation it must execute on or its purpose. It can be categorize into two kinds: (1) Autonomous aircraft – fly base on pre-programmed flights plan and (2) Remotely piloted aircraft – Required real-time control. These types of aircraft also have few different names. They are also called Unpowered aerial vehicle, remote

unpowered air system, powered aircraft systems and model aircraft. Their flight can be controlled either autonomously based on programs that are pre-installed to onboard computers or by real-time remote control of a pilot on the ground or in another vehicle. The usual launch and recovery process of an unpowered aircraft is by using specific equipment or operator on the ground.

UAV is commonly used for military and special operation purposes. Nevertheless, UAV also used in civil applications such as patrolling, firefighting, package delivery and nonmilitary security work, such as inspection of power or pipelines. UAV is a new component of the aviation system which the industry are working to understand, fine and ultimately integrated to aviation community. These systems based on cutting edge improvements in aerospace technologies. They offered advancements that may

open new and enhanced civil/commercial applications as well as improvements to the safety and efficiency of all civil aviation. The safety integration of UAV into non-segregated airspace will be a long-term activity. A lot of parties adding their expertise on such diverse topics as licensing and medical qualification of UAV crew. Technologies for identifying and avoid systems, frequency spectrum (including its protection from unintentional or unlawful interference), separation standards from other aircraft, and development of a robust regulatory framework.

The utilization of UAV in the Royal Malaysian Navy (RMN) is still far behind. There are no serious action taken towards the use and increasing the awareness of this new technology in our navy. RMN is still dependent on the use of helicopters in the execution of our air operations. Not many research and study been conducted to explore and



In the mid-1800s, people already started to come with the idea of pilotless aircraft when Austrians design unmanned, bomb-filled balloons during Venice War.

increase the awareness of the people especially the Navy People the necessity and advantage of UAV.

HISTORY OF UAV – IN THE WORLD AND MALAYSIA

Although much of the technology and equipment related with the UAV are quite new, the concept was already used long time ago. In the mid-1800s, people already started to come with the idea of pilotless aircraft when Austrians design unmanned, bomb-filled balloons during Venice War. The drone saw today started its innovation in the early 1900. Originally the purpose of the drone was for target practice for military personnel training. It continued to be developed during World War I with the pilotless aerial torpedo that would drop and explode at a particular, preset time.

The technology continues to develop during World War 2 with the purpose to train the anti-aircraft gunners and also for attacking mission. However, they were little more than remote-controlled aircrafts during the Vietnam War

Era. After losing a lot of pilot in the war, United States started the highly classify UAV program in 1960. As for today it was reported the United States Air Force occupied around 7500 UAVs, and that means that almost 1 out of 3 US Air Force aircraft are UAVs.

In Malaysia, the UAV industry only become a concern starting approximately from year 2000. Dato' Seri Najib Tun Razak when he was defense minister had played a significant role in raising local UAV industry. Three local companies consist of Composites Technology Research Malaysia (CTRM), Systems Consultancy Sdn Bhd (SCS) and Ikramatic Sdn Bhd – which formed a partnership called Unmanned Systems Technology Sdn Bhd (UST). They design and manufacture UAV locally. Today there are some UAV produced by this company had been used either in our military or another government sector. The UAV also had been used recently during Lahad Datu crisis.

UAV WORLDWIDE

UAV had been widely used in different Navy in the world for various purposes. UAV use for reconnaissance, search and rescue, patrolling and even for attacking targets. Among the country using UAV in their navy is United States, Israel, China, Russia, Australia and others.

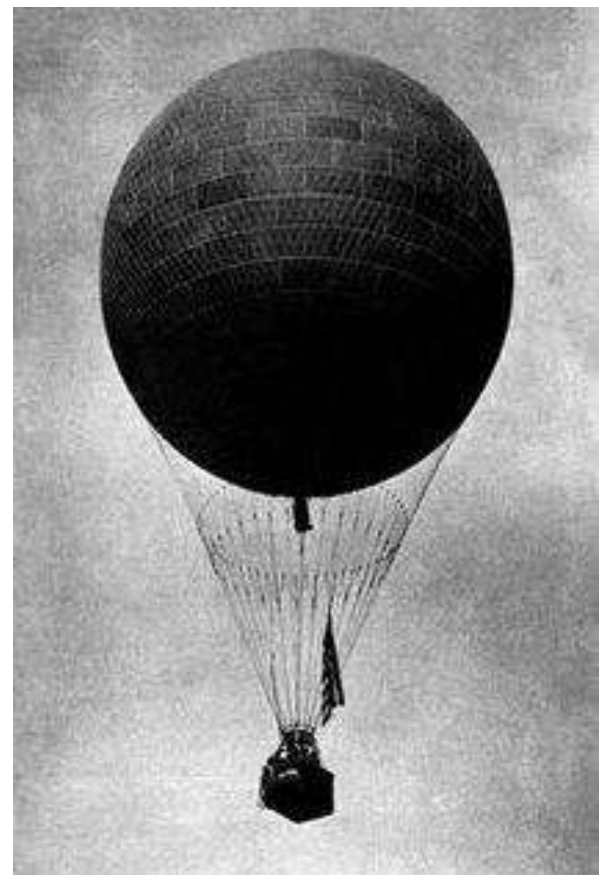
For the US, before they entered World War I, the

Austrians design unmanned, bomb-filled balloons during the Venice War.

US Navy (USN) developed a seaplane that could operate without a pilot on board. Research continued on the concept through the 1920s and 1930s. The Navy draw up and used a small plywood UAV in the Pacific during World War II to attack substantially defended targets.

The Navy also deployed UAVs during the Vietnam War. They design and developed a remote helicopter integrated with a television camera and two 250-pound torpedoes. This remote control helicopter was used to detect and destroy North Vietnam supply barges in Mekong Delta waterways. Despite several successful missions, the program was stopped due to the helicopter flight gyroscopes problems.

Demand for UAVs by the United States military since 2001 has been incredible increased. The United States Navy is making substantial investments in a number of major UAV programs. The budget allocated for the UAV development





Hand launched UAV; another type of UAV operated in military.

in US today had increased eight-time compared to the budget allocated ten years ago showing how significant necessary the UAV technology in their military.

The used of UAV also had significantly risen in other foreign navies. Many programs were established, and annual allocations for UAV development in most of the countries is also growing. They aware the important role of the UAV technology in this modern warfare and must keep with it in order not to left behind.

UAV APPLICATIONS

UAVs are mostly used in military applications for recognition, environmental observation, maritime surveillance and mine removal activities (Eisenbeiss, 2004). UAV is very useful in the navy, and they were deployed for various purpose or mission. It can perform the task that is too dangerous for the typical aircraft. Among the mission that can be assign to UAV are:

- Deep Penetrating strike.
- Penetrating Intelligence, Surveillance, and Reconnaissance (ISR).
- Communications Intelligence (COMINT) collection.

- Electronic Intelligence (ELINT) collection.
- Air-to-air combat.
- Airborne electronic attack.
- Suppression of enemy air defenses (SEAD).
- Close air support (CAS).
- Nuclear, Biological and Chemical Detection (NBCD).

