

Rear Admiral Sushil Ramsay (Retd)

Indian Navy is looking for the replacement of its legacy shipborne choppers for modern helicopters which can execute anti-submarine, anti-surface warfare, electronic intelligence, troop movement, special operations and commando roles.

Rohit Srivastava

In August last year, Indian Navy sent out a Request For Information (RFI) for 111 Naval Utility Helicopters. These choppers will replace the decades' old Chetaks (Alouette III) which are reaching their airframe life.

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On August 9, Indian Navy's Southern Naval Command (SNC) at Kochi launched Operation 'Madad' for assisting state government. In the flood where Kerala lost around 450 people, Indian Navy was one of the first responders.

Rohit Srivastava

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A group photograph of five people standing in a room. From left to right: a woman in a yellow sari, a man in a dark suit and blue tie, a man in a white kurta and dark vest, a man in a dark suit and blue tie, and a woman in a purple sari. Behind them are the flags of the United States and India.

Prime Minister Narendra Modi with the US Secretary of State, Michael R. Pompeo and the US Secretary of Defence, James Mattis, External Affairs Minister Sushma Swaraj and Defence Minister Nirmala Sitharaman in New Delhi on September 6, 2018.

Indian External Affairs Minister Sushma Swaraj and Defence Minister Nirmala Sitharaman welcomed US Secretary of State Michael R. Pompeo and Defence Secretary James Mattis, for the inaugural India-US Ministerial 2+2 Dialogue. They welcomed the launch of the 2+2 Dialogue as a reflection of the shared commitment by Prime Minister Narendra Modi and President Donald Trump to provide a positive, forward-looking vision for the India-US strategic partnership.



This issue coincides with the Two Plus Two India-United States Ministerial Dialogue held in Delhi on September 6 after two postponements. The Dialogue was attended by the Foreign Minister Sushma Swaraj and Defence Minister Nirmala Sitharaman on behalf of India and Secretary of State Michael R. Pompeo and Secretary of Defence James N. Mattis on behalf of US. The Indian side welcomed the launch of the 2+2 Dialogue as a reflection of the shared commitment by Prime Minister Narendra Modi and President Donald Trump to provide a positive, forward-looking vision for the India-US strategic partnership. The ministers recognized that the two countries are natural strategic partners thus they are committed to work together on regional and global issues. It was also decided to establish secure communications between the ministers to help maintain regu-

lar high-level communication on emerging developments. A key component of this Dialogue was the signing of the Communications Compatibility and Security Agreement (COMCASA) which will facilitate India to get access to sensitive US Communication systems and technologies. The lead article is thus on the Two Plus Two India-United States Ministerial Dialogue which brings out the advantages India has gained from this exchange and some concerns of both sides. A write up on COMCASA is also included.

The Strategic Partnership (SP) Model was approved by the Defence Acquisition Council (DAC) chaired by Raksha Mantri Nirmala Sitharaman on July 30. The aim of the SP Model is to boost indigenous defence industry. The DAC also discussed and approved implementation guidelines for the SP Model. It is expected that this will give a

major fillip towards encouraging self-reliance and convergence of the defence sector with the 'Make in India' initiative. In an endeavour to convert policy into implementable directions and to kick start the process, the DAC also approved platform specific guidelines for procurement of Naval Utility Helicopters (NUH). It is thus not a coincidence that the DAC, chaired by Defence Minister Nirmala Sitharaman, met on August 25, 2018 and accorded approval for procurement for the Services amounting to approximately ₹46,000 crores (about \$6.5 billion). The Navy's share includes procurement of 111 NUH at a cost of over ₹21,000 crores under the SP Model. DAC has also cleared the long pending requirement of the Navy for the procurement of 24 MRH thus short articles on both MRH and NUH are included in which the author analyses the future possibilities.

Navy has been in the forefront to provide Human Assistance and Disaster Relief to the people of Kerala during the recent devastating floods. Their effort was commended by the Chief Minister of Kerala, Pinarayi Vijayan in a letter addressed to the CNS which has been reproduced in this issue. Then there are other small happenings in the Navy, brief write-ups of which have been given and the issue ends with the usual News Digest and flag posting. Happy reading to all you discerning readers!

JAYANT BARANWAL
Publisher & Editor-in-Chief



Prime Minister Narendra Modi meeting the US Secretary of State, Michael R. Pompeo and the US Secretary of Defence, James Mattis, External Affairs Minister Sushma Swaraj and Defence Minister Nirmala Sitharaman and other US and Indian delegates in New Delhi on September 6, 2018.

■ LT GENERAL NARESH CHAND (RETD)

SINCE THE 1990S, INDIA and US have been moving closer to establish a framework for defence cooperation with the signing of various agreements. In January 1995, the Agreed Minute on Defense Relations was signed; in 2005, the 'New Framework for Defense Cooperation' which was followed by the 'Disaster Relief Initiative' in 2005 and the 'Maritime Security Cooperation Framework in 2006' were signed. The foundation of the New Framework for the US-India Defense Relationship was based on the axiom that the world's two largest democracies agree on the vital importance of political and economic freedom, democratic institutions, the rule of law, security, and opportunity around the world with defence being the key element of the broader US-India strategic partnership. The key operative words in this context was 'strategic partnership and security in the broader Indian Ocean region'. 2+2 dialogue is a format for interaction of officials of two countries. Japan has applied this format for interaction with multiple nations. India participated in 2+2 with Japan in 2012 where India's Foreign and Defence Secretaries met their Japanese counterparts. Recently India

and US had agreed to interact in the 2+2 format at the Minister's level. The advantage of this format is that many strategic matters of vital importance which fall under the domain of both the external affairs as well as defence ministries can be discussed comprehensively without the problem of jurisdiction and follow up action taken.

Two Plus Two India-US Ministerial Dialogue

Indo-US 2+2 Ministerial Dialogue talks was finalised during Prime Minister Narendra Modi's visit to Washington in 2017. The twice postponed dialogue finally took place on September 6, 2018, at Delhi between External Affairs Minister Sushma Swaraj and Defence Minister Nirmala Sitharaman with US Secretary of State Michael R. Pompeo and Defence Secretary James. N. Mattis. In a special gesture, Sushma Swaraj and Nirmala Sitharaman received their respective counterparts at the Delhi Airport, signifying the importance India attaches to their visit. Ahead of the inaugural 2+2 dialogue, External Affairs Minister Sushma Swaraj and Defence Minister Nirmala Sitharaman held separate meetings on September 6 with US Secretary of State Michael R. Pompeo and Defence Secretary James. N. Mattis respectively. They also called on the Prime

Minister Narendra Modi in the afternoon and briefed him on the meeting.

