

FORUM

SECURE SKIES

**Preserving
a Free
and Open
Airspace**



PLUS

Air Intercept Safety

**Improving
Long-Range
Strike
Capabilities**

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ABOUT THE COVER:

This cover features a Royal Australian Air Force F-35, a fifth-generation aircraft that combines advanced stealth with fighter speed and agility, fully fused sensor information, network-enabled operations and advanced sustainment.

LIZ KASZYNSKI/LOCKHEED MARTIN

U.S. PACIFIC COMMAND



Dear Readers,

Welcome to *Asia Pacific Defense FORUM's*

first-quarter edition for 2016, which focuses on air power. This issue examines the importance of air power to Indo-Asia-Pacific nations and recommendations to increase multilateral cooperation to improve humanitarian responses and deter hostile actions by confrontational nations.

Air power offers increased opportunities to strengthen relationships with like-minded nations in order to address shared challenges. Throughout the region, countries' air forces are participating in bilateral and multilateral exercises to increase interoperability and integration. These activities are essential for a robust deterrent against aggression and deliver an effective humanitarian response to natural or man-made disasters.

In recognition that relief missions, given the size and scope of natural disasters in the region, are multinational, the U.S. hosted exercise Cope North 15 in February 2015 in Guam. Cope North 15 included forces from Japan, Australia, South Korea, New Zealand and the Philippines with observers from Singapore and Vietnam. Central to Cope North was the use of air power to provide expeditionary medical support, aeromedical evacuations and humanitarian assistance airdrops.

However, power can also be used coercively by aggressive nations to exert their authority over others. Understanding and abiding by international laws governing airspace management are central to good order across the region and will preclude confrontation, accidents and misunderstandings. This issue explores how countries can work together to reinforce international rules and norms and avoid potential miscalculations that could escalate to a military conflict.

I hope that you find this edition insightful and thought-provoking, and I welcome your comments. Please contact the *FORUM* staff at **contact-apdf@apdforum.com** with your perspectives.

All the best,

HARRY B. HARRIS, JR.
Admiral, USN
Commander, U.S. Pacific Command

APD FORUM

Air Power

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U.S. AIR FORCE



LT. COL. SETH SPANIER is the chief of Bomber Operations in the Pacific Air Forces (PACAF)/A3OA. He directs the strategic planning and execution of the continuous bomber presence and manages bomber/long range strike/standoff weapons issues within PACAF. He is a senior B-1 instructor pilot with over 2,400 hours of B-1 time (1,233 in combat), including three deployments to Southwest Asia and one deployment to Andersen Air Force Base, Guam, in support of the continuous bomber presence. He is a graduate of

the U.S. Air Force Weapons School and served as an instructor at the school from 2011 to 2013. Prior to his assignment at PACAF, he attended National Intelligence University in Washington, D.C. **Featured on Page 20**

U.S. AIR FORCE



LT. GEN. RUSSELL J. HANDY is commander, Alaskan Command, U.S. Northern Command; commander, 11th Air Force, Pacific Air Forces; and commander, Alaskan North American Aerospace Defense Region, North American Aerospace Defense Command, Joint Base Elmendorf-Richardson, Alaska. As the senior military officer in Alaska, he synchronizes the activities of more than 21,000 active-duty, Guard, and Reserve members from all services and commands. As the 11 Air Force

Commander, he oversees the training and readiness of five wings and Air Force installations in Alaska, Hawaii, and Guam. As commander of the Alaskan Region of the North American Aerospace Defense Command, Gen. Handy directs operations to ensure effective surveillance, monitoring and defense of the region's airspace. **Featured on Page 26**

APCSS



KERRY LYNN S. NANKIVELL joined the Daniel K. Inouye Asia-Pacific Center for Security Studies in 2008. She is a maritime security specialist who has published on maritime issues including the South China Sea disputes, naval modernization, piracy and other nontraditional challenges. She takes a leading role in the center's maritime programming, in Honolulu and around the Asian littoral from Vladivostok to Mumbai. Her writing has appeared in leading publications including *Asian Security*, *Asia Pacific*

Defense Forum, *Ocean Development & International Law*, *Cambridge Review of International Affairs*, *Journal of the Australian Naval Institute*, *Canadian Naval Review* and *Foreign Policy*. **Featured on Page 30**

PK GHOSH



DR. P.K. GHOSH, a retired Indian Navy captain, is a senior fellow at the Observer Research Foundation in New Delhi. He was the coordinator of the maritime initiative known as Indian Ocean Naval Symposium. He was also the co-chair and India representative to two consecutive Council for Security Cooperation in Asia Pacific international study groups on maritime security. He has served in many think tanks, including the Institute for Defence Studies and Analyses, the National Maritime

Foundation and Centre for Air Power Studies. Ghosh has lectured and written on evolving power dynamics in the Indian Ocean region, maritime challenges in the South China Sea, asymmetric threats and maritime capacity building. **Featured on Page 46**

TOM ABKE writes about Taiwan's air power for this issue of *FORUM*. Abke is a freelance researcher and writer based in Bangalore, India. He has contributed to articles and research reports on topics ranging from mining to forced migration. Born and raised in Barbados, Abke has lived and worked in Algeria, Libya, Mali and Tunisia. **Featured on Page 16**

Join the Discussion

We want to hear from YOU!

Asia Pacific Defense FORUM caters to military and security personnel in the Indo-Asia-Pacific region. A product of U.S. Pacific Command, the quarterly magazine provides high-quality, in-depth content on topics that impact security efforts across the region — from counterterrorism to international cooperation and natural disasters.

FORUM provokes thoughtful discussions and encourages a healthy exchange of ideas. Submit articles, pictures, topics for discussion or other comments to us ONLINE or at:

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FORUM

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AUSTRALIA

PLASTIC-EATING CORAL ON GREAT BARRIER REEF RAISES FEARS

AFP/GETTY IMAGES

Corals in the Great Barrier Reef are eating small plastic debris in the ocean, raising fears about the impact the indigestible fragments have on the health of the corals and other marine life.

Scientists found that when they placed corals from the reef into plastic-contaminated water, the marine life “ate plastic at rates only slightly lower than their normal rate of feeding on marine plankton,” according to a study published in the journal *Marine Biology*.

“If microplastic pollution increases on the Great Barrier Reef, corals could be negatively affected as their tiny stomach cavities become full of indigestible plastic,” said Mia Hoogenboom of Queensland state’s James Cook University. Microplastic is defined as particles smaller than half a centimeter.

Scientists also sampled waters near inshore coral reefs in the World Heritage-listed site and found microplastics, including polystyrene and polyethylene.

The reef’s health is already under close scrutiny from the United Nations. Climate change, poor water quality from land-based runoffs, coastal developments and fishing all threaten the biodiverse site.

As much as 88 percent of the open ocean’s surface contains plastic debris, scientists have found. The small pieces — from mass-produced plastics such as toys, bags, food containers and utensils — make their way into the sea through stormwater runoff, raising concerns about the effect on marine life and the food chain. Agence France-Presse

CHINA

NEW LAND ROUTE OPENED for Indian pilgrims to Tibet

China has inaugurated a new land crossing into Tibet for Indian pilgrims who wish to visit one of the holiest sites in both Hinduism and Buddhism, as the two countries seek to set aside differences and improve ties.

Groups of pilgrims can now enter Tibet via a Himalayan pass for a 12-day trip to Mount Kailash — a trip that also takes in a holy lake, according to China’s official Xinhua news agency.

Few Indian pilgrims ever make it to Mount Kailash despite its significance, not only because of its remoteness but also because of difficulties in getting visas for China’s tightly controlled region of Tibet.

China and India have growing commercial links and long historical ties, but their recent history has been overshadowed by suspicion, and they have yet to sort out a festering border dispute.

China and India proposed measures to resolve the border issues while Indian Prime Minister Narendra Modi was in Beijing in May 2015. Beijing has sought to clear obstacles to a relationship that it says could change the international political order. Reuters



GETTY IMAGES



CAMBODIA

RATS SNIFF OUT LAND MINES

The one-eyed rat needed only 11 minutes to detect a deadly mine buried in a Cambodian field, work that humans with metal detectors could have taken up to five days to investigate.

He's part of a team of elite rats, imported from Africa, that Cambodia is training to sniff out land mines that still dot the countryside after decades of conflict.

"Under a clear sky, he would have been quicker," said Hul Sokheng, a veteran Cambodian deminer who's training 12 handlers how to work with 15 large rats to clear Cambodia's farmland and rural villages of bombs. "These are life-saving rats," he said under rainy skies.

Their work could prove vital in a country where unexploded devices, including mines and unexploded shells, have killed nearly 20,000 Cambodians and wounded about 44,000 since 1979, according to the Cambodian government.

The Gambian rats can smell highly explosive TNT inside land mines. They've been trained since they were 4 weeks old. A Belgian nonprofit group deployed them to Cambodia from Tanzania to help clear mines.

Cambodia remains littered with land mines after emerging from decades of war, including the 1970s Khmer Rouge "Killing Fields" genocide, leaving it with one of the world's highest disability rates.

The rodents have taken on mine-clearing duty in several countries, including Angola, Mozambique, Thailand, Laos and Vietnam. Reuters

INDIA

End of the line for shipbreakers

In the world's biggest ship recycling center, workers with blowtorches cut segments of steel stripped from the rusting hull of a towering cargo ship, sold for scrap by its Japanese owner.

Here in the town of Alang on India's Arabian Sea coast, however, more than half of the shipbreaking yards have shut down in the past two years. The future of this trade is bleak in India and for its neighbors Bangladesh and Pakistan.

The industry has been hit by a flood of cheap Chinese steel and new European Union environmental rules that threaten to push business to more modern yards in places such as China and Turkey, in turn devastating local economies.

"People are running this business from their heart, not from their mind," said Chintan Kalthia, whose company R.L. Kalthia Ship Breaking Pvt Ltd. runs one of Alang's more modern yards.

Ships sold to South Asian breakers, which control about 70 percent of the market, are winched at high tide onto a beach, where they are taken apart by mostly migrant laborers.