Deep penetrating strike is a challenging and risky task for both

nominal aircraft and UAV. Typically targets in a deep penetrating situation are highly defended. An aircraft may have to wait to be successful against fleeting targets. However, the longer a penetrating aircraft loiters over a given area, the higher the probability it will be detected. Penetrating aircraft may attempt to counter this by varying the flight path while they loiter although this may expose the aircraft to enemy. Obviously, penetrating strike is an intended mission for an operational UAV. Two main advantages that UAV have over manned aircraft for this missions are longest endurance, and the crew can be avoided from the dangerous environment. On the other hand, UAV also can be deployed to perform over-the-horizon targeting in support of manned aircraft. However, the risk of the UAV higher compared to manned aircraft in this task because it requires active transmissions for communications to connect the UAV with the ground crew. Active connections make the UAV more exposed to detection and attack by air defense systems.



UAV launched from ship.

Second application in deploying UAV is penetrating ISR missions. Intelligence refers to information and knowledge obtained through observation, investigation, analysis, or understanding. Meanwhile, surveillance and reconnaissance refer to the means by which the information is observed. Surveillance is “systematic” observation to collect whatever data is available, while reconnaissance is a specific mission performed to obtain specific data (Chizek, 2003). The information gathered from the ISR sensors either can be stored onboard and analyzed when the UAV has exited the threat environment or transmitted real-time via communication links. However, this process is causing the UAV vulnerable to attack in traditional force-on-force military operations. With a manned aircraft, the onboard crew has the option between directly exploiting the ISR data products and at least filtering that data products are transmitted. Note that ISR collected by passive means is preferred, when possible, for manned and unmanned aircraft. So even though the UAV can be deployed for penetrating ISR, it is less suitable compared to intelligent strike because of the vulnerability that results from transmitting ISR data products to the ground crew.

Next application is Signals Intelligence (SIGINT). It is often gathered by nonstealthy aircraft from standoff range. SIGINT can be categorized into two different types. The first is communication intelligence (COMINT). Collection of COMINT is passive. Exploitation of COMINT data products requires a human analyst. In the case of UAVs, the data products must be transmitted to a ground analyst at potentially high data rates or stored for post-mission analysis. The process reduces the timeline of the information. UAV is not particularly well suited for COMINT collection because the continuously active



MQ-8 Fire Scout; the US Navy helicopter type UAV.

emissions were required to send the information to the ground crew. The transmission would make the platform less stealthy. Therefore manned aircraft have the advantage of exploiting COMINT information onboard.

The second SIGINT category is Electronic Intelligence (ELINT) collection, which is a passive process principally used to collect radar signals. ELINT is an important component of early warning radar used for self-protection aboard penetrating assets. Processing onboard the UAV can be used to detect, characterize, and locate ELINT emitters. The characteristics and location of the ELINT emitters, as opposed to the raw signal data, would be transmitted off board the aircraft. The process will reduce the power level of active emissions required for sending the intelligence products to the ground crew. If raw signal data must be analyzed off board, as is sometimes the case when the signal from an emitter of an unknown type is collected, it may be stored for

post-mission analysis. Only the characteristics and location of the emitter transmitted in real time. UAV may have an application as an ELINT collector because the data rate and active emission requirements are much lower than they are for COMINT. The data transmission requirements for ELINT are within the bounds that would be possible for a UAV.

Air-to-air combat against highly maneuverable enemy aircraft, in other words “dogfighting” is not a suitable application for a UAV for the time being. The situational awareness and reaction time of the ground pilot is insufficient. For a manned system, the pilot’s response time is around 200 milliseconds. For an unmanned system, such a response time is currently almost impossible. The data rate required to provide the pilot with the ground with situational awareness is very high, and any loss of communication signal could be disastrous for the UAV. If SATCOM provides the data link, propagation delay alone will triple the reaction time from 200 to

600 milliseconds. A UAV could be designed to react automatically to information gathered by its sensors, but mature automation technology does not exist to provide this capability, and many challenges remain. The UAV may be suitable for other air-to-air applications, such as attacking enemy high-value airborne targets that are less maneuverable, such as bombers or ISR aircraft. However, these targets are likely to be defended by fighter jets. The best option for using a UAV in an air-to-air capacity is to have the UAV be part of a larger formation that includes manned aircraft. The manned aircraft can lead the UAV into combat and provide guidance to the UAV weapons. In essence, the UAV is just providing the manned platform with more weapons. The UAV itself may be programmed to follow the lead of the manned aircraft and fire weapons at selected targets when instructed. Also, significant technical challenges would have to be overcome. So for the time being UAV still not suitable for air-to-air combat. Advances in automation technology and development of Concept of Operations (CONOPS) and capabilities for integrated manned and unmanned aircraft systems may enable air-to-air applications in future UAVs. But considerable challenges exist today.

Suppression of Enemy Air Defenses (SEAD) is defined as an activity that neutralizes, destroys, or temporarily degrades surface-based enemy air defenses by destructive and/or disruptive means (Bolkcom, 2005). SEAD usually involves the use of

electronic attack platforms with weapons. This application is dangerous for manned aircraft, and displacing the crew is an advantage for the UAV. It should be noted that after UAV deploys a weapon, its stealth characteristics would be compromised because the arms bay door would be open. Once the stealth is compromised, the probability of detection would be increased, but only after the mission is performed. For these reasons, SEAD is suitable for an application for the UAV.

Another application is in the NBCD warfare. Detection of NBCD threats is a dangerous task. Detection can be made either before or after release of NBCD agents. It is easier to detect NBCD agents after release than it is before the release. For instance, by flying through a plume created immediately after an attack on a suspected NBCD weapon site to collect samples. Another way by using sensors to analyze the content of the plume from standoff range to detect the presence of weapon agents and perhaps track the movement of the plume. Radiation and thermal signatures can be used for detection of some radiological and nuclear threats. Spectral analysis can be used to detect some chemical and biological threats. For instance, a

Hyperspectral Imaging (HSI) system can be used to characterize the spectral content of a plume and compare the measured spectra to a catalog of known spectra to see if there is a high probability it contains a chemical or biological warfare agent. For example using a hypothesis test. Some agents may not have unique spectral signatures, leading to false alarms. HSI systems usually incorporate several sensors, each capable of sensing a different portion of the spectrum. A simpler approach to NBCD detection is to have the UAV fly through the plume and collect samples to bring them back for testing against reagents. Because the aircraft may become contaminated, an unmanned aircraft in this application has the distinct advantage of eliminating risk of contaminating the pilot. Still, the aircraft has to be recovered and decontaminated. Although procedures are in place for NBCD decontamination of Navy aircraft, it is a complex and potentially hazardous task to perform on an aircraft the size of UAV on the deck of an aircraft carrier, whether the aircraft is manned or unmanned. An alternative is to have the UAV launch smaller UAVs that will fly through the plume and collect samples, and then recover the small UAVs on the UAV. The concept of



UAV pilot operates his drone.



The US navy sailors retrieve a drone after it had crashed into the sea.

having one unmanned system launch another is sometimes referred to as “marsupial robotics,” and many universities and laboratories are working to develop this type of technology. However, the challenge of launching and recovering marsupial UAVs in a penetrating environment with limited availability of communications for command and control and while maintaining stealth of the UAV is not trivial. A UAV equipped for penetrating strike and NBCD detection applications could have significant tactical value for striking NBCD weapon sites of near-peer adversaries. As discussed, there are many challenges to developing a NBCD detection capability for an UAV. Although progress is being made to address each of these, the combined challenge is formidable.

RISK

The identified potential risk of UAV operation are ground impact and collision with another aircraft. There is also another such as environmental contamination, injuries to ground personnel in

operating the aircraft, and property damage associated with UAV accidents. The risks associated with the fact that most of the unmanned systems are not sufficiently reliable yet by existing common technical standards. Frequently UAVs malfunction or go out of control, which may result in significant costs. UAVs are not cheap by themselves. UAVs may also cause extensive damage as they fall on the ground in urban areas. Finally, they share airspace with manned aircraft (Weibel and Hansman, 2005).