Excerpts of the Joint Statement on the Inaugural India-US 2+2 Ministerial Dialogue

External Affairs Minister Sushma Swaraj and Defence Minister Nirmala Sitharaman welcomed Michael R. Pompeo and James N. Mattis, for the inaugural India-US Ministerial 2+2 Dialogue. They welcomed the launch of the 2+2 Dialogue as a reflection of the shared commitment by Prime Minister Narendra Modi and President Donald Trump to provide a positive, forward-looking vision for the India-US strategic partnership and to promote synergy in their diplomatic and security efforts. They recognized that their two countries are strategic partners, thus the Ministers committed to work together on regional and global issues. It was also decided to establish secure communications between the ministers to help maintain regular high-level communication on emerging developments. Other salient aspects are:

Strengthening the Defense and Security Partnership

Major Defense Partner (MDP). Reaffirmed the strategic importance of India's designation as a MDP and committed to further expand its scope.

Strategic Trade Authorisation (STA-1). India welcomed its inclusion by the US among the top tier of countries entitled to license-free exports, re-exports and transfers under License Exception STA-1.

Communications Compatibility and Security Agreement (COMCASA). The Ministers welcomed the signing of the COMCASA that will facilitate access to advanced defense systems.

Industrial Security Annex (ISA). Negotiations on ISA will be carried out to ensure protection of military information and thus facilitate greater technology sharing.

Military to Military Ties. Considering the rapidly growing military-to-military ties, the two sides committed to the creation of a new, tri-services exercise. It was also decided to start exchanges between the US Naval Forces Central Command (NAVCENT) and the Indian Navy, underscoring the importance of deepening their maritime cooperation in the western Indian Ocean.

Defense Technology and Trade Initiative (DTTI). Acknowledging the unique role of technology in the India-US defense partnership, the Ministers reaffirmed to pursue and enlarge DTTI and welcomed the conclusion of a Memorandum of Intent (MoI) between the US Defense Innovation Unit (DIU) and the Indian Defence Innova-

tion Organisation – Innovation for Defence Excellence (DIO-iDEX).

Counter-terrorism. Further enhance the bilateral counter-terrorism cooperation and to implement UN Security Council Resolution 2396 on returning foreign terrorist fighters. They committed to enhance their ongoing cooperation in multilateral fora such as the UN and Financial Action Task Force (to counter money laundering). The Ministers denounced any use of terrorist proxies in the region and in this context, they called on Pakistan to ensure that the territory under its control is not used to launch terrorist attacks on other countries. On the eve of the 10-year anniversary of the 26/11 Mumbai attack, they called on Pakistan to bring to justice expeditiously the perpetrators of the Mumbai, Pathankot, Uri and other cross-border terrorist attacks. The Ministers welcomed the launch of a bilateral dialogue on designation of terrorists in 2017, which is strengthening cooperation and action against terrorist groups, including Al-Qaida, ISIS, Lashkar-e-Tayyiba, Jaish-e-Mohammad, Hizb-ul Mujahideen, the Haqqani Network, Tehrik-i-Taliban Pakistan, D-Company, and their affiliates. This also included to ensure a stable cyberspace environment and to prevent cyber-attacks.

Partners in the Indo-Pacific and Beyond.

Cooperation in the Indo-Pacific region was reviewed, noting that the common principles for the region articulated in the India-US Joint Statement of June 2017 have been further amplified by President Donald Trump at Danang, Vietnam on November 10, 2017, and Prime Minister Narendra Modi in Singapore at the Shangri-La Dialogue on June 1, 2018. Reaffirmed their shared commitment to a united, sovereign, democratic, inclusive, stable, prosperous, and peaceful Afghanistan. The US acknowledged India's longstanding and ongoing contributions of economic assistance to Afghanistan. In turn India welcomed the recent US-North Korea summit. The US reiterated its full support for India's immediate accession to the Nuclear Suppliers Group.

Promoting Prosperity and People-to-People Ties. The Ministers recognised the importance for increasing bilateral trade, investment, innovation and job creation in both countries. Both sides committed to further expanding and balancing the trade and economic partnership consistent with their leaders' 2017 Joint Statement. Both sides looked forward to full implementation of the civil nuclear energy partnership and collaboration between Nuclear Power Corporation of India Limited and Westinghouse Electric Company for the establishment of six nuclear power plants in India.

2019 Meeting. It was also announced that the next 2+2 meeting is to be held in the US in 2019.

Defence Minister Nirmala Sitharaman's press statement after India-US 2+2 dialogue (salient excerpts)

Defence Minister Nirmala Sitharaman started her statement by thanking Secretaries Mattis and Pompeo for their vision and commitment and deeply value their support for stronger ties between India and the US. The commitment of India and the US to defend our shared democratic values and expand on our common interests is clear and unwavering. On the dialogue she said that in today's meeting, we reaffirmed our intention to cooperate in every way possible to ensure peace, stability economic growth, prosperity and development. We will also work together to combat the persisting threat of terrorism and other shared security challenges. Defence cooperation has emerged as the most significant dimension of our strategic partnership and as a key driver of our overall bilateral relationship. After the introductory remarks she highlighted the key achievements of the dialogue:



External Affairs Minister Sushma Swaraj and Defence Minister Nirmala Sitharaman with US Secretary of State Michael R. Pompeo and Defence Secretary James. N. Mattis, for the inaugural India-US Ministerial 2+2 Dialogue.

Joint Exercises. To carry forward the momentum built so far; for the first time a tri-Services joint exercise with the US will be held off the eastern coast of India in 2019.

Signing of Instruments of Enhanced Defence Cooperation. The signing of the Logistics Exchange Memorandum of Agreement (LEMOA) in 2016 and the Helicopter

Operations from Ships Other Than Aircraft Carriers (HOSTAC) earlier this year were important steps in this direction. The signing of the Communications Compatibility and Security Agreement (COMCASA) today will enable India to access advanced technologies from the US and enhance India's defence preparedness.

Indo-Pacific Command. The US has renamed its Pacific Command responsible for relations with India as Indo-Pacific Command. Reflecting our wider global partnership, we will also enhance our interactions with the US military's Central Command.

STA Tier 1 Status. One of the focus areas of the discussions was on expanding the scope and content of the US' designation of India as its Major Defence Partner thus the recent decision to elevate India to STA Tier-I status for access to advanced

Continued on page 5...