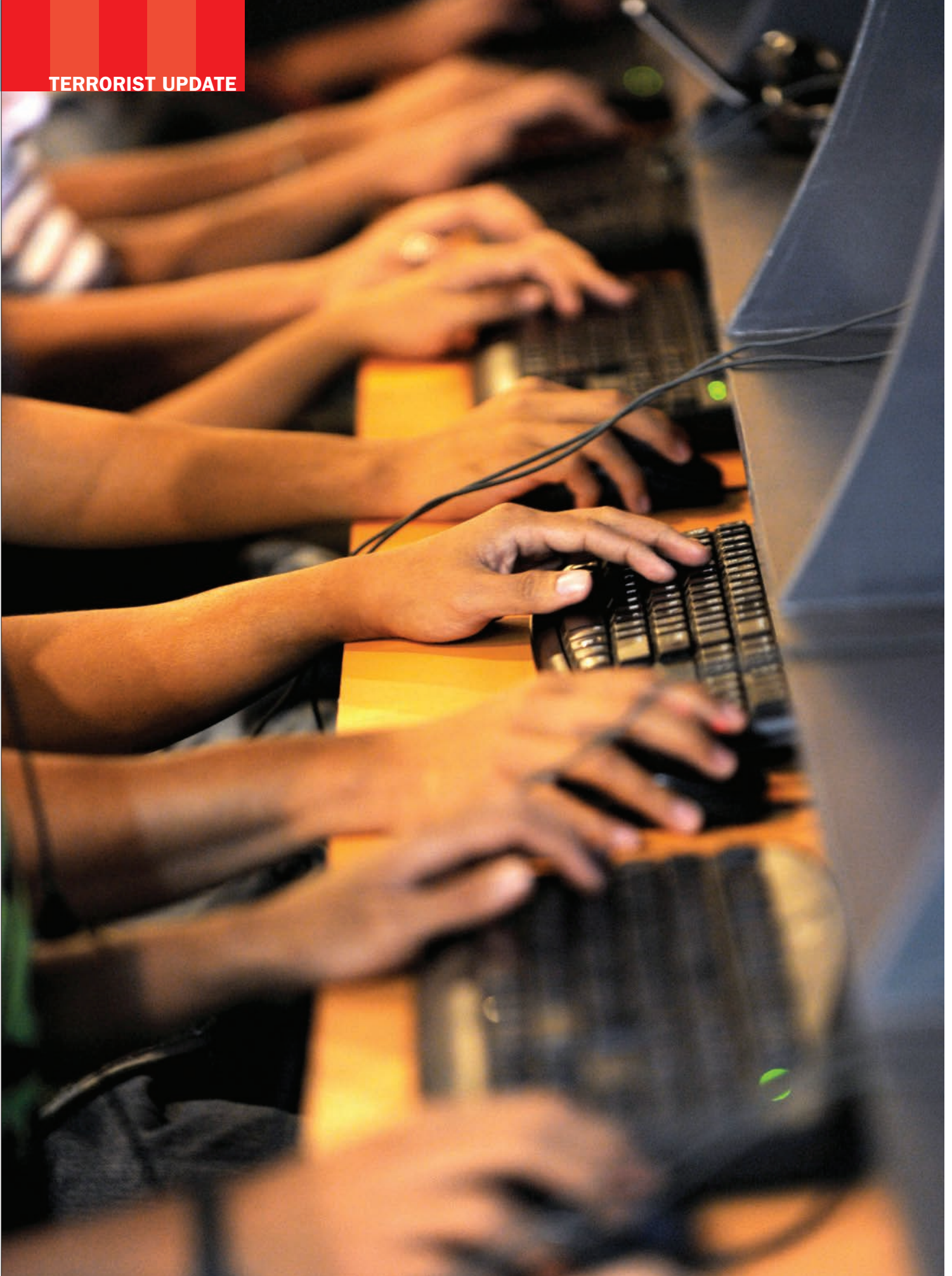
With a plunge in steel prices, shipowners are getting about U.S. \$3.6 million less for the 25,000 tons of recoverable metal from a typical iron ore- or coal-carrying ship than they did at the end of 2014.

The situation in Pakistan appears equally bad. "It has always been a cyclical business, but people who have been in this industry tell me this is the worst in 30 years," said Shoaib Sultan, the owner of Horizon Ship Recycling in Karachi.

As well as facing pressure from cheap Chinese steel, there are also calls to stop beach scrapping because of the danger and environmental damage from pollutants left to drain into the sea. Reuters

REUTERS





U.N. ASKS INTERNET COMPANIES TO HELP FIGHT INTERNATIONAL TERRORISM

THE ASSOCIATED PRESS



U.N. panel has called for Internet and social media companies to respond to the exploitation of their services by al-Qaida and other extremist groups who use the Web to recruit fighters and spout “increasingly horrific propaganda.”

The panel recommended that these companies brief the U.N. Security Council committee that’s monitoring sanctions against al-Qaida, its affiliates and the Islamic State of Iraq and the Levant (ISIL) on measures that the companies are taking to prevent such exploitation.

“A worrisome trend over the past year has been the growth of high-definition digital terror: the use of propaganda, primarily by [ISIL] and its sympathizers, to spread fear and promote their distorted ideology,” the panel of experts monitoring sanctions against extremist groups said in a report to the Security Council.

It said the scale of digital activity linked to ISIL, and to a lesser extent some al-Qaida affiliates, has strategic implications for how the threat from extremists will evolve in the coming years, “not least among the diverse, dispersed and not necessarily demobilized diaspora of foreign terrorist fighters.”

In recommending that Internet and social media companies brief the sanctions committee, the panel said: “The scale of the digital threat linked to radicalization, together with the need for concerted action on countering violent extremism, calls for further action by the Security Council.”

The Internet’s impact on extremist groups is one facet highlighted in the report, which covers the global threats posed by al-Qaida, its affiliates and ISIL.

The panel notes that while these groups pose a threat to international peace and security, “they still kill and injure far fewer people than wars, disasters or traffic accidents.”

Nonetheless, it said al-Qaida, its associates and ISIL still kill thousands, and in recent months the human cost of attacks by these extremist groups “has been enormous.” Extremists have carried out major bombings, assassinations and exploited several million people in Iraq, Syria, and to a lesser but no less significant extent in parts of Afghanistan, Libya, Nigeria, Somalia and Yemen, the report said.

The panel said al-Qaida remains overshadowed by the attention paid to its splinter, ISIL, which controls large swaths of Syria and Iraq. The grip of al-Qaida leader Ayman al-Zawahiri on affiliates appears to be weakening, it said, and al-Qaida’s financial position remains precarious compared with that of ISIL.

The panel said ISIL “can claim to have achieved what al-Qaida never did: the building of a territorial entity through terrorist violence.”

It also said al-Qaida and its affiliates still pose a serious threat in many parts of the world.

They have become more visible and active in Afghanistan in 2015. Groups associated with al-Qaida have grown in number in South and Central Asia. Al-Shabab, the al-Qaida affiliate in Somalia, remains a major security threat in the Horn of Africa.

Southern Libya remains “a safe haven” for extremists planning attacks in the Maghreb and Sahel regions, and experts said they have been told of anti-aircraft guns and portable air defense systems in the hands of extremist groups.

Boko Haram has expanded deadly incursions into Cameroon, Chad and Niger, but the panel said that organization’s ability to maintain long-term control over 20,000 square kilometers of northeastern Nigeria “will require heavier weaponry, access to natural resources and some ability to sustain a local population.”

It said the Indonesia-based extremist network Jemaah Islamiyah appears to be reviving and is recruiting professionals, including engineers and information specialists, which could pose “a significant long-term threat” to Southeast Asia.

Customers use computers at an Internet cafe in Manila, Philippines.

AFP/GETTY IMAGES





PRESERVING **FREEDOM OF MOVEMENT** IN THE SKIES

ADVANCED AIR POWER PROVIDES SECURITY

FORUM STAFF

*Air power is an essential
element of military strategy.*

Militaries worldwide harness their resources to protect national interests by leveraging their air force. These assets also provide humanitarian assistance and disaster relief, in addition to self-defense. “Air power’s innate qualities of reach, speed and perspective give it an unrivaled ability to project influence globally,” John Andreas Olsen wrote in his book, *Global Air Power*. “Nations that possess advanced air power can and will exert their authority in any region, regardless of whether they have a geographic presence.”

An Indian Air Force helicopter rescues a stranded man from his submerged house during floods in Srinagar, India, in September 2014.

AFP/GETTY IMAGES

More than a century has passed since armies and navies began experimenting with the use of airplanes as part of their war tactics. Air power's rise to an essential element of military strategy emerged almost simultaneously with the advent of aviation itself.

"Air power has played a critical role in the conflicts that have set the Asian political scene since World War II. From the Korean War to the Vietnam conflict, to the several wars between India and Pakistan, air forces have helped tip the strategic balance in war and frame the terms of peace," Robert Farley, an assistant professor at the Patterson School of Diplomacy and International Commerce and expert on military

In fact, Larry Wortzel, an analyst on defense issues and the Indo Asia Pacific, said Japan has the "strongest Navy and Air Force in Asia," according to a report by Breaking Defense website, calling Japan "the most modern, the most effective."

"You don't want to mess with them," he said.

The number of JASDF personnel stood at roughly 47,000 by the start of 2014, according to Japan Ministry of Defense figures. The Japanese government has recently made major investments in its air defense with next-generation intelligence aircraft purchases like the F-35 joint strike fighter and upgrades to its F-2 and F-15 fleets, according to the DefenseNews website.

"The F-35 usefully enhances interoperability between the U.S. and Japanese armed forces and puts Japan's fighters on the same page as the U.S. and other allies," Corey Wallace, a security policy analyst at the Graduate School of East Asian Studies at Freie Universität, Berlin, told DefenseNews. "It also enhances the usefulness of Japan's own Aegis-equipped destroyers by essentially enhancing their range. The networking capabilities also makes the Aegis the F-35's 'wingman' by enabling it to leverage sea-based missiles to expand its strike area."

Aegis is not a missile but a system of guided missiles, software and radar carried aboard warships that equip standard missile interceptors.

Developed in the 1970s by the United States, the Aegis combat system has since been improved to enhance its ballistic missile defense capabilities.

Japanese fighters have taken to the sky more often lately because the country says it must counter Chinese fighters and Russian spy planes, according to a January 2015 report by Reuters. During the last nine months of 2014, Japan saw a 32 percent increase in the number of fighters it scrambled compared to the same time period in 2013, Reuters reported.

Tensions with China, and between China and other nations in the region — particularly around the South China Sea — have prompted Japan to ramp up its military engagements, government officials say. A Japanese military official commented on the country's intent to join the U.S. in patrols of the South China Sea.

"The area is of utmost importance for Japanese security," Adm. Katsutoshi Kawano told *The Wall Street Journal* newspaper in June 2015. "Because there is a lack of transparency, we are very concerned about China's actions."



A Japan Air Self-Defense Force F-2A/B fighter pilot salutes during a review ceremony at the Hyakuri Air Base in Omitama, Ibaraki prefecture, in October 2014.

doctrine, wrote for *The National Interest* magazine in January 2015. "But effective air forces need more than flashy fighters. They need transport aircraft that can provide strategic and tactical airlift, and aerial early warning planes that can maintain surveillance and control of the sky. They need a defense-industrial base that can keep the warplanes in the air."

Across the Indo Asia Pacific, some analysts look to Japan, India and China as the three most effective air forces in the region (excluding the United States) and most likely to possess those attributes. What follows represents a snapshot of the impression these three countries leave from a tactical air perspective.

JAPAN AIR SELF-DEFENSE FORCE

Japanese Prime Minister Shinzo Abe has pushed recently to expand the role of his defense forces. What gets little mention in such a politically driven discussion is just how well-equipped those forces already are, particularly the Japan Air Self-Defense Force (JASDF).

Continued on page 14

CHINA ACCELERATES RESEARCH INTO MILITARY DRONES

REUTERS

China is accelerating research into military drones as its arms industry looks to increase export volumes, hoping to gain traction with cheaper technology and a willingness to sell to countries to which Western states are reluctant to sell.

While its technology lags behind the United States and Israel, the biggest vendors of unmanned aerial vehicles (UAVs), China is attracting a growing list of foreign buyers including Nigeria, Pakistan and Egypt.

China has previously had limited success exporting manned military aircraft but is hoping to do better with UAVs, given that they are cheaper and easier to manufacture.

"Research and development on drones in our country has now entered a phase of high-speed progress," said Xu Guangyu, a retired major general in the People's Liberation Army.

"We have some distance to catch up with developed countries — that's certain — but the export market is growing."

Market researcher Forecast International pegged the value of production for military drones worldwide at U.S. \$942 million in 2014. It will grow to \$2.3 billion by 2023, the firm said.

China's biggest drone maker, Aviation Industry Corp of China, is predicted by Forecast to become the world's largest maker of military drones by 2023.