The risks occurring because assigning UAVs military roles (especially offensive ones) by one state, may also cause legitimate concerns and reaction by other countries and stimulate regional arms race. It is crucial to realize these risks as the humankind pursues the goal to get rid of the most dangerous and devastating tools of war - weapons of mass destruction.

In particular, efforts to get rid of nuclear weapons may be undermined by current trends in development of conventional arms,

especially in the United States. One of the directions of unmanned aerial system evolution is developing hypersonic long-range unmanned combat aerial vehicles. Another direction of UAV development - is their potential use in ballistic missile defense systems - particularly those, which are intended for boost-phase intercept.

Development of unmanned systems in the US is watched attentively in Russia. There is a common view shared by majority of Russian analysts that the next phase of nuclear reductions will require setting limits on strategic conventional arms. Ballistic or hypersonic missiles carrying conventional warheads are considered as destabilizing weapons since they might have the capability to disable strategic Intercontinental Ballistic Missile (ICBM) launchers.

Finally, there is also another group of risks. As the unmanned aerial systems are developed, we need to ask a question, what might happen, if UAVs turn out to be in the wrong hands of non-state actors, like terrorists. They can use this UAV for malicious purposes and consequently can be injurious to the world.

CONCLUSION

RMN is still lagging behind compared with other countries in the use and development of UAV technology. Continuous efforts should be undertaken to ensure RMN not be left behind and continue to compete with foreign navies. A lot of studies, and research need to be conducted to find the best method of integrating UAVs into the fleet. For starting, a pioneer group should be established to study, review and analyze the needs, capabilities and advantages to be gained by having a UAV in RMN fleet. **CTM**

The Reality Of MARITIME TERRORISM

Cdr Dzul Khairi bin Mat Saad RMN

THE current period of modern maritime terrorism can be dated from roughly the early 1960s when hijacking and hostage taking for political ends dominated maritime incidents. There have been some serious cases that involved the hijacking of large cruisers with hundreds of passengers or attacks against strategically important military and oil infrastructures, only two percent of all recorded terrorist incidents since 1969 have taken place at sea (Holt 2004, p.338). Several reasons account for this. First of all, terrorists have generally preferred land based targets, as they are fixed, easier to penetrate and more immediately media accessible. Second, operating at sea requires specialized skills and resources that only a few organizations possess. Third, most terrorist groups are tactically conservative, opting for familiar methods that have been tested and offer a high chance of success.

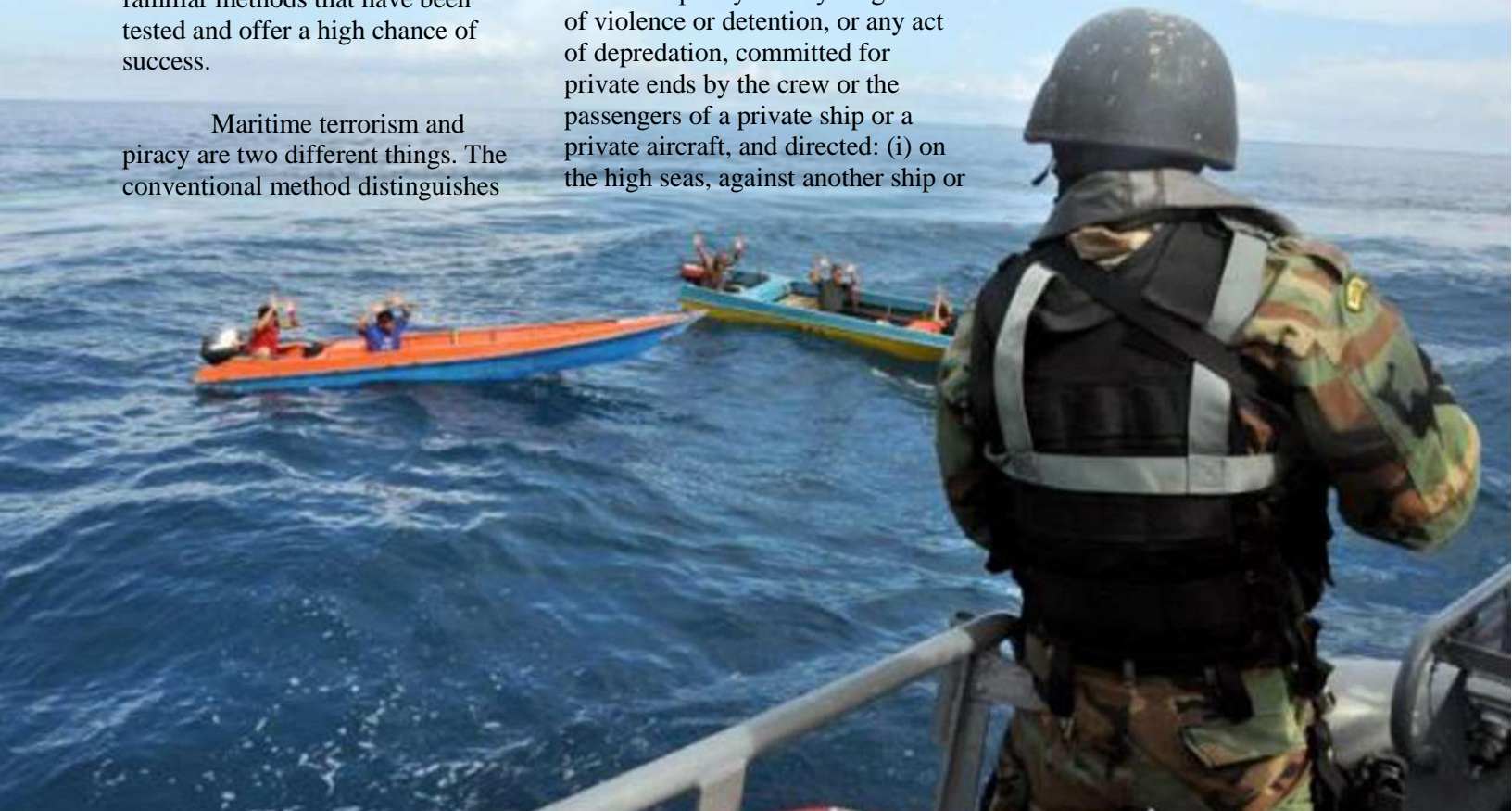
Maritime terrorism and piracy are two different things. The conventional method distinguishes

between piracy and terrorism by focusing purely on the motive of the crime committed in which piracy is motivated by commercial greed and predicated on financial gain, while terrorism is inspired by political goals and stems from perceived religious, political, territorial or historical injustices. Based on this definition, the only difference that lies between piracy and terrorism revolves around the chief motives, which could be either commercial or political. These distinctions are still valid and useful to some extent, but their rigidity is at odds with the emerging new tendencies and nexus between the two categories of criminal activities.

The main definition of maritime piracy was established by United Nation Convention on the Law of the Sea (UNCLOS) 1982 states that piracy is “any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft, and directed: (i) on the high seas, against another ship or

aircraft, or against persons or property on board such ship or aircraft; (ii) against a ship, aircraft, persons or property in a place outside the jurisdiction of any state” (UNCLOS 1982, Article 101). This explanation does not involve the concept of political or economic motivation.