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Indo-US Pact on Communication Compatibility and Security Memorandum Agreement (COMCASA)

“The conclusion of the first ever Ministerial 2+2 between India and the US is a concrete manifestation of the vision of our leaders, Prime Minister Shri Narendra Modi and President Donald Trump, to take the India-US relationship to a new level.” —**Nirmala Sitharaman, Defence Minister**

■ REAR ADMIRAL SUSHIL RAMSAY (RETD)

FOR OVER A DECADE, or more intrinsic discussions, debates, analysis had been ongoing during interactions within the strategic community at various forums; whether or not to sign the Communications, Compatibility and Security Agreement, COMCASA for short, offered by the US for India. COMCASA is an advanced and refined version of Communication Interoperability and Security Memorandum Agreement (CISMOA) which has been specifically designed by US for India. CISMOA is one of the three foundational agreements that the U.S. insists on signing with its military allies. The other two agreements are Logistics Support Agreement (LSA) and Basic Exchange and Cooperation Agreement (BECA).

Once the bilateral relations between the two countries began to improve and the acquisition of big-ticket defence technologies and platforms began to fructify the requirement of signing of India specific and modified version of LSA called Logistics Exchange Memorandum of Agreement (LEMOA) became a contentious issue within India. After a raging debate on the efficacy of LEMOA for several years, finally it was signed in 2016.

As was the case with LEMOA, COMCASA too became a contentious issue and the strategic community in India was divided as COMCASA was viewed as highly intrusive to India's strategic interests and requirements. COMCASA envisages the usage of American military communication equipment onboard various systems bought by India from US. Since this equipment will almost certainly use American encryption standards for inter-operability with other US systems, India would need to allow American experts to access such equipment periodically to inspect Indian arms in Indian military bases. This became a major area of concern as a vast percentage of weapons and systems inventory in India is of non-US origin. Since these would be non-compliant with American communication systems, signing of COMCASA to acquire American systems would make it difficult for India to make its own systems interoperable. Conversely, India cannot do without acquiring some of the niche technologies in areas such as Unmanned Aerial Vehicles, Anti-Submarine Warfare and Aircraft Carrier where US is the undisputed global leader.

However, COMCASA is more than just a military agreement as foreign policy com-



US Secretary of Defence James Mattis and Defence Minister Nirmala Sitharaman exchanging the documents after signing the COMCASA during the 2+2 Bilateral Dialogue between the two countries in New Delhi

ponents are also engrained into it. Over the past two decades there have been unprecedented improvements in the bilateral relations between India and US. Consequently, India has become a de-facto nuclear power with the 1-2-3 nuclear agreement, joined Missile Technology Control Regime (MTCR), Wassenaar Arrangement and the Australia Group.

In the recent past a major bone of contention has emerged with the enactment of Countering America's Adversaries Through Sanctions Act (CAATSA) by US Congress. The law directs the US administration to punish foreign countries doing business with Russian defence and intelligence apparatus by applying sanctions against them. India feels threatened by CAATSA provisions as India enjoys time-tested and long-standing bilateral relations with Russia.

India's Advantage

There are many advantages which India will have signing the COMCASA agreement. A few advantages are given below:

- The COMCASA provides the legal framework for the US to part with its sensitive communication equipment and codes to enable transfer of real-time operational information. Ground to air or vice versa exchange of real/near real time information from air borne platforms helps in superior situational awareness and better decision making process. The legal frame work is also binding on India as it cannot disclose this information to unauthorised parties.

- India will have access to US secure data links which in turn will provide India big time US intelligence including on Pakistan and China.
- The COMCASA will enable 'Interoperability' with US during joint exercises and HADR.
- This agreement allows US to provide India with their latest communication equipment on platforms which they sell to India. Normally India fits its own equipment mostly made by Bharat Electronics Limited.
- COMCASA will also help India obtain the armed version of drones like the Sea Guardian otherwise US does not permit communication systems required for armed versions.
- India has already signed the Logistics Exchange Memorandum of Agreement (LEMOA) with the US and the signing of COMCASA, strengthens India-US military ties. The third agreement US makes almost mandatory for its close allies to sign is Basic Exchange and Cooperation Agreement Cooperation (BECA). The

Mike Pompeo, US Secretary of State amplified, “We have agreed on a hot line between... (Nirmala) Sitharaman and (Jim) Mattis.

way things are moving forward, India will sign BECA in the near future.

After protracted delays, intense debates, speculations, the much-delayed parleys and much anticipated first ever 2+2 Dialogue between the Secretary of State, Defence Secretary of US and the Minister of External Affairs and Defence Minister of India on Thursday, September 6, 2018 signed the COMCASA Pact that will facilitate India to acquire sensitive and niche defence technologies from US. While Mike Pompeo, US Defence Secretary termed COMCASA agreement a “milestone” in US-India relationship, Nirmala Sitharaman asserted that the pact would enhance India's defence capability and preparedness.

Sushma Swaraj, Minister of External Affairs described the parleys, “This meet was a focus on regional stability in South Asia, South-East Asia and Indo-Pacific... India being a part of groups like the ASEAN also help greatly in this endeavour,” She added, “In today's meet we have agreed to speed up the process of India's entry into the NSG.”

Mike Pompeo, US Secretary of State amplified, “We have agreed on a hot line between... (Nirmala) Sitharaman and (Jim) Mattis. India and the US stand for freedom and democratic values... and we aim to extend this across the Indo-Pacific... we will work at different levels to ensure a free Indo-Pacific.”

Defence Minister Nirmala Sitharaman reiterated, “Defence came out as the single-most important aspect of our discussions today. We have been discussing how we can more openly communicate back and forth because of the sensitivity of some of the technology... we have to know that when we share this with another like-minded nation, that we can keep it secure.” Jim Mattis responded, “I think that we're pretty much there already, on the American side.” The US has emerged as India's second-largest arms supplier, closing \$15 billion worth of deals in the past decade. Once the COMCASA accord is in place it could lead to the sale of an armed version of Guardian drones, as Washington has so far only authorised the sale of unarmed, surveillance versions of the aircraft.

It is earnestly hoped that COMCASA Pact could reduce the chances of the US imposing sanctions under CAATSA on India's intent to buy Russian S-400, Triamf surface-to-air missile systems. However, a new defence bill proposes giving the US President the authority to grant waivers when national security interests are at stake. **SP**

2+2 Dialogue: A Quantum Leap in Indo-US... *continued from page 3*

technologies, especially in the defence field is a very positive development. India highlighted the major reforms being implemented by the government to promote defence manufacturing in India under the 'Make in India' initiative, including setting up of defence manufacturing corridors. US has also responded to India's request to nominate a Point of Contact in the US Department of Defense to help address procedural complexities and facilitate Indian companies to join the manufacturing supply chains of US defence companies. She was particularly thankful to have Secretary Mattis, who has spent several years in Silicon Valley, as our interlocutor in taking this aspect of our ties forward.