Its Wing Loong drone sells for U.S. \$1 million, according to Chinese media reports. The U.S.-made MQ-9 Reaper, to which it has sometimes been compared, is priced at about U.S. \$30 million.

The Stockholm International Peace Research Institute (SIPRI) believes China became the second country in the world to openly export armed drones when it delivered five to Nigeria in 2014. Nigeria, which had unsuccessfully sought drones from the U.S., has used them against the militant group Boko Haram.

The U.S. has only exported armed drones to Britain.

Though China is discreet about its weapons exports, it has sold various types of military drones to at least nine countries, according to state media reports, including Pakistan, Egypt and Nigeria.

GROWING MARKET SHARE

China's weapons exports jumped 143 percent in the five years to 2014 compared to the previous five, though it still only accounts for about 5 percent of the global arms market, according to SIPRI.

Military drones provide an opportunity for the country to gain more market share, given that dozens of governments are trying to gain access to the technology while the U.S. has strict export curbs on them.

The U.S. State Department said in February 2015 it would allow exports of armed U.S. military drones under strict conditions, including that sales must be made through government programs, and that recipient nations must agree to certain "end-use assurances."

China's Foreign Ministry declined to comment on the country's policy on drone exports.

The growth of the market is proving a boon for Chinese arms makers.

Fei Yunjian, the Beijing-based chief of Beijing Heweiyongtai Science and Technology Co. Ltd., a private firm that sells police equipment, including drones, to domestic and foreign customers, said he had already sold surveillance UAVs to countries in the Middle East and Africa, without specifying which ones. "We're placing high importance on them," said Fei. "Demand for all of our products has shot up — it's simply because the world has become more chaotic," he said.

Ma Hongzhong, director of China Aerospace Science and Industry Corp.'s Unmanned Aircraft Research Institute, told the *China Daily* newspaper that many of China's defense giants, including his own, are allocating "significant resources" to drone development.

"The industry has a very low entry threshold," he said, adding that his company is focusing on military drones that can play a role in counter-terrorism and riot control operations.

Many defense firms also make and sell missiles and rockets to arm drones, heightening the appeal for international buyers, analysts said.

"Admittedly, our technology is not first-rate compared with developed countries, but we don't want to be left behind," said Ni Lexiong, a naval expert at the Shanghai University of Political Science and Law.



Continued from page 12

Abe's push to make Constitutional changes allowing for a more active military role has been polarizing, "and any perceived revival of Japan as a military player prompts strong reactions from those who have suffered from its military expansionism in the past — notably China," the BBC News said in July 2015.

INDIAN AIR FORCE

One has to look no further than Exercise Cope India, a bilateral air force exercise between India and the U.S., to recognize the skill of Indian Air Force (IAF) personnel.

"Using a variety of tactics, the Indians managed to go

toe-to-toe with the best that the U.S. Air Force had to offer," Farley wrote about the exercises, which took place between 2004 and 2009.

India continued its international relationship building in July 2015 through an air combat exercise with the United Kingdom. Indian fighter pilots matched their skills with British counterparts in the bilateral Indradhanush exercise. IAF personnel participated in the exercise with four Sukhoi-30MKI fighters, a C-17 Globemaster III strategic airlift aircraft, a C-130J Super Hercules special operations plane and an IL-78 midair refueler, *The Times of India* newspaper reported in July 2015.



People's Liberation Army Air Force pilots — members of the August 1st Aerobatics Team — climb out of J-10 fighter jets after arriving for the China International Aviation & Aerospace Exhibition in Zhuhai, Guangdong province, in November 2014.

REUTERS

India reportedly has begun modifying its Sukhoi-30MKI aircraft to carry air-launched supersonic cruise missiles known as Brahmos so that it can now reach the interiors of China and Pakistan, according to an April 2015 report in *The National Interest* magazine, which is based in Washington, D.C. The Brahmos cruise missiles are the fastest in the world, reaching speeds of Mach 3.0, or 3,000 meters per second.

India is also testing a three-stage solid-fueled intermediate-range ballistic missile, *The National Interest* reported. The Agni-V has a range of about 5,000 kilometers.

The IAF is also working to acquire additional airlift capabilities, including new, domestically made helicopters.

With 170,000 personnel and 1,500 aircraft, the Indian Air Force is the fourth largest in the world, behind the U.S., China and Russia, *India Today* reported in June 2015.

PEOPLE'S LIBERATION ARMY AIR FORCE

China's increased defense spending has increased defense spending comes as no surprise to military analysts who have kept a keen eye on the People's Liberation Army. China's military budget for 2015 was expected to increase by 10 percent over the previous year, rising to about U.S. \$145 billion, *The New York Times* newspaper reported in March 2015.

Chinese state media reported in July 2015 that China needs to develop a long-range strategic bomber to strike adversaries farther away from its coast should a conflict arise — further bolstering the impression that China has no intentions of scaling back defense spending or growth any time soon.

China's goal by 2050: Build an armed forces capable of winning wars, according to *Indian Defence Review*.

"A visionary, long-term and time-bound approach to military modernization, supported by a strong and innovative military-industrial capability, has transformed the People's Liberation Army Air Force of China from an antiquated, derelict, poorly trained and oversized force to a modern aerospace power with increasing proficiency to undertake its stated missions in the 21st Century," according to the July 2014 *Indian Defence Review*.

The People's Liberation Army Air Force isn't only posturing in a defense stance. Air Force personnel used a drone in a humanitarian mission for the first time in July 2015, dispatching the unmanned aircraft to help in monitoring work following an earthquake in Xinjiang.

CONCLUSION

The global air power industry has experienced lots of change since the end of the Cold War. The Indo-Asia-Pacific region, in particular, has seen a robust transformation in air power since the 1990s, according to a report titled "Trends in Airpower Modernization in the Asia-Pacific Region," produced by the S. Rajaratnam School of International Studies in Singapore.

With greater emphasis on acquiring advanced air combat missile systems as well as other advanced air power technologies, countries across the region are sure to remain in competition to attain the latest cutting-edge equipment to beef up their air capabilities. That race to be the first to attain the latest trend could mean an ongoing shifting in air power balance.

"How these trends will eventually play out, the balance of air power capabilities in the region, the factors leading to shifts in the balance of airpower capabilities," the Singapore report said, "these are questions that continue to challenge strategic thinking in the region." □

DETERRENCE



BUILDING

Bringing Stability to the Cross-Strait Relationship

TOM ABKE

The possibility of military conflict with mainland China has loomed over Taiwan since 1949 after the declaration of the People's Republic of China on the mainland. China has long maintained the objective of eventual unification with Taiwan. China's decadeslong military buildup and saber-rattling opposition to Taiwan's past moves toward official independence suggest that the Chinese are prepared to achieve unification by military force.

A host of considerations, however, including the modern, formidable and survivable defense force of Taiwan, have so far deterred a military move by China in what remains one of the world's most delicate and complex relationships between nations.

"China wants to unify, Taiwan wants to maintain autonomy," Dr. Douglas Paal, vice president for studies at the Carnegie Endowment for International Peace, said in a phone interview with *FORUM*. "It's been that way for a long time. Within Taiwan, the debate is between maintaining the autonomy that Taiwan has today or taking it a step further and becoming a legally independent sovereign state with a different name from China. And China has frequently threatened to take action of an unspecified nature — but presumably military — to stop that from happening."

Prior to his appointment at Carnegie, from 2002 to 2006, Paal was head of the American Institute in Taiwan, which replaced the U.S. Embassy in 1979 after the U.S. normalized diplomatic ties with China.

Credible Airborne Threats

China has a constantly expanding force of Russian and Chinese fighter jets, surface-to-air ballistic missiles (SAMs), cruise missiles, mobile electronic warfare devices including unmanned aerial vehicles, and such sophisticated counteroffensive weapons as guidance-scrambling anti-radiation missiles. These combine to make China's airborne military threat to Taiwan a major concern, especially when compared to Taiwan's quantitatively inferior force.

"Fighting wars is not a simple bean-counting game," said Dr. Ching Chang, a research fellow at the Society for Strategic Studies in Taiwan. "The one with more forces or hardware might not necessarily prevail all the time. Given the case of U.S. vs. Vietnam or Soviet invasion to Afghanistan, mass is a favorable leverage but never a victory guarantee. Neither does the quality of weapons always have the chance to offset the leverage of quantity."

In the case of Taiwan, however, the quality of their force is a recognized advantage. "The primary advantage that Taiwan has is the relative modernity of its force," said Mark Cozad, senior defense research analyst at Rand Corp. Whether the analysis compares the state of the art of its tactical and strategic defense systems or its advanced fighters, its modernity has "traditionally been Taiwan's advantage, particularly when faced with an air threat from China."

Cozad acknowledged that in terms of sheer size and firepower of forces, Taiwan would be considerably outgunned by China if a full-blown military conflict erupted across the Taiwan Strait. But he added that the cost of defeating Taiwan in such a conflict, with the aim of unification, is likely too high for China to attempt it — at least in the foreseeable future.

"If I'm looking at how threats from China might be offset, the biggest thing to consider is survivability," said Cozad. An adequate level of survivability of Taiwan's force, he explained, rather than an ability to actually defeat China in the theater of combat, could be sufficient to deter China from deploying a military solution to the political problem of unification.

Securing Survivability

As keys to survivability, Cozad listed mobile air defense systems, underground facilities, obscurants, lines of decoys — both physical and electronic — and other devices. He also called out strategy and tactics that "make it hard for the enemy to know where targets are" as well as obscure estimates of the battle damage and essentially to "raise the level of uncertainty."

"If you look through the Chinese military science literature, you'll find that they're fairly conservative in their planning," said Cozad. "And so, uncertainty could be a very difficult thing for them to deal with."

Cozad affirmed that steps taken by Taiwan to protect its force and enhance its survivability throughout a prolonged conflict are exactly those that serve as a

deterrent to an invasion by China. These include its elaborate system of underground facilities such as the Tri-Service Hengshan Military Command Center, built to defend against China's ballistic missiles; the Air Operations Center, known as "Toad Mountain," which oversees Taiwan's air and missile defense networks; the F-16 facility at Chia-yi, which is entirely within a mountain; and a backup base on Taiwan's east coast inside Chiashan, or "Optimal Mountain."

Paal agrees with Cozad on the significance of survivability. "This is a top priority, and it has been undertaken," Paal said. "Adm. Chen Yeong-kang, the deputy minister of defense, has been involved in this for some time. Taiwan has done a very serious job of trying to learn to use highways as runways when runways are blasted, and then to learn to repair runways when they are blasted, in order to keep their airplanes up."

If the mountain housing the F-16s at Chia-yi is attacked, "it probably will survive, and when the planes come out flying, they will have the other threats of the surface-to-air missiles to deal with," Paal said. Taiwan has been acquiring missile defenses, maybe not at a bold enough pace to meet the challenge from China, but certainly enough to raise the cost of China's efforts to intimidate Taiwan."

Chang perceives the cost to China of a military strike against Taiwan extending beyond the scope of battle expenses to the arena of global trading interests. "Any conflict or even tension occurring across the Taiwan Strait may have both a psychological and a substantial impact to the global market," said Chang, "since both Taipei and Beijing have a significant role in various international merchandise supply chains."

This anticipated cost to China's trading interests not only deters China from seeking a military solution to unification with Taiwan but also has set it on a course to use its growing economic relationship with Taiwan as the cornerstone of its new strategy for unification.