Maritime terrorism as such, still has no internationally accepted legal definition, most probably because the definition of terrorism itself is under huge dispute. The Council for Security Cooperation in the Asia Pacific (CSCAP) Working Group has offered an expansive definition for the types of events that comprise maritime terrorism as “the undertaking of terrorist acts and activities within the maritime environment, using or against vessels or fixed platforms at sea or in





MV Limburg attacked by terrorists off the Coast of Yemen.

potential closure would generate should not be underestimated.

Maritime forces under the umbrella of different Task Forces are conducting regular patrol in potential areas of maritime terrorism. In addition, naval ships of individual countries are also maintaining their presence in their areas of jurisdiction to curb this menace. Naval forces, even if they cannot intervene to eliminate the factors that generate and maintain terrorist phenomenon at sea, are effective tool in combating it and maintaining

maritime security to an acceptable level. Mitigating the potential effects that can lead to maritime terrorism is possible only through coherent reactions to the information provided by the intelligence services. Training, equipping and maintaining a high level of training for naval forces engaged in combating terrorism has become a prime concern for naval forces belonging

port, or against any one of their passengers or personnel, against coastal facilities or settlements, including tourist resorts, port areas and port towns or cities” (Maritime Terrorism Research Center 2014).

Depending on the measure, between 80% and 90% of global trade moves by sea, with the majority of non-bulk cargo carried in shipping containers. With trade concentrated in so few ports in today’s global economy, even a single maritime terrorist incident has the potential for significant economic disruptions with considerable financial and human implications. Given these potential impacts, the threat of maritime terrorism must continue to be taken seriously. The world’s economy depends on the security of maritime shipping lanes such as the Bab el-Mandeb between the Red Sea and the Arabian Sea, the Bosphorus between the Black Sea with the Mediterranean Sea, the Panama Canal between the Atlantic Ocean and the Caribbean Sea, the Straits of Hormuz between the Persian Gulf and the

Arabian Sea, the Suez Canal between the Red Sea and the Mediterranean Sea and the Straits of Malacca between the Indian Ocean and the South China Sea are all extremely important sea borne highways that accommodate vessels carrying vital natural resources and raw materials. The strategic importance of these sea lanes cannot be stressed enough and the scale of the negative repercussions that their



Suicide bombers in a skiff packed with explosives blew a hole in the USS Cole, killing 17 sailors in 2000.

to countries with major interests in maintaining an acceptable level of safety of the maritime transport.

There are numerous threats that are challenging the maritime domain and can have severe effect on the world economy. Much of work has been done internationally to analyse the maritime

terrorism and its effects on maritime domain. The research in conjunction with previous researches will highlight the threat of maritime terrorism, its implication and finally the possible measures to address this menace.

THREAT OF MARITIME TERRORISM

It is pointed out that in history of terrorist activity, less than two percent of international terrorist attacks have hit maritime targets (Holt 2004, p.338). Initially, the attacks against maritime targets can be considered as one of the rarest forms of international terrorism. However, there have been some serious cases that involved the hijacking of large cruisers with hundreds of passengers or attacks against strategically important military and oil infrastructures. The earliest record of modern maritime terrorism with a serious impact on international affairs was the hijacking of the Italian Achille Lauro in 1985 (Tuerk 2008). The incident took place in Egyptian territorial waters when the crew and the passengers were held



The world's economy depends on the security of maritime shipping lanes through which passes an enormous amount of commodities and energy sources being traded internationally.

hostage while the terrorists demanded the release of Palestinian prisoners detained by Israel. The terrorists surrendered after two days and were captured through US military intervention while they were escaping on board of a commercial jetliner.

In maritime domain, the importance of a rapidly proliferating trend called the “phantom or ghost ship” phenomenon is yet another relevant concern. It refers to the capturing, repainting, renaming and

re-flagging of vessels that continue sailing and serving the criminal and economic needs of the hijackers. A good example that illustrates how these “phantom or ghost ships” operate is the case of MV Juliana, a merchant ship that was hijacked off the coast of Indonesia in August 2000 (Gana n.d., p. 440). It was carrying 1993 tons of steel sheets worth of 50 million dollars, which was sold by the terrorists to an unidentified party. But the striking part is that the MV Juliana eluded port authorities for six months with false names, forged registrations, and new paint until finally it got caught by Thai customs officers.

The early years of the 21st century brought a surge in the acts of maritime terrorism and a radical change in terms of the attacks modus operandi. In January 2000, Al-Qaeda attempted to drive a boat loaded with explosives into the USS The Sullivans in Yemen (Ensalaco 2008, p. 230). The attack failed only because the boat sank under the weight of its lethal payload. Later, in October 2000 suicide bombers in a skiff packed with explosives blew a hole in the USS Cole, killing 17 sailors on board (Ensalaco 2008, p.



Special forces conducting anti-piracy and counter terrorism exercise.

from Singapore to Penang. They have held three hostages including the ship's master and release them upon the payment of ransom (Nincic 2010, p. 5). In January 2004, gunmen from the same terrorist organization took control of the MV Cherry 201 which was on passage from South Africa to Indonesia (Mitchell 2007, p. 11).

231). In October 2002, an explosive laden boat hit the French oil tanker, MV Limburg, off the coast of Yemen. The oil tanker was carrying 400,000 barrels of Iranian crude oil and though it was crippled by the attack it stayed afloat and spilled around quarter of its cargo (90,000 barrels) into the Gulf of Aden (Whitaker 2002).

In February 2004, the southern Philippines based Abu Sayyaf claimed responsibility for an explosion on a large ferry in the Manila Bay, the MV Superferry 14 that killed at least 116 people (Banlaoi 2011). Since then, maritime attacks have tended to be fairly small in nature, consisting largely of bombings near port facilities or suspicious activities involving barges. The 2008 Mumbai attack opens a new realm in maritime domain in which terrorists used the sea to create havoc on shore (CNN 2014). In July 2010, an explosive device detonated under keel of Japanese oil tanker MV M Star while traversing through Strait of Hormuz causing no serious damage (Frodal 2010).

The terrorist groups have represent a new "school" in striking

against maritime targets because they employed smaller seaborne vehicles packed with explosive materials driven into military or civil targets in kamikaze style in which the attackers did not plan for survival either. This type of suicide strategy has been present in international terrorism for a long time but until this moment, it was mainly applied to land based infrastructures. Terrorist acts in the years of 2003 and 2004 further confirmed a shift towards oil tankers and other oil related infrastructures to be

considered as prime targets for maritime terrorism. In August 2003, members of an Indonesian separatist group, the Free Aceh Movement, seized the Malaysian flagged tanker, MV Penrider, which was carrying fuel oil

The incident on 24 April 2004 stirred up those security analysts who have been sceptical about the relevance of preparations made to handle potentially arising threats from maritime terrorism against oil facilities. On this day, members of the Al-Qaeda group launched a devastating operation against two major Iraqi offshore terminals, the Basrah Oil Terminal and the Khor Al Amaya Oil Terminal (KAAOT), causing the life of three U.S. Navy sailors while three others were wounded (Cordahi



MV Superferry 14 on fire after bombed by Abu Sayyaf in the Manila Bay.

and Kishan 2004). Even though the attack failed to cause serious damage on the targeted oil platform but it highlighted the increasing focus of maritime targets by terrorists. To attack maritime targets, terrorist groups build their support and operational infrastructures on land, not at sea. The USS The Sullivans, USS Cole, MV Limburg, MV M Star, Mumbai attack and several other case studies demonstrate that planning of such acts was done on land and such attack can be considered as the extension of land terrorism.