In conclusion she said that the first ever Ministerial 2+2 between India and the US is a concrete manifestation of the vision of our leaders, Prime Minister Narendra Modi and President Donald Trump, to take the India-US relationship to a new level.

Analysis

Areas of Concern. The two areas of concern for both sides were India's import of Russian missile and air-defense system S-400 when US has imposed sanctions on Russia, under which any country engaged with its defence and intelligence sectors could face secondary US sanctions and the second issue is that the US is asking countries to halt oil imports from Iran after US President Trump withdrew from a 2015 deal between Iran and six world

powers that was intended to stall Tehran's developing nuclear capabilities. India is Iran's top oil buyer after China, and it is seeking a waiver from the US. A bill in US has been proposed which will accord President Trump to grant a waiver. Secretary of State Michael R. Pompeo is making his first trip to India as secretary of state and has spoken in conciliatory terms in his remarks to reporters in Delhi. He said that many countries, including India, "are in a place where it takes them a little bit of time to unwind" oil imports from Iran. He said that, "We'll work with them, I'm sure, to find an outcome that makes sense." He also said the US would work with India on another area of concern - India's upcoming purchase of a Russian missile and air-defense system S-400. The purchase will violate sanctions instituted by Congress on arms purchases from Russia, but lawmakers have allowed the possibility of a presidential waiver. Pompeo added that no decision has been made on a waiver. But "we do understand the history of India's relationship with Russia," he said And added that, "Our effort here is not to penalize great strategic partners like India."

India's Gains. Undoubtedly the 2+2 dialogue has been very successful due to the cooperative effort of both India and US. India has been a true gainer with access to much needed military technology with the signing of COMCASA; becoming major defense partner; inclusion

I congratulate Secretary Mike Pompeo, Secretary James Mattis, EAM @SushmaSwaraj and RM @nsitharaman for a very productive first ever India US 2+2 dialogue. I am sure this dialogue will further deepen India-USA relations.

@SecPompeo

@DeptofDefense


—From Prime Minister

Narendra Modi's Twitter page

in the Strategic Trade Authorization-1; negotiations to begin on Industrial Security Annex; conclusion of Memorandum of Intent (MoI) between the US Defense Innovation Unit (DIU) and the Indian Defence Innovation Organisation - Innovation for Defence Excellence (DIO-iDEX) which when finalised will give a fresh impetus for access to the latest developments in technology. The other key achievement was recognizing that Pakistan is

the source of important terrorist groups. Accordingly on the eve of the 10-year anniversary of the 26/11 Mumbai attack, the ministers called on Pakistan to bring to justice expeditiously the perpetrators of the Mumbai, Pathankot, Uri and other cross-border terrorist attacks. Specific terrorist groups including those which are Pakistan based were also named which is the first time that US has joined India in naming Pakistan, from Indian soil, as the cradle of cross border terrorism. Sharing of maritime domain intelligence will also give India detailed access to movements of China's navy in the Asia Pacific Region. The US reiterated its full support for India's immediate accession to the Nuclear Suppliers Group (NSG) on which Foreign Minister Sushma Swaraj said that, "In today's meet we have agreed to speed up the process of India's entry into the NSG." This a major step forward. India and US have come closer in recent years to find ways to counter-balance China's spreading influence across Asia, especially in Pakistan, Southeast Asia and the Indian Ocean.

2+2 Dialogue as of now, is limited to external affairs and defence ministries but may be tried out by a combination of other ministries also.

The focus of the 2+2 talks has been to deepen global strategic partnership between the two countries and resolve differences over India's defence engagement with Russia and crude oil import from Iran. 

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Government Nod for 24 MRH for Navy

Indian Navy is looking for the replacement of its legacy shipborne choppers for modern helicopters which can execute anti-submarine, anti-surface warfare, electronic intelligence, troop movement, special operations and commando roles.

■ ROHIT SRIVASTAVA

IN A BID TO strengthen the depleting anti-submarine capability of Indian Navy, Defence Acquisition Council (DAC), apex procurement body of the Ministry of Defence, on August 25, approved procurement of 24 multi-role helicopters (MRH). Reportedly, the deal is for Sikorsky’s MH-60 Romeo for around \$2 billion.

“To enhance the capability of Navy at sea, approval has also been granted for procurement of anti-submarine capable, 24 in number multi-role helicopters, which are an integral part of the frontline warships like the aircraft carriers, destroyers, frigates and corvettes. Availability of MRH with the Navy would plug the existing capability gap,” Ministry said in a statement.

In last August, India sent out Request for Information (RFI) for 123 Naval MRH.

Indian Navy is looking for the replacement of its legacy shipborne choppers for modern helicopters which can execute anti-submarine, anti-surface warfare, electronic intelligence, troop movement, special operations and commando roles. In last August, India sent out RFI for 123 Naval MRH. India is currently operating Sea King in anti-submarine roles. The first RFI in this regard was sent out in 2011 which was later cancelled. Currently, India is using 23 Sea King for this role.

Putting across its requirement for the MRH, Navy in its RFI said that it “intends to procure approximately 123 Naval Multi Role Helicopters (NMRH) along-with spare engines, three flight simulators, one maintenance simulator, and infrastructure including ToT, 10 year Performance Based Logistics, associated shore support, Engineering Support Package (ESP), training,



MH-60R Seahawk helicopter

Specifications of MH-60R Helicopter	
Mission Gross Weight	
Surface Warfare (SUW)	21,290 lb 9,657 kg
Maximum takeoff gross weight	23,500 lb 10,681.82 kg
Engines	(2) T700-GE-401C
Mission endurance SUW	3.30 hours
Dash speed	140 kts
Weapons	Anti-ship missiles, torpedoes, 50 cal. guns
Auxiliary fuel	Up to two external tanks

documentation and spares package along with contemporary state of the art equipment, weapons and sensors under Strategic Partnership.”

“The indigenous manufactured portion of the procurement is to be manufactured in India based on design to be provided by

the foreign OEM to the selected Strategic Partner,” it added. The Request for Proposal (RFP) is expected sometime this year.

Navy will procure it in two variants viz NMRH (Multi-Role) for anti-submarine warfare (ASW), anti-surface warfare (ASuW), electronic intelligence (ELINT), search and res-

cue, external cargo carrying (min 2,500 kg) and limited casualty evacuation; and NMRH (Special Ops) for Special Ops and Commando Role, troop carriage, maritime interdiction including anti-piracy operations, combat search and rescue (CSAR), external cargo carriage (min 2,500 kg), limited casualty evacuation (CASEVAC), humanitarian assistance and disaster relief (HADR) and logistics and communication duties.