"China's primary objective is unification. And so there are a lot of ways that it could potentially do that," according to Cozad. "Since 2008, when Taiwan's President Ma Ying-jeou and his KMT party were elected, the relationship has been for the most part better. There's been an effort on both sides to increase ties, political and economic ties, but again there are limits to what the Taiwan population — as a whole — are willing to accept."

Political Consequences

This perceived intolerance for increased unification, mixed with concerns about the consequences of unification — concerns fed by negative reports from Hong Kong's population over their own unification with China, said Cozad — could prompt a return to power by the current opposition party, Democratic Progressive Party (DPP). DPP's sympathies for the Taiwan independence movement, which favors having Taiwan as a sovereign country entirely independent from China,



Graduates of Taiwan's military academy march during the joint commencement for the Air Force and Navy academies in Kaohsiung in southern Taiwan in June 2014. REUTERS



Taiwan military personnel enter a CH-47SD Chinook helicopter during a military exercise at an Army base in Hsinchu, northern Taiwan, in July 2015. REUTERS

could put it at odds with the mainland, as it was a decade ago when Taiwan twice organized referendums related to independence.

A declaration of independence is the one action that Chang views as a probable cause for China's military intervention against Taiwan. "The possibility of a military solution may occur only if Taipei claims a formal, de jure, political independence," said Chang. "Changing the Republic of China into another name such as the Republic of Taiwan may trigger the conflict for sure. Other forms of seeking de facto independence can also be risky. On the other hand, accusing Taipei [of] delaying the unification process as an excuse for activating the military actions against Taiwan is relatively unlikely."

The most likely scenario of any military intervention by China, according to Cozad, would be a blockade of Taiwan's shipping lanes, thereby isolating it from the rest of the world.

Bolstering Defenses

Could the continuing prospects for the use — or threat

— of force by China justify an expansion of Taiwan's air defenses to include advanced fighter aircraft such as the United States' F-35, as some have urged? Paal perceives more cost-effective ways to bolster Taiwan's defenses. "Back in 1992, I was very much involved in selling the F-16 to Taiwan," said Paal, "because at that time, the PRC's [People's Republic of China's] capabilities had offset Taiwan's ability to resist force being used against it."

Since then, Paal contends, times and conditions have changed. "The attrition rate in combat between Taiwan's advanced fighters — should they have them — and the capabilities that China now has to shoot them down, has gotten so high that you have to wonder if adding more fighters is the best way to spend money on Taiwan. Wouldn't they be better off to have fast-moving patrol boats and helicopters and more anti-SAM patriot missiles and other kinds of anti-missile capabilities, as the focus for spending? Because when putting an airplane in the air, you lose U.S. \$150 million or whatever the cost of the item is, whereas, you can launch quite a few missiles against the Chinese models for a lot less money." □



LONG-RANGE STRIKE IN THE INDO-ASIA-PACIFIC THEATER

A U.S. Air Force Boeing B-52 Stratofortress strategic bomber performs a flypast during an aerial display at the Singapore Airshow.

REUTERS

AIR POWER, COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE, AND ASSURANCE AND DETERRENCE

LT. COL. SETH SPANIER/U.S. AIR FORCE

The long-range capabilities of U.S. bombers are ideally suited to the vast distances and unique challenges of the Indo-Asia-Pacific region. Bombers provide a significant capability, enabling readiness and illustrating U.S. commitment to deterrence while offering assurances to allies and partners and complementing their military capabilities.

Bombers strengthen regional security and stability and ensure the U.S. is capable of defending national security interests in the region through the full range of U.S. military capabilities, from multilateral integration to conventional strike and nuclear deterrence.

HISTORY

Since the dawn of military aviation, long-range strike aircraft were sought to solve problems caused by the “tyranny of distance.” During World War II, aircraft such as the B-29, with its large payload and 6,598-kilometer range, proved decisive. XX Bomber Command B-29s provided Allied commanders a significant offensive capability, while XXI Bomber Command B-29s from the Marianas (Saipan, Tinian and Guam) could reach any target in the theater of operations. Strategic bombing, combined with B-29 mining, was an essential element in the Allied victory.

Decades later, during the Vietnam War, long-range strike missions were flown on an unprecedented scale, as B-52s flew 26,615 sorties over Southeast Asia and delivered staggering quantities of ordnance from multiple locations, to include as far as Guam. Today, advances in range, stealth and persistence allow bombers stationed in the continental U.S. to provide deterrence on a global scale.

CURRENT OPERATIONS

The U.S. Air Force, in conjunction with U.S. Pacific Command (PACOM), has maintained a routine, rotational, forward-deployed, global strike capability in the Indo-Asia-Pacific region since March 2004 — an important precursor to the U.S. military rebalance to the region. These forces are deployed at the direction of the U.S. Secretary of Defense and employed by the PACOM commander.

This continental U.S.- and Guam-based continuous bomber presence (CBP), consisting of B-1, B-2 and B-52 aircraft, enhances U.S. combat capability while minimizing risk to forces in theater. CBP aircraft

accomplish regular training and exercise participation, advance and strengthen alliances and long-standing military-to-military partnerships, and ensure continued access to the global commons for all.

CBP flights routinely transit international airspace throughout the Pacific, including the area China included in its unilateral 2013 air defense identification zone declaration over a significant portion of the East China Sea. These CBP flights are consistent with long-standing and established International Civil Aviation Organization policies that are inherent in air operations around the world.

From the Malacca Strait to the Bering Sea, and from the North Pole to the South Pole, U.S. bombers provide unmatched combat capability to the PACOM commander.



A U.S. Navy FA-18 Super Hornet connects to a KC-135 Stratotanker for refueling during a 2010 U.S.-Japan military exercise above the South China Sea. AFP/GETTY IMAGES

NEAR-TERM OPERATIONS

Today, and in the near future, long-range strike operations continue to expand and evolve, as the U.S. Air Force improves its ability to support geographic combatant commanders. CBP is a key component in improving both joint service and allied interoperability. CBP missions integrate multiple aerial platforms in the Pacific theater and provide a significant combat capability for our allies and partners against potential

Chinese Air Force B-6K strategic bomber aircraft fly in formation in July 2015 during a training session for a parade marking the 70th anniversary of the end of World War II.

REUTERS



Members of the 5th Logistics Readiness Squadron load an aircraft at Minot Air Force Base, North Dakota, in March 2014.

SENIOR AIRMAN BRITTANY Y. AULD/U.S. AIR FORCE



An AGM-86B air-launched cruise missile is released from a B-52H Stratofortress over the Utah Test and Training Range during a Nuclear Weapon System Evaluation Program sortie in September 2014.

STAFF SGT. ROIDAN CARLSON/U.S. AIR FORCE



adversaries in even a contested and degraded operational environment.

CBP missions commonly integrate with U.S. and allied fighter and support aircraft, including the Royal Australian Air Force, Japanese Air Self-Defense Force, Republic of Korea Air Force, Royal New Zealand Air Force, Royal Malaysian Air Force, Philippine Air Force and more.

To highlight a few specific multinational examples from the recent past, CBP missions have participated in Pitch Black and Talisman Sabre in Australia, Keen Sword near Japan, the Langkawi International Maritime and Aerospace Exhibition in Malaysia, Balikatan in the Philippines, as well as Valiant Shield and Cope North near Guam and the Pacific Rim exercise known as RIMPAC near Hawaii. America's allies and partners fully recognize the importance of detailed integration with bombers in the Indo-Asia-Pacific region.

According to group Capt. Kirrily Dearing, Royal Australian Air Force liaison officer to U.S. Pacific Air Forces, "Recent bomber missions to Australia continue a long-standing program of combined training activities and exercises which provide mutual benefit to Australia and the United States. These activities provide access to extensive range facilities in the north and are an excellent opportunity for mutual training on combined air control, maritime and land strike missions through participation in exercises including Talisman Sabre. These activities continue to consolidate the strong interoperability between our forces." Training opportunities with allies and partners sharpen the skills of the joint force and increase combat capability.

Often, joint/multilateral CBP missions develop new tactics for air-sea battle/joint access and maneuver in the global commons, which is essential in coalition efforts to thwart the anti-access area denial capabilities of potential adversaries. In missions ranging from single sorties to large force exercises, CBP bombers accomplish detailed integration with the U.S. and allied naval forces to create new tactics for air operations in maritime surface warfare.

The expanses of the Indo-Asia-Pacific region and the diverse number and types of assets in the region result in a "tactics development laboratory" for allied and coalition forces. The extreme distances associated with CBP missions allow perpetual refinement of command, control, communications and intelligence (C4I) procedures that enable air operations centers to have seamless control through globally assured communications on behalf of the geographic combatant commander.

Finally, CBP familiarizes bomber units with foreign base access and operations throughout the Pacific theater. CBP complements the military rebalance to the Indo-Asia-Pacific region, expands our engagements with allies, and builds new partnerships across the international community, including access to new places and bases around the region.

LONG-TERM OPERATIONS

A CBP will remain constant across the Indo-Asia-Pacific region for the foreseeable future, due to both the importance of the region and the presence of destabilizing factors. Beyond their familiar, daunting conventional and nuclear strike capabilities, CBP assets are increasingly capable as intelligence, surveillance and reconnaissance (ISR) platforms, as C4I nodes, and in nontraditional mission sets such as search and rescue, where bomber endurance, sensors, beyond line of sight communications, and multiple well-trained crew members can provide a difference that saves lives.

Future sensors such as passive or active electronically scanned array radars, advanced electro optical/infrared targeting pods, and datalinks will vastly improve the capabilities of bombers to integrate with allied and coalition



An E-8 Joint Surveillance Attack Radar System aircraft takes off from an undisclosed location in Southwest Asia.

STAFF SGT. LILIANA MORENO/U.S. AIR FORCE

partners. New weapons such as the long-range anti-ship missile, the joint air to surface standoff missile-extended range, and the quickstrike extended range mine continue to expand ground component command options. CBP access to regional bases is increasing and will likely continue to do so in the future, providing unprecedented flexibility and capability as bombers continue to work with partners and allies.

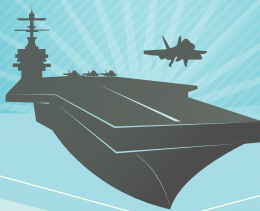
Finally, the U.S. Air Force's next bomber, the long-range strike bomber, is an integral element in the future long-range strike family of systems that will soon integrate into Indo-Asia-Pacific region defense plans. It will provide long-endurance ISR and strike against fixed and mobile targets in any airspace in the world, while integrating ISR, electronic attack and C4I assets.

At the end of the day, the complex security challenges within the Indo-Asia-Pacific region are partially mitigated by strengthening allied and partner interoperability while deterring threats to security and stability. Despite its immense capability, CBP is one small arrow in the allied and partner quiver that applies long-range aviation capability to meet security objectives. □

PROJECTING POWER

Aircraft carriers symbolize a nation's military might – specifically its ability to project air power far beyond its borders. Carriers are also extremely expensive and complicated to build and operate.

The Indo-Asia-Pacific region is amid an aircraft carrier arms race, with most of its major powers doubling or tripling the size of their carrier fleets.



DEVELOPMENTS *by* COUNTRY

China is operating a refurbished Soviet-built carrier bought in 1998. China's Navy is reportedly building a second carrier and wants a flotilla of three or four carriers by 2020.

Japan recently doubled the size of its helicopter destroyer fleet.

India operates two refurbished carriers bought from the United Kingdom in 1986 and Russia in 2013. India is constructing its first indigenously built carrier, and plans to build a second one in the future.