Trilateral agreement on maritime security patrolling between Malaysia, Indonesia and the Philippines.

Most of the analysis reveals that failure to detect the planning and preparations of terrorist on land will lead the terrorist group to successfully launch the maritime attack. Although the chances of attacks by terrorists in maritime domain are less, nonetheless off shore areas are well within reach of terrorist from land and quite vulnerable to such activities till the time terrorist activities are continued on land. Admiral Sir Alan West, the UK's First Sea Lord warned that maritime terrorism is a clear and present danger that could potentially cripple global trade and have grave knock-on effects on developed countries (Walker 2012).

Despite these threats, given the relative recent quiet on the maritime front, how concerned should we be about maritime terrorism? The answer, unfortunately, is that we should continue to be very concerned. US Navy Captain (R) Jim Pelkofski has noted that indications point to an acceleration of the pace of maritime terrorism, heralding a coming campaign (Walker 2012). Hijacking and using a ship as a

weapon or to sink and close a major shallow chokepoint such as the Strait of Malacca or the Suez Canal could have significant economic implications for the global economy. Similarly, an improvised explosive device (IED), chemical or biological weapon or other weapon of mass destruction discovered in a container could have dramatic economic repercussions.

IMPLICATION OF MARITIME TERRORISM

The world's economy depends on the security of maritime shipping lanes through which passes an enormous amount of commodities and energy sources being traded internationally. The Bab el-Mandeb, Bosphorus, Panama Canal, Straits of Hormuz, Suez Canal and the Straits of Malacca are all extremely

important sea borne highways that accommodate vessels carrying vital natural resources and raw materials such as coal, gas and oil to national economies all around the world. The strategic importance of these sea lanes cannot be stressed enough and the scale of the negative repercussions that their

Maritime escort services has become an industry in its own right.





Sea basing providing enhanced afloat positioning of joint assets and providing offensive and defensive power projection.

potential closure would generate should not be underestimated.

Sea freight is considered to be probably the most economical and the most practical especially with regards to bulky and heavy items. Transportation by sea is almost 10 times cheaper than rail, 45 times cheaper than road and 163 times cheaper than air (Fatman17 2009). Hence, sea is the cheapest and easiest means of mass transportation contributed to the internationalisation of world trade. The increase in transcontinental sea commerce over the past few decades is attributable to globalization. The vulnerabilities and unregulated spaces have concurrently allowed the domain to be used for illicit activities including terrorism by transnational crime syndicates. Maritime attacks are more expected in coastal or brown waters than high seas because of limited resources available to terrorists, lack of marine related skills and poor publicity compared to land. History indicates that coastal areas, narrow straits and restricted water are most lucrative areas for maritime terrorism.

There is a general fear that terrorists could overcome existing

short comings in seaborne attack capabilities by contracting out to pirate syndicates. Most concern in this regard has focused on the possible employment of maritime crime groups to hijack and deliver major ocean going vessels such as oil tankers, container ships, and LNG carriers, which might then either be scuttled to block critical sea lines of communication (SLOC) or detonated to cause a major explosion at a target port of opportunity. While

The oceans are indivisible and maritime security threats do not respect boundaries.

the possible convergence between piracy and terrorism remains highly debatable, it is a contingency that has been highlighted in several maritime threat assessments over the past five years and is clearly one that security, intelligence and maritime officials are not prepared to dismiss out of hand.

Liquefied Natural Gas (LNG) is considered to be extremely dangerous material once ended up in

terrorist hands. An explosive laden boat detonated next to or underneath of an LNG ship, as in the case of MV Limburg would cause at least half of the on board LNG to spill into the harbour creating a searing heat which is hot enough to burn everything from buildings to people in a mile from the outer edges of the fire (Raines 2003). Despite the double hull structure of LNG ships, they are still considered vulnerable to breaching as the terrorist attacks against the double hulled oil super tanker Limburg and the subsequent release of 90,000 barrels of crude oil into the Gulf of Aden clearly demonstrated. Thus cause billions of dollars to shipping industries and international community.

In reality, from the perspective of a Very Large Crude Carrier (VLCC), an intentional collision is much more difficult to prevent than a hijacking, since nothing short of a cannon will actually deter or stop a ship on a kamikaze mission. In this respect, the hands of shipping companies are tied, as outfitting oil tankers or commercial cruisers with heavy

weaponry is completely absurd and dangerous. As large vessels would be unable to evade a smaller, more nimble craft, especially in a narrow channel, the only solution to avoid such a kamikaze attack is to better monitor and patrol the waterway.

Various companies have opted for hiring escort vessels in the past, which, like maritime bodyguards, would follow the travelling tanker or freighter carrying

a cargo of extreme value or vulnerability. Providing such maritime escort services is actually becoming an industry of its own and also having huge financial effects. The problem with escort companies is that their fortified vessels and armed crew are not welcomed in the territorial waters of the littoral states. Maritime attacks may also hold an increasing degree of attractiveness in that they have emerged as an alternative means for potentially causing mass economic destabilization. Disrupting the mechanics of this highly intensive and efficient trading system has the potential to trigger vast and cascading fiscal effects, particularly if the operations of a major commercial port were severely curtailed.

MEASURES TO ADDRESS THE MENACE

In order to prevent a large scale terror attack on a maritime target, measures must continue to be implemented in the maritime domain, particularly in the areas of target hardening and situation awareness development. This necessitates a deepening of cooperation between concerned states. Solutions must be tailored which take into account issues such as differing resources, national priorities and concerns over the erosion of sovereignty.

To prevent the maritime terrorism, a proactive approach is required. Countermeasures against terrorist designs must be focused, appropriate, and based on a true understanding of the threat faced. Additionally, the land capability of terrorist groups needs to be disrupted and degraded, which will in turn deny any extension towards maritime realm. Protection of port and shipping is everyone's business today. Navies cannot do it alone but can contribute to the overall effort.



The Lahad Datu incident was a major maritime security issue that occurred in Malaysia in 2013. They were several key lessons learned from this incident that will prevent it occurring again.

There is a dire need to share intelligence within different functionalities of a state, between regional states and at international level. Navies can contribute to by providing quick reaction force. But individual state action is not enough. The oceans are indivisible and maritime security threats do not respect boundaries. Maritime terrorism is a reality and its consequences would be more devastating in destabilizing the world economy. Last but not the least; we should not be too focused on maritime terrorism alone but also look at the root cause of the problem in the long run. We need to understand the key dimension of the issue and improve upon the socio economic disparity and intra religion disharmony.

CONCLUSION

Maritime domain offers terrorists ample opportunities for strategic reach and geographical flexibility. Additionally, the relative advantages conferred by the maritime environment may look increasingly attractive as security around key land installations is gradually hardened. The opposing school of thought argues that highly destructive acts of maritime

terrorism are beyond the reach of most groups. Additionally, attacking land targets requires less skill and funding compared with maritime targets and may therefore present more attractive options. It is also extremely difficult to sink a ship at a particular spot. Moreover, most tankers these days are robustly constructed and carry their cargo in inert forms. In this regard the concept of maritime security has undergone a radical shift. Now, littorals are facing mountainous challenges of transnational and asymmetric threats in maritime domain. Terrorist organizations can use it to achieve strategic objectives for political gain. The threat to shipping posed by maritime terrorists is a fearsome issue whether they are in port or navigating in a restricted waterway, commercial vessels are easy targets for terrorists.