“The helicopter should be twin-engine; having wheeled landing gear, dual flying controls (two pilot seats) and blade fold capability with weight less than 12.5 tonnes. The helicopter should be capable of operating from ships and ashore. Towards maritime surveillance and targeting capability, sensors and weapons to meet the envisaged role would be required to be integrated with the helicopters,” the RFI said.

According to the company brochure, MH-60R is “the most modern members of the SEAHAWK family, the MH-60R and MH-60S helicopters bring powerful new capabilities to the US fleet with digital cockpits and mission-adaptive systems. The SEAHAWK helicopter family has more than three million flight hours with more than 600 SEAHAWK helicopters in service worldwide. Sikorsky helicopters, with more than 60 years of experience in performing maritime missions, has continuously improved survivability and safety.”

With over 50,000 operational flight hours achieved, MH-60R is considered as the one of the most capable and mature anti-submarine warfare (ASW) anti-surface warfare (ASuW) multi-mission helicopter available in the world today. Over 100 of these helos are operational with US Navy. The net centric warfare capable chopper can also launch eight HELLFIRE® missiles from right and left extended pylons. ■

India One Step Closer to Naval Utility Hepter

In August last year, Indian Navy sent out a Request For Information (RFI) for 111 Naval Utility Helicopters. These choppers will replace the decades’ old Chetaks (Allouette III) which are reaching their airframe life.

■ ROHIT SRIVASTAVA

BREAKING THE LOGJAM OVER the execution of the strategic partnership model, Ministry of Defence (MoD), on August 25, giving the much desired major flip to the ‘Make in India’ in defence, gave its first approval under the ‘Strategic Partnership (SP) Model’ for the procurement of Naval Utility Helicopters (NUH).

Announcing the decision, Ministry in a statement said, “The Defence Acquisition Council (DAC), in a landmark decision today, approved procurement of 111 utility helicopters for the Indian Navy at a cost of over ₹21,000 crore. This is the first project under the MoD’s prestigious Strategic Partnership (SP) Model that aims at providing significant fillip to the Government’s ‘Make in India’ programme.”

In August last year, Indian Navy sent out a Request For Information (RFI) for 111 Naval Utility Helicopters. These choppers will replace the decades’ old Chetaks (Allouette III) which are reaching their airframe life. The deal is expected to cost the exchequers around ₹21,738 crore (\$3.2 billion).



AS565 Panther helicopter by Airbus

These choppers will operate from frontline warships and offshore patrol vessels and will also operate from shore for search and rescue operations. The first RFI for NUH was floated in 2010 followed by Request

For Proposal (RFP) in 2012 which was cancelled in 2014. Talking about the SP Model, the statement said, “The model has a long-term vision of promoting India as a manufacturing hub for defence equipment thus

enhancing self-sufficiency and establishing an industrial and R&D ecosystem, capable of meeting the future requirements of the armed forces. The contract when finalised, would result in a vibrant and wide-spread defence industrial ecosystem in the Indian aviation sector with the private industry and MSMEs as major stakeholders.”

The model provides for indigenous manufacturing of major defence platforms by an Indian Strategic Partner, who will collaborate with foreign original equipment manufacturer, acquire niche technologies and set up production facilities in the country.

The tender is expected to see Airbus fielding its Panther AS565 and H135M against Russian Ka-226T Naval and Sikorsky S-76D, Bell, Augusta Westland (if allowed). Out of 111, 95 helicopters are expected to be manufactured in India. Through an Indo-Russia joint venture, which will manufacture Ka-226T at the Hindustan Aeronautics Limited’s helicopter plant at Tumkur, Karnataka, India is procuring 200 Ka-226T for Indian Army’ light utility helicopters requirement. MoD’s decision is just a first step in a long process of selection of product and Indian SP. ■

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Operation Madad – Indian Navy’s ‘Madad’ to Kerala

On August 9, Indian Navy’s Southern Naval Command (SNC) at Kochi launched Operation ‘Madad’ for assisting state government. In the flood where Kerala lost around 450 people, Indian Navy was one of the first responders.

PHOTOGRAPHS: Indian Navy



Chief of the Naval Staff Admiral Sunil Lanba supervising the relief operations in progress; Relief material being loaded on a naval helicopter for distribution.

■ ROHIT SRIVASTAVA

WHEN THE DISASTER STRUCK the ‘God’s own Country’ Kerala in the second week of August, the state government in this moment of distress and disaster called the Centre for help. Responding to the call, Government of India sent out armed forces and National Disaster Response Force (NDRF) to help the state machinery. Going beyond their call of duty and risking their life and stretching the equipment to their operational limits, working round the clock ignoring exhaustion, Indian men and

women in uniform performed as if they were god sent saviour of Kerala, winning heart of all and sundry along the way. In the flood where Kerala lost around 450 people, Indian Navy was one of the first responders. It all began when on August 8 many parts of the state received over 1,000 mm of rain which forced the authorities to open floodgates of over 30 dams in the state. The massive flow of water in the rivers coupled with the massive downpour led to rivers breaking their banks and ravaging everything which came in its way. Nothing could stop rivers on the rampage. Such was the flow of water even small rivulet became harbingers of death and destruction.

On August 9, Indian Navy’s Southern Naval Command (SNC) at Kochi launched Operation ‘Madad’ for assisting state government. It was running two relief camps with community kitchen for 3,000 people at Aluva and Kochi. Over 1,50,000 food packets and around 50,000 kg of relief material has been distributed by the Navy to the stranded and needy. INHS Sanjivini, the hospital ship of Indian Navy was in the standby for medical help at Kochi. In addition, Navy’s support ship INS Deepak delivered 900 tonnes of fresh water at Kochi. Similarly, on August 20 INS Mysore reached Kerala from Mumbai carrying emergency kits, food, water and life jack-

ets. Indian Navy has deployed its Sea King, Dornier, Dhruv and Chetak helicopters. Naval personnel’s stupendous and selfless acts have a buzzed the social media. Not for the first time, Indian Navy has done similar work during other natural calamities as well. On August 17, Indian Navy chopper piloted by Cdr Vijay Verma 321Flight airlifted a pregnant lady and evacuated her to the Navy’s hospital ship INHS Sanjivini, which has been deployed as part of the rescue and relief operation, where she delivered a baby. Amidst much gloom and despair, Navy brought happiness to the family and to everyone who saw the act on the social media.