Australia decided to build two Canberra-class carriers, the largest ships in Australian naval history. The first entered service in 2014. The second may follow sometime in 2016.

South Korea operates one helicopter carrier and plans to build another two, although their construction has been delayed.

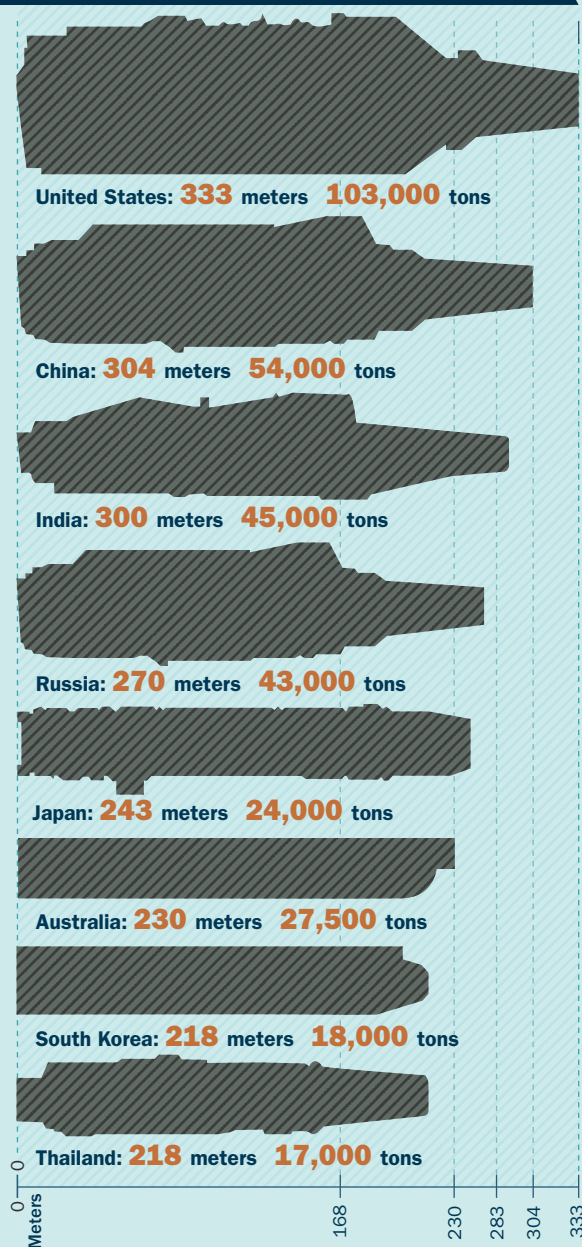
WHAT IS AN AIRCRAFT CARRIER?

There is no single definition of an "aircraft carrier." Generally, the term refers to a ship that's equipped to deploy fixed-wing aircraft, including vertical-landing jump-jets.

The United States has 10 large "supercarriers," displacing more than **64,000** metric tons, and nine smaller amphibious assault ships that primarily carry helicopters.

Most nations operate light (roughly **30,000** ton) or medium (**40,000** ton) carriers. The carriers of South Korea and Thailand are small enough to be considered "helicopter carriers" and are used primarily for helicopters. Japan operates helicopter destroyers.

LARGEST CARRIERS *per* COUNTRY



AIRCRAFT CARRIERS *per* COUNTRY*

Countries	In Service	Under Construction	Planned
<i>United States</i>	<i>19</i>	<i>3</i>	<i>11</i>
<i>Japan</i>	<i>4</i>	<i>0</i>	<i>0</i>
<i>India</i>	<i>2</i>	<i>1</i>	<i>1</i>
<i>China</i>	<i>1</i>	<i>1</i>	<i>2</i>
<i>Australia</i>	<i>1</i>	<i>1</i>	<i>0</i>
<i>Thailand</i>	<i>1</i>	<i>0</i>	<i>0</i>
<i>South Korea</i>	<i>1</i>	<i>0</i>	<i>2</i>
<i>Russia</i>	<i>1</i>	<i>0</i>	<i>1</i>

39

The number of aircraft carriers in service worldwide

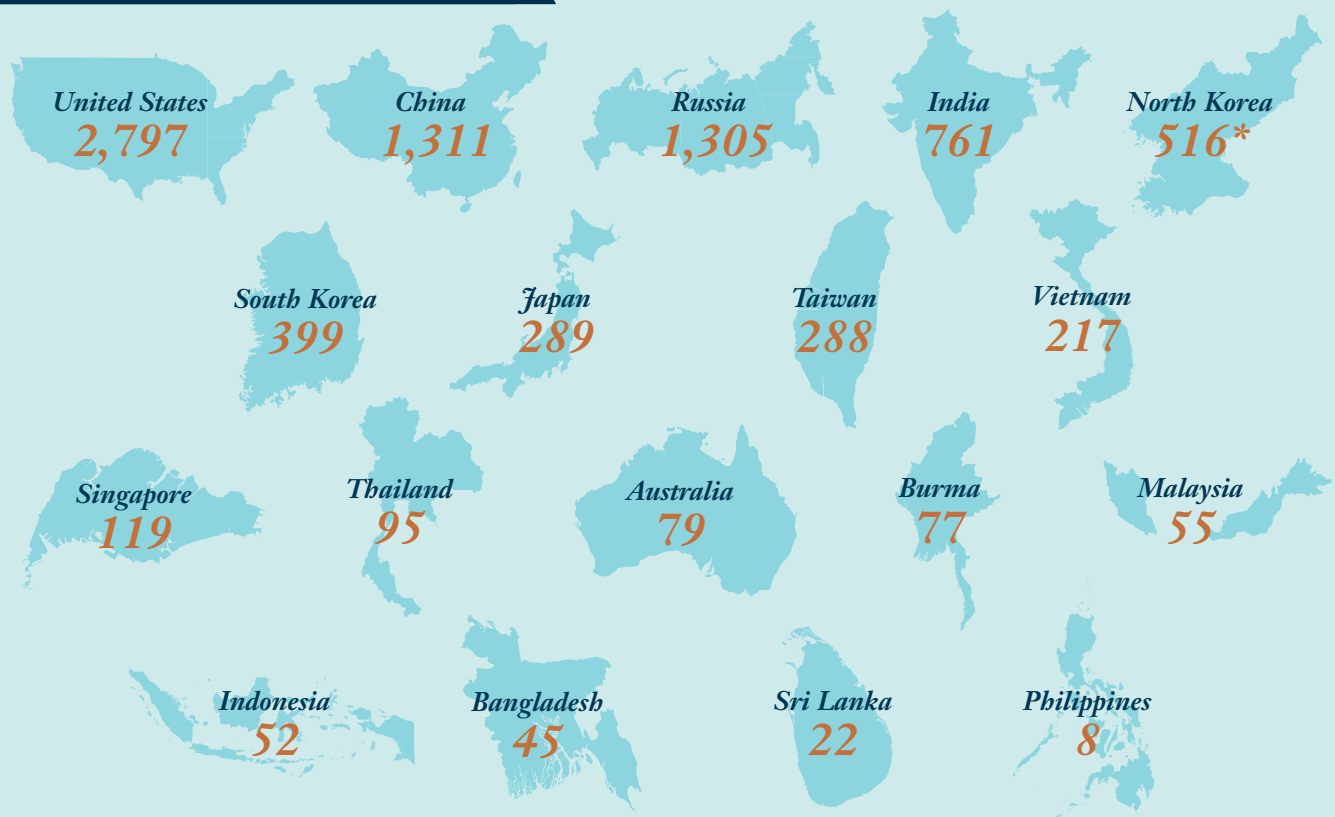
The United States and the nations of the Indo-Asia-Pacific region account for the vast majority of carriers in use. Outside of these craft, 10 other aircraft carriers are in operation.

France has four. Italy has two.

Brazil, Russia, Spain and the United Kingdom each has one.

* Includes super carriers, fleet carriers, light aircraft carriers, escort carriers, helicopter carriers and helicopter destroyers. Total of In service, Under Construction, and Planned totals are not cumulative given the decommissioning of older ships.

NUMBER of COMBAT AIRCRAFT



* Experts believe that many North Korean warplanes are not airworthy.

Sources: Central Intelligence Agency, *The World Factbook*, International Institute for Strategic Studies, public domain print and media reports.

AIR INTERCEPT SAFETY

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REINFORCING INTERNATIONAL
NORMS IS KEY FOR ENSURING
SAFETY AND SECURITY

LT. GEN. RUSSELL J. HANDY/U.S. AIR FORCE

The U.S. Air Force will celebrate its 70th anniversary in September 2017. Since the inception of this service branch, air power has developed into an innovative, flexible and effective arm of defense and diplomacy. The U.S. Air Force projects combat air power, delivers humanitarian assistance and fosters diplomatic relationships in every part of the world. The U.S. Air Force has established a formidable record of achievement through its operations and advancements over the course of its rich history.



The vast size of the Alaskan training ranges allows pilots to fully explore the speed and altitude envelope of the F-22. JOHN M. DIBBS

In recent years, there has been a steady evolution of military air activity in proximity to sovereign national boundaries in the Arctic and the Indo-Asia-Pacific regions. This highlights a particular safety concern: the need for all countries to abide by internationally recognized standards for aerial intercepts that ensure safety and security of personnel and assets, while preserving each state's right to operate in international airspace. All nations retain the right to defend their airspace, which clearly includes surveillance and reconnaissance of the airspace that adjoins a nation's borders.

Most leaders would agree that failure to establish and abide by a common set of rules and procedures increases the chances of aircraft mishaps due to misunderstanding or miscalculation and potential conflict. In this context, it is useful to discuss the international norms for air intercepts and how modern air forces apply them.

who use and traverse these spaces.

The International Civil Aviation Organization (ICAO), a specialized agency of the United Nations, was established in 1947 for this specific reason. With a membership of 190 of the 193 U.N. member nations (including Russia and China), ICAO codifies principles of international air navigation and establishes standards and recommended practices. To ensure safe operation in such airspace, the Convention on International Civil Aviation (often referred to as the "Chicago Convention") and its annexes, including Annex 2 (Rules of the Air) and other ICAO publications, are sources of guidance for professional airmanship that are followed by modern air forces.

When compatible with mission requirements, military aircraft that encounter each other in the air should operate consistent with ICAO guidance. Among these standards, in Section 3.8 of Annex 2, ICAO defines and outlines expected standards of conduct

and procedures for safely executing aerial intercepts. Although these ICAO standards are intended for the intercept of civilian aircraft, the fundamental principles are wholly relevant and are universally accepted in the military context. Many countries also publish national standards for aerial intercepts. For example, the U.S. Federal Aviation Administration (FAA) outlines the procedures for aerial intercepts to ensure the safety of all aircraft and personnel involved. International application of these procedures is the only way to ensure safety of air operations throughout the world.

We apply these procedures for air intercepts in three phases: the approach phase, the identification phase and the post-intercept phase.

ICAO and FAA procedures state that the responsibility for safety resides solely with the intercepting aircraft, regardless of which phase is being flown. The pilot of the aircraft initiating the encounter is responsible for ensuring safe separation when operating under the principle of "due regard." Due regard establishes a mutual, self-limiting code of conduct that is mindful and respectful of the presence of other aircraft.