Although maritime terrorism incidents are less but it is a hard reality. The Mumbai attacks in 2008 demonstrated the vulnerabilities of the countries to sea borne terrorist attacks. Terrorism has neither creed nor nationality and no country big or small is immune from it. Thus keeping in mind the maritime terrorists incidents in mind and the effects it created on maritime

security and global economy, it is concluded that the maritime terrorism exists and it can be exploited by terrorists at any time. Any one incident in any part of the world will have serious impact on trade and shipping which ultimately contributes in surge of shipping, insurance, security and cargo handling charges.

Naval forces, even if they cannot intervene to eliminate the factors that generate and maintain terrorist phenomenon at sea, are an effective tool to combating it and maintaining maritime security to an acceptable level. Mitigating the potential effects that can lead to naval terrorism in maritime trade is possible only through coherent reactions to the information provided by intelligence services.

United Nations (UN) passed different resolutions in post 9/11 incident in collaboration with International Maritime Organization

(IMO). These regulations need to be implemented in impartial manner. Besides dealing with the terrorist at sea, solution of this menace should be found on land by provided better economic, social, educational, political, religious and basic necessities so that the young people should not be driven by ill minded people towards this revolting crime.

RECOMMENDATIONS

There are several recommendations should be made such as a firm commitment amongst international cooperation on maritime terrorism issues is necessary. As a start we could work on improving coordination in basic areas like information exchange, increase burden sharing, technology cooperation and capacity building.

Furthermore, there are methods and tactics associated with terrorism which can be mutually

identified, practiced and put in place as preventive measures. Integration and interoperability are the key to success in these activities, particularly where diverse forces of varying capability and mission must work together seamlessly in support of defence and security operations.

On the other hand, consideration on integrated multidimensional approach to the problem of maritime security should be looked into. It is necessary to work across traditional agency boundaries. Security agencies, enforcement agencies, port authorities and industry all have important roles to play. States do not have all the answers in the new security environment, so it is important to work closely with the shipping industry and relevant international organisations like the **IMO**. **CTM**



A military helicopter is shown in flight over a vast expanse of blue ocean. The helicopter is positioned in the upper half of the frame, moving towards the right. Below it, in the lower half of the frame, a person is seen in the water, appearing to be in a rescue or search operation. The water's surface is textured with small waves and ripples.

Search and **Rescue**

Lt Cdr Abdul Rahim bin Baba RMN

“SAR can be describing the capabilities in handling the situation, countries reputation and also showing of capable assets”.

IN recent years media around the world were busy covering about the Search and Rescue (SAR) operation which involving plane crash and notoriously the disappearing of Malaysian Airlines aircraft Flight MH 370. Neighbouring Countries and a far participated in the unprecedented SAR operation of which the Royal Malaysian Navy (RMN) is no exceptions. RMN has provides all necessary support in order to achieve the ultimate goal as others; to locate the position of the doomed plane. Moreover, this incident has unleashed the importance of SAR operation as often happened; aviation mishap often cause the aircraft to ended up in the bottom of the sea. SAR operation easily reflected the countries capability, knowledge superiority and ability for related countries to join efforts to complete the tedious task.

In general, SAR can be defined as “a search for and provision of aid to people who are in distress, imminent danger or disaster”. The general field of search and rescue includes many specialty sub-fields, typically determined by the type of terrain the search is conducted. SAR could be managed within national or multi-national level. Indirectly, SAR can be describing the capabilities in handling the situation, countries reputation and also showing of capable assets. This article was written to share knowledge and to give everyone a general idea what is going on when SAR mission is activated. Elaborate the consequences when any order were given and behind every action will

be taken when handling such a dramatic situation during the time of need.

AVIATION DISASTER

2014 is a sad year for the Malaysian and the whole world were haunted by the unusual aviation disasters in the span of few months. There were two major aviation disasters involving the country’s flag carrier Malaysia Airlines Systems



The SAR operation for MAS flight MH370 involved several countries.

Bhd (MAS) in March and July, MH370 and MH17. Then, before the end of 2014, on 28 December, Indonesia Air Asia which is 49 per cent owned by Kuala Lumpur-Based Low-Cost Carrier Air Asia Bhd lost a plane over the Java Sea.

The first disaster involving Flight MH370 was called “mystery” by many, and till now nobody knows what happened to the jetliner which just “vanished” after it was last tracked over the southern Indian Ocean on March 8. The prolonged sadness than continue when Flight MH17 was later shot down over strife-torn Ukraine on July 18, Malaysians could not believe their

luck and declared that year as “a tragic day for the Malaysians.”

Another incident is involving Indonesia Air Asia Flight QZ8501 on December 28 closed a terrible year for the aviation industry. Until this article was written, search and rescue still continue for the QZ8501. A few dead bodies recovered and the body of the plane had been located.

MARITIME DISASTER

The sinking of the MV SEWOL also chronicled in the year of 2014. It was happened on the morning of 16 April 2014 en route from Incheon to Jeju Island, Korea. ferry capsized while carrying 476 people, mostly secondary school students are the victims. 304 passengers died in the disaster and 172 was survived, many were rescued by fishing boats and other commercial vessels that arrived at the scene approximately 30 minutes before any South Korean coast guard or ROK Navy ships arrived. The SAR efforts were conducted by the South Korean government in



The SAR operation for Air Asia flight QZ8501.

cooperation with the United States Navy, civilian groups, and individual parties.

SUBMARINE DISASTER

One of the most terrifying disasters which cannot be forgetting was K-141 KURSK. It was an Oscar-II Class Nuclear-Powered Cruise Missile submarine of the Russian Navy. The submarine lost with all hands when it sank in the Barents Sea on 12 August 2000. There was an explosion while preparation for firing was ongoing. The Russian Navy's final report on

the disaster concluded the explosion was due to the failure of one of KURSK's hydrogen peroxide-fueled Type 65 torpedoes. The explosions blew a large hole in the hull and collapsed the first three compartments of the sub, killing or harming all but 23 of the 118 personnel on board.

All 118 sailors and officers aboard KURSK perished. The Russian Admiralty initially told the public that the majority of the crew died within minutes of the explosion, but on 21 August, Norwegian and Russian divers found 24 bodies in



The Russian Oscar-II Class Submarine KURSK tragedy was the worst submarine disaster in history.

the ninth compartment, the turbine room at the stern of the boat. It proves that there are personnel still alive during the explosion. One of the crew wrote a note listing the names of 23 sailors who were alive in the compartment after the ship sank. However, none of them was survive due to late and incompetent rescue.

One of the success SAR mission involving submarine was an AS-28 Priz-Class Deep-Submergence Rescue Vehicle of the Russian Navy. On August 5, 2005 AS-28, became entangled with the aerial of a hydrophone array off the coast of the Kamchatka Peninsula, in Berezovaya Bay, Russian. The aerial, anchored by 60-tonne concrete blocks, caught the propeller of the submarine, and the submarine then sank to the seafloor at a depth of 190 meters. This was too deep for the ship's complement of seven to leave the submarine and swim to the surface. The British rescuers and Russian officials reported that fishing nets also had entangled the vessel.

On August 6, Russian Minister of Defense oversees the rescue operation, which was under the command of the Commander of the Russian Pacific Fleet. On August 7, all seven sailors were rescued after the cables trapping their submarine were cut by a British Remotely Operated Vehicle (ROV). The submarine surfaced safely and all seven crewmen survived from the disaster.