COMMENDABLE PUBLIC SERVICE DURING THE CATASTROPHIC FLOOD OF 2018



CHIEF MINISTER
KERALA

The People of Kerala value, recognise and honour your exceptional, tireless and timely assistance at a time of severe calamity and crisis during the floods of 2018 for bringing relief and succour to the lives of thousands of citizens. The high degree of commitment and professionalism displayed by you and your team at a difficult time contributed in large measures to the State’s rescue and relief efforts. Your contributions are in keeping with the highest ideals of selfless service and community involvement which the nation cherishes.

Admiral Sunil Lanba, PVSM, AVSM, ADC,
Chairman COSC and Chief of the Naval Staff
New Delhi


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Trends in CFD Applications for the Maritime Industry

VOLKER BERTRAM, DNV GL MARITIME ADVISORY

HULL DESIGN IS THE number one factor in fuel efficiency. It impacts profitability, competitiveness and ship value. Since the first commercial ship basin was commissioned in 1883, towing tanks have provided naval architects with a reliable method of predicting the performance of a ship at sea. Tank testing is commonly used for both resistance and propulsion tests. However, the cost and effort of producing a model and testing it, means that this process is utilized late in the design cycle. This method verifies and fine-tunes an established design, rather than being a tool to help drive and optimize the design.

CFD has long been considered a credible alternative to tank testing. It provides a numerical model that can be implemented much earlier in the design process. Naval architects can make use of engineering data to influence and improve the design process. Another advantage to CFD is the accuracy of results, independent of the scale of calculation.

PREFERRED APPROACH

The improvements in computing power, have allowed experts working in shipping to use CFD calculations to simulate vessel hydrodynamic performance more accurately and faster than ever before. The industry’s ability to handle complex geometry with all relevant details has also greatly improved. Development in grid generation has made it easier to generate high-quality grids for accurate CFD simulations.

Many aspects have advanced the wide acceptance of CFD as a design and optimization tool. The increase in hardware power combined with progress in various aspects of the flow solvers permit a wider scope of more sophisticated applications. Such analyses have become increasingly important and have now resulted in CFD surpassing model tests as the preferred approach for many applications in the maritime industry.



Model of a complete propulsion system in STAR-CCM+

DEVELOPING TECHNIQUES

More sophisticated CFD analyses for ships and offshore platforms employ a variety of techniques that have become widely available in recent years. One key aspect for carrying out calculations based on complex geometries, such as analysis of offshore platforms, is geometry recognition. In this case the pre-processing software uses prismatic cells to recognize cylinders with extrusion along centerline and thin solids, or gaps, with projection from one side to another. The result being that today, CFD models often provide a higher level of detail than achieved with model tests. CFD software can now handle moving parts (propellers or rudders), model complete systems rather than single parts, and can replace geometry (if required) to perform analysis with and without specific parts.

TURBULENCE MODELLING

In the 1980s and 1990s unsatisfactory results were often blamed on the limitations of turbulence modelling. This type of modelling is useful for analyzing the flow structures and resulting resistance of bare

hulls, as investigated in most validation studies. However, the propeller behind the ship dominates flows and reduces the effect of the turbulence model. For most applications in the marine industry, the standard k-ε or k-ω turbulence models are adequate. But other models are available to better predict secondary flows, the Reynoldsstress model (RSM) currently being one of the most popular options. In the future, large-eddy simulation (LES) analyses are likely to end the debate on turbulence modelling. LES directly captures the larger, significant ‘finger-print’ vortices of the flow directly and uses subgrid-scale turbulence models for the small, ‘background noise’ turbulence. Currently only a few research institutions have the computational resources necessary to carry out LES calculations. However, these resources are expected to become available to the industry over the next ten to fifteen years through a general growth of computing power and cloud-based business models.

CLASSIFICATION SOCIETY APPROVED

Free-surface flows are of great interest to naval architects. Measuring the wave resis-

tance of a ship can help them determine which small or moderate changes in hull shape could significantly reduce the overall resistance of the vessel and improve its performance. Other applications of freesurface flows include seakeeping, slamming and sloshing. Modern CFD methods allow the simulation of highly nonlinear free surface flows. Such simulations are now so well predicted that they are widely accepted by classification societies for load determination in strength analyses.

EASIER TO USE

CFD tools have become more user-friendly as reflected in the use of integrated design environments. The integrated design environment combines many aspects of CFD software including free-form hull description using parametric modelling, interfaces to most modern CFD solvers, several optimization algorithms, and software to handle process management and user interfaces. The design engineer can then work on simulation driven designs using one interface from model generation to post-processing.

Growing computer power and fully automatic procedures have opened the door for formal optimization as the natural step beyond simulation-based design. Lines optimization (also local bow optimization for refits in times of slow-steaming) saves typically 5% beyond the simulation-based approach. Trim optimization saves typically 3% beyond the classical approach based on crew experience.

LEAVE IT TO THE EXPERTS

Despite the growing power of CFD software, it remains a tool. The speed and quality of results achieved depends on the person using the tool. Effective CFD results are achieved through a combination of knowledge, understanding and skillful CFD techniques. Despite progress in number crunching, expertise and competence remain at the core of good engineering.

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Deployment – Kerala Flood – as on August 21, 2018	
Rescue Teams	112
Medical Teams	2
Boats	104
Dornier	5
Sea King	4
ALH	3
Chetak	4

This is was not just one of act, there are many such wonderful stories to tell. Similarly, naval pilots landed a SeaKing chopper over roof top to evacuate stranded people. Any pilot can tell that landing a heavy helicopter in such space as rooftop where he is not sure of his sides is a very risky situation. In spite of all odd, testing his skills and machines to its limit, he did it.

Aid Rendered – Kerala Flood – as on 23 August, 2018			
Aircraft	Cumulative Aid		
	Rescued	Med Aid	Sorties/Hrs
Sea King/Dornier/ALH/Chetak	16843	1375	223/458:38

Once the water receded, Southern Naval Command (SNC) terminated Operation Madad, the largest ever humanitarian and disaster relief (HADR) operation undertaken, “that lasted close to 16 days, with a total of 16,843 persons having been rescued, of which 15,670 were by boat, while 1,173 had to be airlifted. The efforts reached a peak with 92 rescue teams with Gemini boats deployed in a day. The aircraft were also able to undertake air sorties from daybreak to dusk without stopping.” The Western and Eastern Naval Commands also participated in the operation.

Before scaling down of the operation on August 20, Indian Navy had deployed 112 rescue teams and two medical teams, 104 boats, three Dornier aircraft and 11 helicopters including — four Seaking, four ALH Dhruv and three Chetak.

On August 29, Chief of the Naval Staff (CNS) and Chairman Chiefs of Staff Committee (COSC) along with the Vice Admiral A.K. Chawla, Flag Officer Commanding-in-Chief, Southern Naval Command (SNC) paid a visit to Muttinakam village in Varapuzha Panchayat of Ernakulam district to review flood relief and rehabilitation work being carried out.