SAFE INTERCEPTS

This principle is fundamental and essential to the safe operation of aircraft in shared airspace. During the approach phase, pilots generally expect intercepting aircraft to join up on the left, or port, side of an intercepted aircraft, in a visible position slightly above and ahead of the intercepted aircraft while remaining well clear. During this phase, it is important that intercepting aircraft control closure and remain predictable. After speed and position have been safely established, the intercepting aircraft should, if necessary, proceed with the identification phase of the procedure.



U.N. International Civil Aviation Organization (ICAO) Council President Olumuyiwa Benard Aliu speaks during a global safety meeting in Canada in February 2015. The ICAO establishes international air navigation standards. REUTERS

INTERNATIONAL NORMS

International law, as generally agreed to by convention and customary international law, defines international airspace as any airspace that is not subject to the internationally recognized sovereignty of a state, including all airspace seaward of coastal states' national airspace, the airspace above contiguous zones, exclusive economic zones and the high seas. Aircraft in international airspace are obligated to operate with due regard for the rights, freedoms and lawful uses of the sea and airspace by all aircraft.

Beyond the requirement to operate with "due regard," there are no established international laws regarding aerial encounters of state aircraft. But there are international norms and aviation standards that preserve international rights to use international airspace as well as ensure the safety and security of all

The Asia-Pacific Ministerial Conference on Aviation Security (APAM-AVSEC)

Tokyo, Japan 13th March, 2010



Delegates from 18 nations and officials from the International Civil Aviation Organization discuss ways to bolster global aviation security. AFP/GETTY IMAGES

During that phase, aircraft should move from a stabilized (observation) position on the left side to accomplish the steps required only for identification. Intercepting aircraft should close on the intercepted aircraft in a stable, predictable fashion and avoid excessive closure rates that would alarm the intercepted aircraft.

Intercepting aircraft should proceed no closer than necessary during this phase. Once positive identification is established, the intercept aircraft should immediately proceed with the post-intercept phase.

During this phase, intercept aircraft should move away in a controlled manner, remaining predictable and stable. Intercepted aircraft should exercise increased vigilance throughout the intercept process and regard this as a critical phase of flight.

Aerial interception is dangerous when participants ignore standards and employ unauthorized maneuvers that could result in catastrophe. Airmen must be held to a high standard in this regard. Commanders are also responsible for upholding these standards. Before a pilot in the U.S. Air Force is permitted to fly an air intercept, he or she must be evaluated on the ability to perform the procedures as outlined above. Failure to meet these standards by a pilot at any level could result in action ranging from remedial training to loss of flying status.

Intercepts happen for any number of reasons, and the term “intercept” itself does not necessarily mean the intercepting pilot intends to turn or steer the intercepted aircraft. Most intercepts are for the purpose of training or to visually corroborate the identification of an aircraft.

As the global commons becomes increasingly saturated with air traffic, the potential for aerial encounters will increase, and the need for conformity with recognized international procedures becomes essential. ICAO procedures for air intercepts provide a framework for the safe operation of aircraft in international airspace.

These procedures were carefully established with safety as a priority. Through international standardization and adherence to established procedures, the risk inherent in conducting aerial intercepts can be mitigated for all who share the skies.

I'd like to thank Airmen from all nations for their attention to this important issue and ask for leaders of Airmen from around the world to ensure crews comply with accepted international norms while meeting the requirements of their chain of command. A common objective prevails for all Airmen to be the arbiters of peace and stability in their respective regions. Safe and disciplined aerial intercepts are an important part of this. □

The background of the image is a photograph of a coastal scene. In the foreground, there is a weathered concrete pier or breakwater with a decorative, wavy pattern. The pier extends from the bottom left towards the right. In the background, the ocean is visible with gentle waves breaking onto a sandy beach. The sky is a pale, clear blue.

CHINA'S MOST **DANGEROUS** GAME

SOLVING THE
POLICY PUZZLE
OF THE
SOUTH CHINA SEA



M

KERRY LYNN S. NANKIVELL

any have been caught off guard by events in the South China Sea. A string of provocative Chinese actions has challenged stability. These include the recent large-scale, land-creation projects on seven features, mainly reefs, in the Spratly Islands and introduction of military facilities and equipment on these artificial sites, as well as others in the Paracel Islands; China's harassment of USS Impeccable near Hainan in 2009; confrontation of survey vessels contracted by Vietnam in 2011; seizure of the Scarborough Shoal in 2012; and positioning of an escorted oil rig in disputed waters near Vietnam in 2014.

These incidents went largely unanswered by the international community, while regional stakeholders reacted to single events without enacting clear and proactive policies. As a result, the Chinese government has maintained momentum even as regional anxieties increase.

The strategic seascape in the South China Sea presents an unusual policy puzzle for stakeholder governments for at least two reasons. First, the disputes are extremely complex. Consider the math: seven littoral claimants (including Taiwan) with concave coastlines; more than 180 named islands, rocks, reefs and shoals; and a thousand years of regional history from multiple countries' perspectives. Second, governments struggle to identify policy responses to Chinese provocation because the delicate status quo is predicated on four central paradoxes. A paradox is a situation that is made up of two opposites, and therefore seems self-contradictory. The South China Sea disputes fit this definition in several respects — economic, political, military and legal — that are described in more detail later in the article.

These paradoxes drive the claimants' behavior and place limits on what policy objectives can reasonably be pursued without assuming unacceptable risk. Strategic assessment of the South China Sea should be seen in shades of gray because of these paradoxes. While Southeast Asian claimants are fearful of China, they're also deeply interconnected with Beijing. It's a dispute that is both historical and contemporary. It's not a military conflict, but it is intensely coercive. Though a few claimants make illegitimate claims, they choose to pursue them using legal language, treaties and forums.

The sheer complexity of the disputes and the fast-moving pace of ongoing developments clearly challenge China's rivals to mount appropriate responses. However, determining what is appropriate and what is unnecessarily risky is proving a difficult task for stakeholders.

Managing tensions in this context and averting unintended or unnecessary conflict requires not only a nuanced understanding of regional realities but also good doses of ingenuity and agility.

ISTOCK

COMPLEXITY DEFINED

What is often referred to as the South China Sea dispute is actually a conglomeration of many disagreements, involving different parties in different places in a single sea. For example, while China, Taiwan and Vietnam all claim the Paracel Islands, Malaysia, the Philippines and Brunei enter the dispute only around the Spratly Islands to the southeast. Indonesia has no territorial dispute in the South China Sea, but it claims maritime zones that overlap with China's and Taiwan's dashed-line claims. Since 2009, China has claimed a maritime boundary defined by 10 dashes in a U-shape. Taiwan still draws its claim with an 11-dashed line from the Gulf of Tonkin to the eastern coast of Taiwan, following the original map published in 1947, which officially introduced the Chinese claim but failed to explain its origins or legal basis.

Indeed, there are three different categories of disputes in the South China Sea: territorial, maritime and jurisdictional (see sidebar on page 9). These disputes are interrelated but distinct. They are also governed by different bodies of law. The maritime and jurisdictional disputes are disagreements under the United Nations Convention on the Law of the Sea (UNCLOS), but the question of sovereignty over the land features, including rocks, reefs, shoals and islets, falls under customary international law.

Though all maritime jurisdictions described in UNCLOS are drawn from an identified baseline onshore, the treaty is also written as if ownership of that shore is already well-established. When two countries in a dispute cannot settle basic questions of sovereignty through bilateral negotiation, they can revert to the International Court of Justice to adjudicate on the basis of treaty agreements, customary international law and history.

This kind of judgment is often difficult to make, especially in areas such as Southeast Asia that have been populated for millennia. The claimants to the land features in the South China Sea (China and Taiwan, Vietnam, the Philippines, Malaysia and Brunei) are primarily interested in this territorial aspect of the dispute. Some claimants, though China in particular, base their maritime claims on history rather than contemporary law of the sea, which is why the discussion about the historical record in the region is so deeply politicized.

By contrast, external stakeholders, including the U.S., are generally uninterested in who owns which land feature. They typically only ask that whatever solution is reached to determine sovereignty over the land features, it be reached peacefully, by consensus, and in accordance with international norms.

UNCLOS might seem to be more instrumental in the second category of dispute that pertains to maritime boundaries. In the case of the South China Sea, for example, the U-shaped dashed claims of Beijing are so unusual that any legal claim is tenuous if not specious under any reading of UNCLOS or custom. For the other

five claimants with more mainstream claims, however, there still appears to be some ambiguity regarding how the treaty might apply.

While the text is clear about the size and scope of maritime zones, it was written for the ideal coastline and not the irregular one. It leaves open a range of questions in complicated cases. For example, under ideal conditions, the equidistant line between two coastlines is easily measured. When the coastline is fringed by islands or reefs, however, should they be measured from the mainland, from the rock farthest out from the beach or from somewhere in between?

Moreover, although UNCLOS talks about “rocks” and “islands” as different things, it doesn’t provide clear and measurable guidelines about how to distinguish between the two. As a result of these and other particularities, the specifics of many cases are not answered directly by the treaty. They are worked out gradually through state practice and jurisprudence. This isn’t a bad thing, but it does take time and, in the meantime, leaves governments with little guidance about whether their claims are “reasonable” or likely to be supported by law.

Then there are the jurisdictional disputes, which are different in nature than the other two. The territorial and maritime disputes are disputes under the law. Though they are complicated, there are mechanisms available to resolve these disputes if and when the parties decide to engage. The dispute over jurisdiction, especially with respect to the right to limit the activities of foreign militaries in an exclusive economic zone (EEZ), is a dispute about the law itself. Those that claim unusual jurisdiction to limit freedom of navigation do so on the basis that military activities within 200 nautical miles of a nation’s coast are coercive and nonpeaceful by nature.

The jurisdictional dispute cannot be resolved either by past practice or by UNCLOS, because the disputants call into question the fundamental fairness of these sources themselves. In this sense, the jurisdictional disputes in the South China Sea are as much political and ethical as they are legal.

In the fight to nationalize the South China Sea, China makes the argument for its exclusive jurisdiction most forcefully. Beijing has long accused foreign militaries (including those of its neighbors) of threatening the peace through close-in intelligence, surveillance

and collection and military exercises in China’s EEZ.

Major encounters between U.S. assets in the South China Sea are a product of this jurisdictional disagreement, starting with the aerial collision

OPPOSITE PAGE:
Cameras aboard a U.S. Navy surveillance aircraft photograph Chinese dredging vessels at work near Mischief Reef in the Spratly Islands in May 2015. REUTERS

China’s flag flies over structures built at Mischief Reef in the Spratly Islands in April 1995. Historically, Brunei, Malaysia, Taiwan, the Philippines and Vietnam have also staked claims to various islets and reefs in the archipelago. AFP/GETTY IMAGES

in April 2001 of a People's Liberation Army Navy J-8IIM fighter and a U.S. Navy EP-3E Airborne Reconnaissance Integrated Electronic System II (a signals reconnaissance version of the P-3 Orion), and continuing today. The outcome of this particular dispute between the U.S. and the claimants in the South China Sea has profound consequences, not only for the mobility of U.S. forces, but also for the international maritime order more generally.

If militaries required the consent of coastal states to operate in EEZs around the world, then 38 percent of the world's oceans could be closed. This would include some internationally significant areas, including the Mediterranean Sea, Red Sea, Persian Gulf, Gulf of Aden and Arctic Ocean. If, on the other hand, the U.S. and others insist on resisting this kind of ocean enclosure, they increasingly risk direct confrontation with China.

A RISK ASSESSMENT:

COMPLEXITY, CHANGE AND CHINA

It is difficult to determine which facet of these complex disputes is the most dangerous. While the territorial and associated maritime boundary disputes are intensely nationalistic, politicized and sometimes militarized, the jurisdictional dispute brings the United States into open disagreement with China. Both carry destabilizing consequences.