What is interesting to be highlighted from all of the incidents is how the SAR mission was initiated and conducted? Are we referring the same publication or manual when facing that kind of disaster? In our country, National Security Council (NSC) also known as Majlis Keselamatan Negara (MKN) is responsible to handle all kind of disaster from the beginning until the disaster fully recovered. All the procedures, duties and



Winching during a SAR operation.

responsible regarding the SAR are enclosed in the National Security Council Directive No.20 (known as Majlis Keselamatan Negara, MKN Arahan No.20).

NATIONAL SECURITY COUNCIL (NSC) DIRECTIVE NO.20

With the implementation of NSC Directive No. 20 by the Prime Minister's Department on 11 May 1997, Aeronautical Search and Rescue (ASAR) Operational Procedures have been amended to harmonies with inter-agency actions during an aeronautical incident. The main focus NSC is to manage the disaster towards Reduction Disaster Risk which is an on-going basis through programs such as prevention, development and preparedness of disaster. This is in line with initiatives undertaken at the international level. NSC work scope including Maritime Search and Rescue and Aeronautical Search and Rescue.

Maritime Search and Rescue (MSAR) is broadly defined as the

search for vessel in distress (or referred to as an 'maritime incident'), and the provision of aid to persons who are, or feared to be, in need of assistance, regardless of the nationality or status of such persons or the circumstances in which such persons are found at sea

For the MSAR, it may result from incidents or maritime distress involving life and property. Malaysian Maritime Enforcement Agency (MMEA) as the lead agency using Search and Rescue (SAR) National Manual or International Aeronautical and Maritime Search

and Rescue (IAMSAR) Malaysia Volume IV. For oil spills or accidents involving pollution or environmental damage will be handled by the maritime Department of Environment (DOE) as the Lead Agency using The National Oil Spill Contingency/Materials Pollution.

In Malaysia, MSAR services are provided in accordance with IMO Maritime SAR Convention 1979, IMO SOLAS Convention 1974 and UNCLOS 1982 and International Aeronautical Maritime Search and Rescue (IAMSAR) Manual 1998.

Malaysia Maritime Enforcement Agency (MMEA) is responsible for a number of search and rescue operation. This includes tracking and maritime incidents, coordinate and control as well as conducting maritime search and rescue operations in Malaysia and areas of responsibility of allocating resources to assist in aspects of SAR humanitarian and civil incidents. MMEA also conducted SAR prevention programs to reduce the number and severity of maritime SAR incidents.

Aeronautical Search and Rescue (ASAR) is broadly defined as the search for aircraft in distress



MMEA is the leading agency for SAR in Malaysia.



The Helicopter is a critical assets for any SAR operation.

(or referred to as an ‘aeronautical incident’) and the provision of aid to persons who are, or feared to be, in need of assistance, regardless of the nationality or status of such persons or the circumstances in which such persons are found, whether it occurs over land or sea. For the ASAR, the Department of Civil Aviation (DCA) is in charge as the Lead Agency.

In Malaysia, ASAR is provided in accordance with Annex 12 to the Convention on International Civil Aviation (Chicago 1944) and International Aeronautical Maritime Search and Rescue (IAMSAR) Manual 1998. As signatory to the Chicago Convention 1944, Malaysia is obligated to provide ASAR services on a 24 hour basis, within the Malaysian Aeronautical Search and Rescue Regions (SRR), (defined within the Kuala Lumpur and Kota Kinabalu Flight Information Regions – FIR) as shown in Appendix 1.

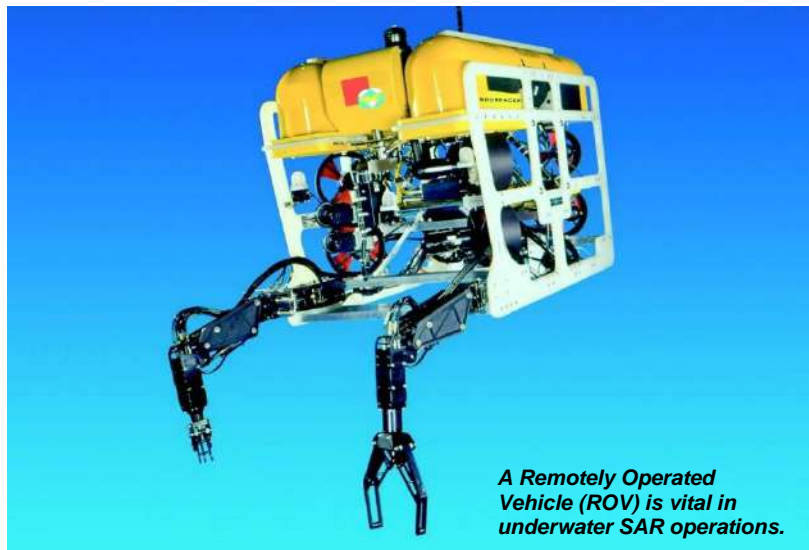
Participation by Armed Forces subjected to the order given from NSC. In the National Security Council Directive No.20, the duties perform by Armed Forces is very general. The duties stated as follow:

- Provide personnel support at all levels during disaster.

- Providing help divers if necessary.
 - Carry out SAR operations if needed.
 - Provides air transportation for emergency relief and personnel transfer.
 - Provide Liaison Officers at all levels during disasters.
 - To provide immediate relief for the victims if the Armed Forces as a Government Agency who arrived early at the location and ready to handing over the duties to the Rescue Agency who arrived later to resume and continue the effort in accordance with the instructions.
 - Provide assistance for Rehabilitation and Reconstruction Program after disasters if necessary.
- Provide transportation assistance which is limited to movement on land, air and sea at all levels during disasters.
 - Provide assistance machineries to help and working process during disasters at all levels.
 - Provide assistance expert services such as explosives expert, engineering, communications, medical field as well as other assistance if needed.
 - Assist in providing construction work if needed to facilitate disaster control operations.

SUBMARINE SEARCH AND RESCUE (SUBSAR)

The general philosophy for Submarine Search and Rescue (SUBSAR) Operations is to provide a reasonable level of assurance in response to the submarine accident. The aim of the SUBSAR



A Remotely Operated Vehicle (ROV) is vital in underwater SAR operations.

organisation is to save lives by ensuring the earliest possible localisation of the distress submarine (DISSUB) and the recovery of her crew.

It will become more complicated when the disaster happened at Malaysian waters and involve with other country assets. We need to ask ourselves that are we ready to manage and support them in term of refueling capabilities, logistic support or quay to receive more than one ship at one time for the certain period of time? This must be well understood by every Naval Area Commander with full support from his subordinate.

The necessary thing regarding SAR for the initial action must be ready in every Operation Room such as quick reference, referring publication and flow chart. Altogether must be in place and follow the procedure step by step in order not to miss any single thing.

RECOMMENDATION

The importance of producing a relevant publication on SAR in one single publication cannot come at a better time. RMN must react to this need into publishing a comprehensive SAR manual which elaborates all the necessary steps, guidance, procedures as the relationship between different national and international agencies also become more complex. The manual must be able to provide the RMN all the required knowledge to execute the initial SAR process and its activation. However, the National Security Council Directive No.20 will have to be broken down and adjusted with the guidance in IAMSAR manual so that it will adhered to the international and national norms.

To be in state as operational level, documented procedure,

experience and doctrine as to ensure the execution of practice is essential. Continuity of discussion and demonstration and provide training in accordance with National Security Council Directive No. 20 will ensure the efficiency of rescue when it occurs in real situation involving real life.