Speaking to the people, CNS “emphasised that all naval personnel including himself were connected with Kerala by an umbilical cord with the ‘Janamabhumi’ as all personnel are trained under the SNC based at Kochi prior to becoming full-fledged naval personnel, and reiterated that he had been closely monitoring the situation over these past several days and that the Navy had deployed its personnel and assets from across the Navy during the crisis and that the focus now is on relief activities.”

Adding further he said that Indian Navy has selected two localities - Muttinakam in Varapuzha Panchayat and Cheriya Kadamakudi in Kadamakudi Panchayat, based on inputs received from the local administration, wherein rehabilitation initiatives were proposed to be undertaken to restore the area. Later during the visit, CNS also handed over a cheque of ₹8.9 crore to CM Disaster Relief Fund as a voluntary contribution from the salaries of naval personnel.

Russian Naval Weaponry to Strengthen Peace in South East Asia



RUSSIA'S DEFENCE MATERIEL EXPORT organization Rosoboronexport has teamed with the undersea research organisation Gidropribor to launch a program promoting the latest naval weaponry to the navies of South East Asia. The aim of this weaponry is to preserve the power balance in the region and maintain peace among the local nations.

"A wide range of missions carried out by the navies of maritime powers necessitates equipping them with various types of naval hardware and special equipment. The foreign navies include 225 Russian-built ships. Of them, more than 100 surface ships and submarines carry naval underwater weapons. Rosoboronexport is offering its partners unique solutions to equip and upgrade the armament of these ships," said Alexander Mikheev, Director General of Rosoboronexport.

Naval underwater weapons are in service with all the world's major navies. However, only a few countries - including Russia - are capable of designing and man-

ufacturing these weapons independently, due to the high complexity and cost of these efforts. A number of weapons produced by JSC Sea Underwater Weapons - known as the Gidropribor Concern - are offered by Rosoboronexport and are unrivalled in the world.

International customers are offered a wide range of naval hardware and special equipment. Among them are torpedoes, mines, mine countermeasures and underwater anti-sabotage weapons, as well as ship self-defence against underwater weapons.

In the domain of torpedo weapons, the TE-2 universal electric remote-control homing torpedo is available. It is designed to destroy submarines, surface ships and fixed targets. In addition, a number of newly developed torpedoes, including 533 mm torpedoes and 324 mm small torpedoes, have great prospects for the world market.

The MDM-1 and MDM-2 sea floor mines are designed to create a mine threat and destroy surface ships and submarines in surface and submerged conditions, espe-


cially when used in minefields. The Shelf naval mine offered has no counterparts in the world. It can be deployed from aircraft, submarines, and surface ships. The Shelf mine has a hydroacoustic passive/active detection and targeting system, which is protected from triggering when exposed to natural disturbances and influence sweeps. Once deployed, the mine can detect any submarines and surface ships regardless of the level of their noise and speed. Its unique design makes it difficult for the target to use countermeasures and conduct evasive action.

Naval mines are not rigidly linked to a particular ship project. Countries whose naval doctrine provides for mine laying are interested in their acquisition. Rosoboronexport expects attention to Russian-made naval mines from a wide range of countries in Africa, South-East Asia and Latin America.

As regards mine countermeasures and ship self-defence against underwater weapons, Rosoboronexport offers the following products: Mayak-2014 sonar systems, MG-

74ME self-propelled sonar countermeasure devices, small-sized self-propelled torpedo defense devices, the SHAT-U broadband acoustic sweep as well as the GKT-3M deep-water contact sweep, which is unmatched in the world market. A flexible configuration of the sweep enables its use in single shipborne, heliborne, paired near-bottom and network versions.

In addition, diver delivery vehicles that can be used from the world's most popular Russian-built Projects 877 and 636 submarines - as well as Piranha class midget submarines - are considered by Rosoboronexport to be promising for the global market.

"We also expect considerable interest in Russia's naval underwater weapons from countries developing their own shipbuilding industry, but having no prior capability to develop and produce naval weapons. In addition, a number of countries are seeking the know how necessary to establish the production of these weapons by their national industrial base. Rosoboronexport is ready to work in these areas," added Alexander Mikheev. 

News in Brief

US NAVY AWARDS BOEING \$805 MILLION MQ-25 CONTRACT



Boeing will build the US Navy's first operational carrier-based unmanned aircraft, the MQ-25 aerial refueler, through an \$805 million contract awarded today.

Boeing was awarded the engineering and manufacturing development contract to provide four aircraft. Boeing plans to perform the MQ-25 work in St. Louis.

MQ-25 is designed to provide the US Navy with a much-needed refueling capability. According to the US Navy, the MQ-25 Stingray will allow for better use of combat strike fighters by extending the range of deployed Boeing F/A-18 Super Hornet, Boeing EA-18G Growler, and Lockheed Martin F-35C aircraft. MQ-25 will also seamlessly integrate with a carrier's catapult and launch and recovery systems.

Boeing has been providing carrier aircraft to the US Navy for more than 90 years.

INDO-ISRAELI BARAK-8 TO JOIN ISRAEL NAVY

Israel Aerospace Industries (IAI), on August 15, informed entering into an agreement with Israel Navy to supply Indo-Israel Barak-8 surface to air missile for its Sa'ar-6 corvettes. "The Barak-8 system was chosen after it was demonstrated to meet the operational requirements and future challenges faced by the Navy," company said in a statement.

The Barak-8, developed jointly by IAI and Indian Defence Research and Development Organisation (DRDO), for both the navies, is a Long Range Surface to Air Missile which detect target at 100 Km range and can engage them at 70 km range.

Speaking on the agreement, Joseph Weiss, IAI CEO & President, said, "Barak-8 is one of IAI's leading systems and a growth engine for IAI in sales to its customers. The new deal adds to several Barak-8 contracts entered over the past few years with total value of more than \$5 billion, which is another feather in the system's glorious cap."

Used in naval point and area defense, Barak-8 is all weather missile system which can engage sea skimming to high altitude targets using its "several advanced state-of-the-art systems (such) as, digital radar, command and control, launchers, interceptors with modern RF seekers, Data link and system-wide connectivity."

On May 21, 2017, IAI announced award of a "\$630 million- contract for supply of LRSAM air and missile defense systems for four ships of the Indian Navy." First Indian Navy contract for this system was signed in April 2009 for \$1.1 billion.

India is also procuring the land version of Barak-8 under its Medium-Range SAM

programme for over \$1.6 billion. This is expected to arm five air defence regiments of Indian Army. The contract was signed in April 2017.