Moreover, since at least 2009, Beijing has launched a comprehensive campaign to tilt the status quo on all fronts. This campaign has most dramatically included a massive land reclamation project on seven submerged features in the Spratly Island group since mid-2014. Since June 2014, China has dumped more than 4.5 million square meters of sand on seven submerged or partially submerged features in the Spratly Islands: Fiery Cross, Subi, Mischief, Cuarteron, Hughes, Gaven



and Johnson South reefs, according to accounts and satellite imagery published by *IHS Jane's Defence Weekly*. In their natural state, it is likely that none of these reefs break the water's surface at low tide; now three features already or may in the future include a NATO-standard runway. A runway of that size could support virtually any modern People's Liberation Army Air Force fighter and other aircraft. The new artificial islands house, or will soon house, other surveillance such as anti-aircraft towers (spotted at Gaven and Hughes reefs), helicopter pads, radars and other communications equipment. All these facilities give the Chinese Navy some badly needed "legs" off its southern coast. All of them greatly increase Beijing's capacity to enforce its perceived exclusive jurisdiction over the South China Sea at the expense of everyone else.

China's contemporary land-creation projects are perhaps a long-overdue answer to the construction projects already undertaken by other claimants. While China has dominated the disputed Paracel Islands since 1974 and the Scarborough Shoal since 2012, it has long been outnumbered and outgunned by its smaller neighbors in the relatively far-off Spratlys.

LAND CREATION

Before 2014, only Brunei and China didn't own significant military facilities in the Spratly archipelago. Vietnam occupies the most positions in the island group, with 29 possessions, including Spratly Island itself. Spratly Island is Vietnam's most hardened feature, equipped with a short runway, a helipad and a few outbuildings. Taiwan holds the single largest natural island, Taiping, which is also known as Itu Aba.

Taiping is the only feature in the Spratlys that boasts fresh water. It proved its strategic value as a Japanese submarine base throughout World War II. The Philippines holds the second-largest Spratly Island at Thitu and operates a small naval station there, including a short, unpaved runway. Thitu is within sight of China's Subi Reef and reportedly needs a lot of repair. None of Manila's other nine holdings in the eastern Spratlys pack much punch either. For instance, Second Thomas Shoal is naturally submerged, but in 1999, Manila ran a ship aground at that location.

The rusted, grounded ship has provided a toehold for a small Armed Forces of the Philippines garrison of 10 marines ever since. Starting in 2013, Beijing has made it difficult for Manila to resupply the ship, putting even this toehold in jeopardy.

Malaysia holds a few features on the southern fringe of the island group, including Swallow Reef, which is home to a short airstrip, a naval station, a marine research station and a tourist resort. After occupying Swallow Reef in 1983, Malaysia embarked on China-style reclamation, enlarging the island from a few hectares to 0.2 square kilometers. The project created more square meters on Swallow Reef than China has on Gaven, Hughes, Cuarteron or Johnson South reefs. Although the reef is

home to several dozen military personnel, as well as anti-ship and anti-air guns intended to defend Kuala Lumpur's territory, Malaysia's project provides multipurpose uses. Meanwhile, China's projects have predominantly military purposes.

Making straight-faced comparisons with the current Chinese buildup in the South China Sea and the military development activities of other regional states that came before is difficult. Until 2014, Beijing occupied only seven features in the Spratly Islands, while China's neighbors each had a garrison and an airstrip in the area. China has compensated for that dearth since June 2014, and gone well beyond to establish clear and unquestionable dominance. The scale of the land creation has drawn much criticism for that reason.

U.S. Pacific Command (PACOM) Commander Harry B. Harris Jr. condemned China for its "great wall of sand," and even the Association of Southeast Asian Nations (ASEAN), which normally prefers more subtle and accommodating language, averred that the reclamations have "eroded trust and confidence and may undermine peace, security and stability in the South China Sea," Channel News Asia's website reported in April 2015.

China responded that its activities in the Spratly Islands are "fair, reasonable, lawful. ... It is beyond reproach." This official response illustrates how deeply impervious Beijing has become to criticism on this issue. Not only is it patently untrue given the current disputes, but even if Chinese sovereignty over the waters in question were established, massive military construction in such close proximity to the mainland coasts of the Brunei, Malaysia and Philippines could never be "beyond reproach."

As it is, Chinese sovereignty is not clearly established, and moreover, the parties to the dispute have agreed in writing to "exercise self-restraint in the conduct of activities that would complicate or escalate disputes" as part of the Declaration on the Conduct of Parties in the South China Sea signed in 2002. Clearly, there are legitimate concerns about the legality and the strategic intent of Chinese activity.

CENTRAL PARADOXES

Beneath the jurisdictional complexity at play, the South China Sea disputes are bounded by at least four central paradoxes: economic, political, military and legal. The policy boundaries set by the paradoxes leave little room for effective response to Chinese coercion. Learning to work effectively within a narrow band of policy space is the primary challenge facing those that seek to influence events in the South China Sea.

Economics

Economic development drives both cooperation and conflict among the claimant states. On the one hand, greater economic interdependence suggests that the claimant states should be increasingly unwilling to confront one another militarily over insignificant rocks

THREE TYPES OF DISPUTES

THE SOUTH CHINA SEA DISPUTES CAN BE GROUPED INTO AT LEAST THREE CATEGORIES

TERRITORIAL DISPUTES

This category of disputes concerns who owns what land features.

MARITIME BOUNDARY DISPUTES

These disputes involve general disagreement about where to draw limit lines in the water. Maritime boundary disputes show that there is no specific agreement on which features generate exclusive economic zones (EEZ) under the United Nations Convention on the Law of the Sea (UNCLOS), which are entitled only to a territorial sea, and which don't generate any maritime zones. Because of the generous size of the allowable EEZ under UNCLOS, this can be the difference between owning 125,000 square nautical miles of EEZ, 450 square nautical miles of territorial sea or owning nothing at all.

Even when ownership and entitlement to maritime zones are not in dispute, because the features lie in such close proximity, maritime boundary disputes are also about determining the "right" dividing line between one country and its neighbors. In some places, maritime boundary disputes are also a result of China and Taiwan's unusual

dashed-line claims, which enclose most of the South China Sea and conflict with all of the littoral states' more conventional EEZ claims.

JURISDICTIONAL DISPUTES

This class of disputes in the South China Sea is primarily but not limited to disagreement about what regulatory rights are conferred within which zones. Many of the rivals in the South China Sea claim they are permitted to regulate the activities of foreign militaries in their EEZ, wherever those are ultimately drawn. Such a regulatory right is not recognized under UNCLOS, nor claimed by the vast majority of states.

In the South China Sea, however, all claimants except the Philippines and Brunei believe that they have the right to limit the operation of foreign military vessels in their EEZ. A recent spat between Malaysia and China, for example, highlights this subregional practice.

On June 3, 2015, the Chinese Coast Guard (CCG) patrol vessel Haijing 1123 was spotted lingering in waters near the disputed South Luconia Shoals, and reporting on June 19 suggested another

vessel might be anchored nearby. Both ships were described as "intruders" by Malaysian authorities, though they were anchored more than 80 nautical miles from the Malaysian coast. At this distance, the vessel was comfortably far from Malaysia's territorial sea, the only zone in which Kuala Lumpur has the right to limit foreign military movements.

Of course, if the CCG vessel was within 12 nautical miles of an islet or rock near the shoal, Kuala Lumpur would retain jurisdiction. Some of the reefs at Luconia Breakers may be above water at high tide. The precise location of the ship in relation to those smaller features was not included in the news reporting, so it is hard to determine if Kuala Lumpur might claim jurisdiction on that basis. Reports seem to suggest that Kuala Lumpur is basing its jurisdiction on the vessels' proximity to the north Borneo coast.

This interpretation of UNCLOS, which confers wide-ranging rights to the coastal state to limit the freedom of navigation for passing navies, is not supported by the treaty text. It also contradicts orthodox interpretations of international law.



Philippine Soldiers wave from the dilapidated Sierra Madre ship of the Philippine Navy as it is anchored near Second Thomas Shoal in the Spratly Islands in May 2015. REUTERS

and reefs. Indeed, China is the largest trading partner of each of the claimants, accounting for a much larger share of trade with each member state of ASEAN than members do with one another. This also describes the relationship between the U.S. and China, whose two-way trade in 2014 accounted for U.S. \$600 billion in goods and services. Logically, no party to this dispute should be willing to risk direct confrontation or escalation. Despite its overwhelming military advantage, even Beijing has not tried to resolve its disputes with Southeast Asia through military action. Beijing has not acquired new territory in the Paracels or the Spratlys since 1995, and even then, the territory it acquired was unoccupied. The only exception to this is the Scarborough Shoal, which was absorbed into China's effective control in 2012, even though no Chinese military assets were deployed. Direct military confrontation has not been initiated by any party to any dispute in the South China Sea since Vietnam did in 1988, probably because of the desire to safeguard the economic gains of good relations.

Even as the region develops together, the South China Sea disputes are getting no closer to resolution. Rising gross national products (GNPs) have clearly emboldened littoral countries to use their growing national strength (and growing military budgets) to reassert control over territories that they believe are rightfully theirs. It could be that rising incomes have led to domestic overconfidence, while interdependence facilitates underestimation of the other stakeholders' resolve to risk economic advantages to secure sovereign rights.

More practically perhaps, because most of the regional economies are disproportionately dependent on export-led growth, rising GNPs have also prompted a greater interest in access to and security of regional sea lanes. The sea lanes of the South China Sea are important globally, but they are a matter of economic survival to the rising economies of the littoral states. Thus, they all seek to maximize their exclusive control over these waterways, and to varying extents, they are.

Economic development also drives competition to the living and nonliving resources in the sea. It might be debatable whether there is a true "scramble" for the sea's oil and gas wealth, but it cannot be denied that there is intense competition already underway for the last of the South China Sea's fish resources. In 2013, China enacted a unilateral seasonal fishing ban throughout the South China Sea, and year-round, it regulates the activities of foreign fishermen wherever they are found inside the 10-dashed line.

Beijing has reorganized and recapitalized the Chinese Coast Guard to get it done. In the past two years alone, Beijing has grown its Coast Guard fleet by 25 percent. It now operates more ships than its counterparts in Indonesia, Japan, Malaysia, the Philippines and Vietnam combined. Other regional fishing nations are also rushing to safeguard their fishing interests in disputed waters, led by Indonesia.



A Chinese ship reportedly sank this Vietnamese fishing boat, which was lifted from the water at a Danang shipyard in June 2014. AFP/GETTY IMAGES

The new Jokowi regime in Jakarta has reacted to increased competition for fish in the sea by demonstrating new resolve to enforce what it defines as its own exclusive fishing jurisdiction. Authorities have started using the Navy to sink foreign vessels caught poaching in Indonesian waters. All of this increased enforcement activity has heated up the fishing dispute in the South China Sea and increased the risk of unintended escalation between rival law enforcement organizations asserting their jurisdiction to disputed areas.

Military

The economic paradox leads to a military one: The South China Sea disputes have given rise to a military competition without military contest. The 20th-century history of the South China Sea has been one of a scramble for islands and reefs by regional navies. In this context, the rapid and impressive development of China's People's Liberation Army Navy (PLAN) over the past two decades has inspired real fear among China's neighbors that China will soon use its navy to take the occupied features by force.