The personnel who on duty in the Operation Room need to be provide with this kind of knowledge. There will be training or short courses for them in order to give exposure concerning SAR. To make it more serious, personnel who had attended the SAR related courses could take up the function to man the Operation Room. Prevention is better than cure.

The Searching for a Simulated Submarine Casualty Exercise (SMASHEX) is one of the example exercise conducted specifically for the SUBSAR. This exercise planed every year and purely host by RMN Submarine Force Head Quarters. Every year they try to improve and share the knowledge to the participants involved from the various entity.

An annual conference must be designed to enhance and strengthen cooperation in the field of SAR among the countries. This annual gathering enables the building of mutual understanding and trust relationship between countries. It will provide an invaluable opportunity for the participant to share their experience and to learn as much as possible regarding SAR and most important things is to develop networking and fruitful contacts between participations.

CONCLUSION

The search and rescue (SAR) operation for missing Malaysia Airlines (MAS) flight MH370 has played an important role

in strengthening ties between the countries involved. A lot of lesson learnt from the scenario can be check and improved. It is very important for the RMN to do it right, fast, efficient and safely. Every reaction represent good or bad image for RMN to the public and when come to involve national it will broad to the whole world.

Involvement from RMN in SAR recently is a good start. The scenarios give thousands of experiences to the person involved and must be share among us. This beneficial experience will be a milestone and in line with RMN's vision to become a world class navy and to safeguard Malaysia's maritime interests. In attaining this goal, RMN must emphasis on developing its human capital and equipping them with the necessary competencies and knowledge to match the challenging, complex and high-tech environment in which it operates.

In order to reach good level in the SAR, it must be well trained and rehearsal. So that any weaknesses can be learnt and check the knowledge. Full commitment should always in our head, as well as outlining our guarantee to give rapid response and readiness for any SAR operation.

Each of us whether we are a corporate entity, government agencies or governing bodies has a role to play in ensuring the SAR operation. Public or media is ever ready to criticize if action to slow or inefficient. We need to take this opportunity to work together in our effort to further enhance our knowledge and broaden our experience in this domain. It is timely for us to share the responsibility and initiative in promoting cooperation and collaboration in the field of SAR.

CTM

INDEPENDENCE CLASS LITTORAL MISSION VESSEL

SPECIFICATIONS

Length: 80m

Width: 12m

Displacement: 1250 tones (2.5 times Larger than the Patrol vessel)

Speed: In excess of 27 knots

Endurance: 3,500 Nm (as far as Sydney. Lasting 14 days at sea)

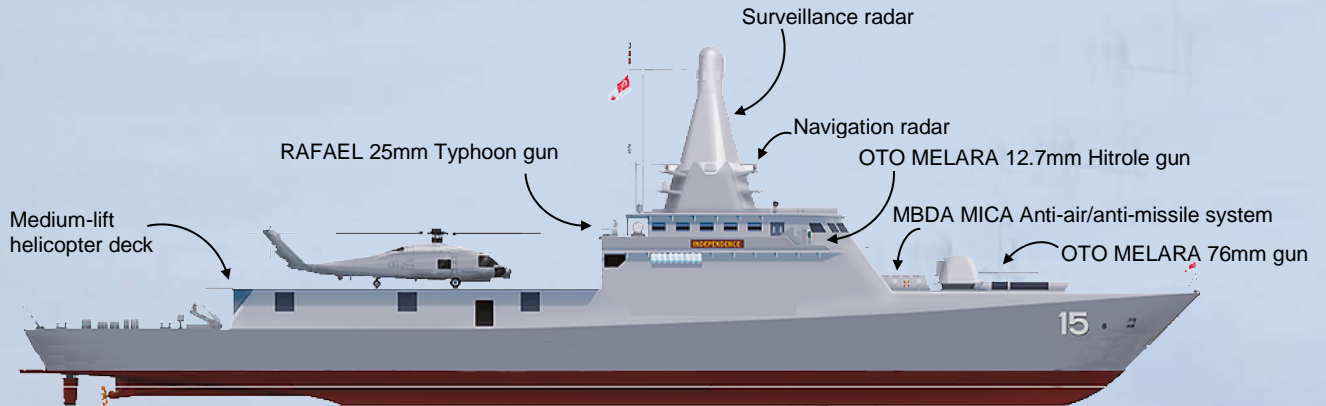
Crew: 23 men (5 officers, 18 military experts)

STACKED MAST

- Radars and sensors are stacked on top of each other in an enclosed area and are easily accessible; reducing the time for repairs by 80%.
- Information on the ship and its combat systems are also monitored onshore.

VERSATILE

Ship can be configured to performed different missions like boarding or HADR operations. It can launch and recover RHIB, boarding teams and helicopter. It can also deploy unmanned vessels or drones.



TARLAC CLASS LANDING PLATFORM DOCK

SPECIFICATIONS

Length: 123m

Width: 21.8m

Displacement: 7,400 tones (standard), 11,583 tones (full load)

Speed: 16 knots (30 knots maximum)

Endurance: 9,360 Nm (Lasting 30 days at sea)

Crew: 121

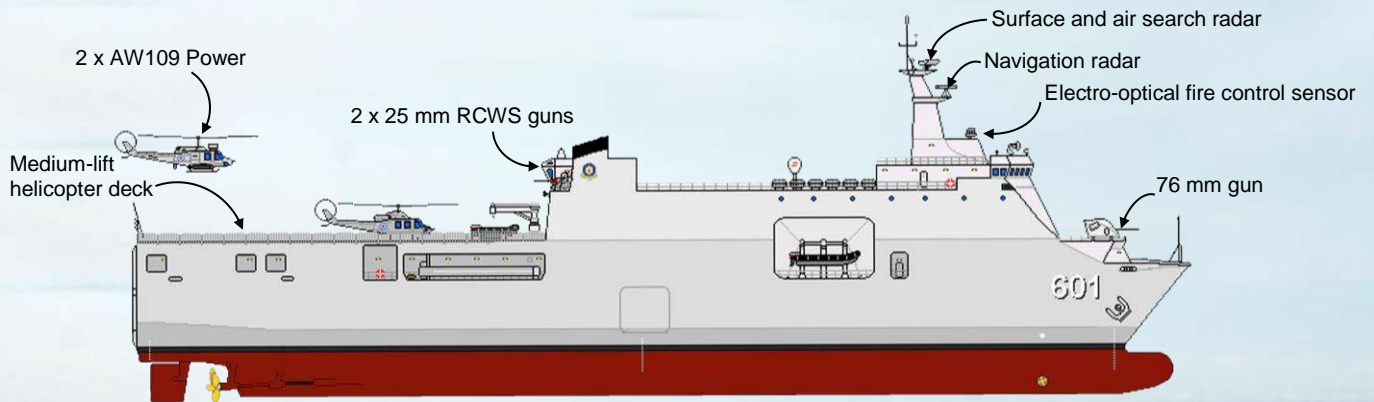
Capacity: 500 troops and associated vehicles and equipment

Aviation facilities: Hangar and flight deck for 2 medium helicopters



OPERATION

These ships would be the first of its kind to be operated by the Philippine Navy, and are meant to be used for amphibious operations and transport duties, but will double as a support platform for HADR and SAR.



PUSTAKMAR 2017



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“Whoever is first in the field and awaits the coming of the enemy, will be fresh for the fight; whoever is second in the field and has to hasten to battle will arrive exhausted” - Sun Tzu



**STRIVE
FOR
VICTORY**



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TAKTIK
MARITIM**