IGSL CULMINATES THE 04 X 1000T FUEL BARGES PROJECT FOR INDIAN NAVY WITH ALL DELIVERIES AHEAD OF SCHEDULE

Goa Shipyard Ltd (GSL) created yet another landmark in the history of Indian Shipbuilding Industry, by delivering all 4 x 1000T Fuel barges, ahead of contractual schedule. The 4th and last barge "FUEL BARGE-13", was delivered on July 23, 2018, 5 months ahead of contractual schedule, in the presence of Cmde G. Shyamsundhar, CSO (Tech), Karnataka Naval Area. The barge was ceremoniously inducted into the Indian Navy by Rear Admiral K. J. Kumar, Flag Officer Commanding Karnataka Naval Area on July 24, 2018, at Karwar.

For a long time, Indian Navy was in shortage of self-propelled 1000T Fuel Barges for fuelling of large ships such as INS Vikramaditya. With induction of GSL constructed efficient and modern fuel barges, the Indian Navy has got a shot in the arm as critical operational requirement of fuelling large ships would now be met by these ocean going vessels. The contract for construction of 4x1000T Fuel barges was signed between GSL and Indian Navy on Jun 4, 2015. And within a short duration of three years all four fuel barges have been delivered by GSL, with the first being delivered on August 17, 2018, and last one on July 23, 2018. The vessels are built to best quality standards of IRS class.

INS TEG LENDS ASSISTANCE TO MV VELA IN THE GULF OF ADEN



On August 25, 2018, whilst patrolling in the piracy infested waters of Gulf of Aden, INS Teg, a warship of the Western Naval Command, received a call from a Combined Task Force aircraft for providing assistance to MV Vela, a Norwegian owned ship with an all Indian crew. The vessel was in distress as her Port Anchor along with the entire 330 mtrs cable weighing approx 42 tons had inadvertently slipped and was hanging into the sea. This had severely disabled the ship with her speed being restricted to 5-6 knots, thus making her vulnerable to piracy attacks, apart from being a navigational hazard for herself as well as for other ships in the dense shipping corridor.

INS Teg quickly dispatched a specialist team to carry out an assessment of the situation and provided assistance for recovery of the anchor and cable. Concerted efforts over three days finally resulted in the successful recovery of the anchor along with the entire 330 m of cable.

THE US ELEVATES INDIA'S TRADE STATUS TO NATO-LEVEL ALLY

US on July 30, elevated India's status as a trading partner to equal that it has accorded largely to its NATO allies, mostly for the purposes of speeding up the sale of

high-tech defence and non-defence products that are otherwise subjected to strict controls and licensing. "We have granted to India Strategic Trade Authorization status STA-1 that's (a) very important status under our export control regime and acknowledges US-India security and economic relationship," said US secretary of commerce Wilbur Ross at the Indo-Pacific Business Forum. The US has given STA-1 to only 36 countries most of whom are NATO or key non-NATO allies. The move, which will reduce the number of licences needed for US exports to India, means India can get easy access to the latest defence technologies. It could also mean a leg-up for the foundational Communications, Compatibility and Security Agreement (COMCASA) agreement which the US is keen to get India to sign and which is one of the three agreements that the US has with its closest military allies.

INS KHANJAR VISITS YANGON, MYANMAR



INS Khanjar, a Missile Corvette of Indian Navy was on a three-day visit to Yangon, Myanmar to undertake operational turn around (OTR) and as part of goodwill visit from August 18 to 20, 2018. On arrival at Yangon, the Commanding Officer called-on Captain Tet Lwin Run, Fleet Commander 1st Fleet and the Indian Ambassador to Myanmar Shri Vikram Misri. A joint Yoga Session for IN and Myanmar Naval personnel was also organised in addition to the cross visits between Indian Navy and Myanmar Naval personnel.

PAKISTAN NAVY TO ACQUIRE FOUR ADA-CLASS CORVETTE

The Pakistan Navy is set to boost its fleet with four Ada-class corvettes. The ships are produced by a consortium of Turkish defense contractors. The Ada-class has been developed for Turkey's Milgem national warship development project with the aim to design and build locally a fleet of hi-tech stealth multipurpose corvettes and frigates that will replace older ships which are currently in service. At present no details regarding the corvette or the cost is available expect that two of the ships will be built at Turkey's Istanbul Shipyard while the remaining two will be constructed in Pakistan's southern port city of Karachi. It is understood that the fully-loaded displacement will be plus 2,032 tonnes with the usual armament of 76mm gun, torpedoes, anti-ship missiles and close-in weapon system. ☐

APPOINTMENT

- Vice Admiral Anil Kumar Chawla, has taken over the reins of the Southern Naval Command as its 28th Flag Officer Commanding-in-Chief on July 31, 2018. The Admiral has replaced Vice Admiral A.R. Karve, who retired after 38 years of yeoman service.

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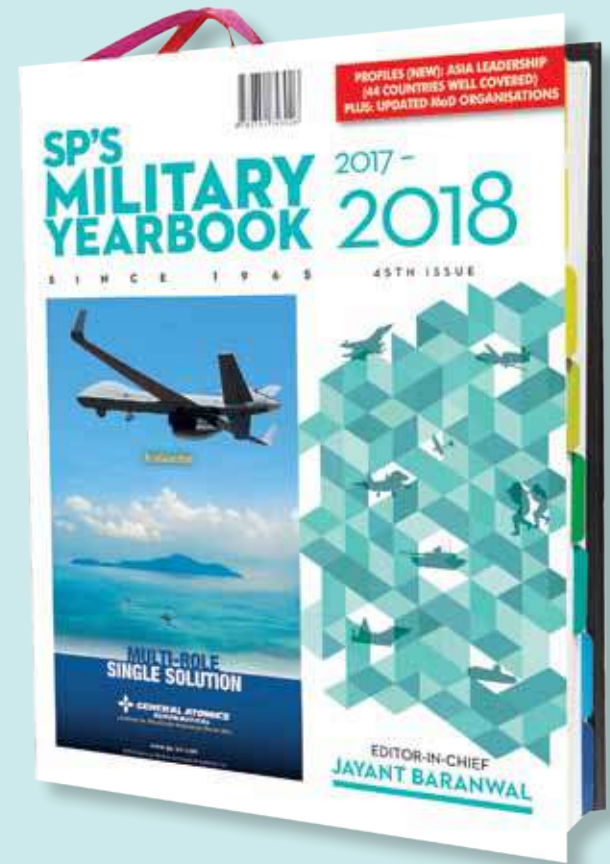
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