If China does intend to start a shooting war, the

Southeast Asian claimants will not be able to resist, even as a coalition. China, however, has thus far been reluctant to use direct military force in the South China Sea, even though it has long enjoyed a substantial military advantage. The last direct military-to-military confrontation took place before China's naval modernization program really began. In 1988, the PLAN clashed with the Vietnamese Navy in a bid to take unoccupied features in the western Spratlys, including Fiery Cross.

Since then, confrontations between China and other claimants have been more indirect or have involved armed law enforcement vessels primarily. For example, when China deployed the Haiyang Shiyong oil drilling rig to disputed waters near Triton Island in May 2014, it was accompanied by up to 80 vessels, almost all law enforcement. Hanoi reciprocated, confronting the flotilla with ships from its Coast Guard, the Fisheries Surveillance Force, and even the commercial fleet but not the Vietnamese Navy.

When harassment by these vessels didn't persuade Beijing to remove the rig, Hanoi turned to land-based tactics, allowing protesters to loot and burn Chinese factories in Ho Chi Minh City in the worst outbreak of public disorder in Vietnam in years. If Hanoi could not coerce Beijing into removing the rig through a show of paramilitary force, it would use economic, commercial and diplomatic pressure instead.

China's land creation activities reflect the same paradoxical pattern. The activities themselves are indicative of a military competition, but don't involve direct confrontation. Rather than seize strategic territory in the Spratly Islands to establish dominance, Beijing has opted to build its way to the top on those features that it already occupies. Competing claimants are left with a difficult policy choice: Either directly obstruct the construction through use of military assets or seek nonmilitary responses. Predictably, all claimants have chosen the course of action that is the least escalatory, and international stakeholders such as the United States have followed suit. It seems that all parties agree that a direct military contest is a bad thing in the South China Sea, though only Beijing has found a way to coerce its rivals without crossing over into a direct military contest.

Politics

Overlaying the economic and military paradoxes, a political paradox looms at the heart of the disputes. The claims being made are anticolonial in nature, but they have intra-Asian primary effects. A nuanced understanding of the disputes has to place Southeast Asia's colonial past at the center of contemporary politics.

The only nation to effectively occupy the Paracel and Spratly islands for exclusive use was Japan during World War II. With that precedent in mind, all claimants have sought to control the islands since that time, if only to deny their use for attacks on their mainland coasts.

Before the arrival of the Japanese, the ungoverned space of the South China Sea was also an invitation to foreign domination by European powers. Though none of the European colonizers of the region permanently occupied both island groups, officials from Britain, France, the Netherlands and Spain used and mapped the sea much more effectively than any of the resident authorities.

In fact, when France claimed all of the Paracels and Spratlys in 1933, the Chinese Embassy in Manila asked the U.S. Embassy exactly where these "Spratly Islands" were on the map. Though Chinese, Malaysian, Philippine and Vietnamese Sailors used the South China Sea for centuries before the Europeans arrived, their governments didn't survey or map the area well enough to be able to defend it. Their omissions left the backdoor open to foreign coercion.

This history of foreign domination of the South China Sea means that the politics of the South China Sea dispute are deeply intertwined with national self-determination and sovereignty. It also explains why all the claimants seek not only to consolidate their territorial holdings but also to establish their right to limit foreign military activities in their maritime zones. The inconvenient fact is that, because all claimants are pursuing this same anti-colonial policy, they are pressing against one another more than against external powers. China's attempts to control transit and overflight in the South China Sea may be primarily directed at the United States, for example, but they have the most immediate impact on its Southeast Asian neighbors. China's claim seeks to limit U.S. access to China's southern coast, but it encroaches on its neighbors' territories and jurisdictions at the same time. China restricts its neighbors' military mobility and ability to exercise partnerships and alliances far more than it restricts the U.S. Navy. This anti-colonial policy with primary intra-Asian effects creates tense and hard-to-read politics.

The land creation is a case in point. It seems clear that China intends to use these footholds in the Spratly Islands to contest U.S. presence in the seas. The newly built capabilities far outstrip the minimum of what is required to defeat any regional rival; the more likely intent is to demonstrate overwhelming capability to intimidate others to concede without contest. The NATO-capable runway, the anti-aircraft towers, and the radar and missile accoutrements that will likely come with these territories are wasted on Southeast Asian states. They are clearly directed at a more capable rival. If China succeeds in establishing a defensive, consent-based zone throughout the 10-dashed line, U.S. interests will be importantly affected. That is nothing compared to the existential blow that will be dealt to Vietnam. Cut off from the wider world by a Chinese-controlled sea, virtually all of Vietnam's seaborne commercial and military partnerships will be subject to Beijing's whim.

The fact that China's anti-U.S. posturing carries threatening implications for Southeast Asia means that

the conditions are now right for easier alignment of Washington and Southeast Asia. However, the fact that China and Southeast Asia share a colonial past indicates that the United States will not be uncritically accepted by the region as its savior. As Washington and Southeast Asian governments work together to build stronger maritime relations, both parties should be appropriately sensitive to this tension.

Law

The final paradox that lies at the heart of the South China Sea disputes is a legal one. To varying degrees, all claimants in the South China Sea pursue patently illegal claims using legal institutions and legal systems. All parties, including Beijing, would like to achieve their national strategic goals by legally defensible means. As the dispute intensifies, this tension is resulting in different policy choices in different capitals.

In the Philippines, for example, Manila modified its more unusual claims to the Kalayaan Islands in the eastern Spratlys to better conform with the legal principles of UNCLOS. The Philippines no longer claims that Mischief Reef is an island entitled to a maritime zone (it is naturally submerged). Instead, it makes the more clear-cut legal claim that Mischief Reef falls under Philippine jurisdiction because it lies within the Philippine EEZ, as drawn from its main islands. This shift meant relinquishing some jurisdictional claims, but it gained Manila some legal authority in return.

China asserts its patently illegal claim to the water space enclosed by the 10-dashed line through use of legal language and legal institutions in a policy termed “legal warfare.” Rather than officially reject the validity of the law, Beijing instead has formally questioned the UNCLOS arbitration panel’s jurisdiction and accused the Philippines of ignoring its legal obligations under the 2002 China-ASEAN agreement to refrain from unilateral moves to change the status quo. It will be up to the judges to consider the validity of China’s arguments, but China has not ignored the legal discussion. To the contrary, China has implicitly asked the arbitration panel to give legal endorsement to China’s immunity from the court’s jurisdiction.

The fact that China signed and ratified UNCLOS, given its longstanding claims that run counter to several principles of the treaty, is evidence that China wants to remain part of the current international legal order as long as possible. It’s unclear how long such a contradictory policy will be able to hold, but for now, China is going to great diplomatic lengths to argue its case within the law without sacrificing its ultimate strategic goals.

The other claimants face a similar dilemma. Indonesia, Malaysia and Vietnam all make illegal claims to be able to limit foreign military activities in the waters beyond their territorial seas. Vietnam’s claim to islands in the Paracels and Spratlys are not

well defended by the historical record and might be excessive in terms of the maritime jurisdictions that Hanoi draws for itself. Malaysia bases its claims to the southern Spratly Islands on the fact that they fall within the country’s EEZ. That is fine for submerged features and those only visible at low tide, but international law is clear that sovereignty over islands is the basis of sovereign rights at sea, and not the other way around.

In a situation where nobody’s hands are entirely clean, hesitation and diplomatic maneuvering are at work. None of the parties want to ignore the law altogether because compliance brings tangible benefits. Yet none of the claimants want to concede their more unusual sovereign claims either. The result is a situation where many parties, China primary among them, continue to pursue exceptionalist legal claims through increasing engagement with the law and legal institutions.

POLICY RECOMMENDATIONS

The South China Sea disputes present a uniquely challenging policy puzzle. Understanding how complexity is piled on paradox does not provide easy answers, but it does suggest four corollary parameters for an acceptable way forward.

1. The fact that Southeast Asia’s increasing economic interdependence with China drives both competition and cooperation in the South China Sea means that economic relations between states can no longer be viewed as separate and distinct from territorial and maritime rivalries. For the United States, this means recognizing that China is a preferred economic partner to Southeast Asia, and so must be part of any solution in the South China Sea. For Southeast Asia and China, it means that economic relations should be managed critically, and in view of the pulls toward conflict or coercion that they sometimes carry.
2. As a military competition without direct contest, all stakeholders need to calibrate their activities in the sea with respect to the upper and lower limits of acceptable behavior. That is, they should avoid the temptation to escalate through direct military activity, even in response to the perceived direct military activities of others. Instead, parties should signal their resolve by nonmilitary means and strengthen their civilian administration of their claims. For the United States, engagement of the region should be directed within those limits as well.
3. The paradoxical politics of a rising East Asia’s internal relationships with the globalized West put firm limits on the amount of unanimity that policymakers in any country can expect from their partnerships. For some issues an easy agreement can be struck among Asian states, while there are issues upon which the United States and

Southeast Asia will more naturally align. There are even issues that China and the United States will increasingly agree on, as major global economies and militaries. For now, the political landscape is messy and complex. There are no easy divisions between “good guys” and “bad guys,” and most relationships will carry some element of partnership and some element of rivalry at the same time.

4. The continued recourse to legal language and legal institutions to pursue illegal or unusual claims means that all parties need to move beyond treaty texts in their dialogue with one another. What is required is not dismissal of UNCLOS nor an uncritical defense, but a more transparent conversation about why the treaty was written as it was in the first place. All parties could use a reminder that the preservation of the freedom of military navigation alongside the creation of the EEZ was part of the grand bargain that made the final treaty possible. It was an exchange of concessions between oceangoing states like the United States and developing nations like China and others in Southeast Asia. It represented then, and still represents now, the best possible negotiated outcome for a globally accepted constitution for the oceans. The choice at hand is not whether to respect the customary rules governing the oceans; the choice is whether to respect the existing agreements or revert to the regulatory disorder at sea that prevailed in previous centuries. No legal action can facilitate this kind of open dialogue between the parties, but an ongoing political conversation about the law might.


CONCLUSIONS

All parties to the South China Sea disputes would be wise to devise policy that falls within the broad boundaries set by the paradoxical strategic realities at hand. Identifying appropriate responses and executing them smartly will not be easy, nor will it result in comfortable alliances. It is, however, more likely to result in the peaceful management of the disputes than any alternative.

To fall outside these parameters is to either risk unnecessary escalation into unintended conflict or the loss of sovereign rights and the erosion of the international principles reflected in UNCLOS and customary law. As none of those risks is acceptable to any party, it's clearly time for all governments to start thinking creatively about how to operate effectively within the paradoxes that they face. □

CHINESE LAND CREATION

in the Spratly Islands

Feature	Created Area	INFRASTRUCTURE		
		Air 	Land Assets 	Sea 
FIERY CROSS	0.96 km ²	Airstrip	Major Station	Harbor
SUBI	0.96 km ²	Helipad/Airstrip	Station	—
MISCHIEF	0.96 km ²	—	Station	Future Navy Base
CUARTERON	0.1 km ²	Helipad x2	Comms & Radar	—
GAVEN	0.1 km ²	Helipad x2	Anti-Air	Supply Platform
HUGHES	0.1 km ²	Pre-existing Helipad	Anti-Air	Harbor
JOHNSON SOUTH	75,000 m ²	Helipad x2	Comms & Radar	Small Port

Source: Asia Maritime Transparency Initiative, based on April 2015 data.



SOVEREIGNTY CLAIMS

in the

SOUTH CHINA SEA



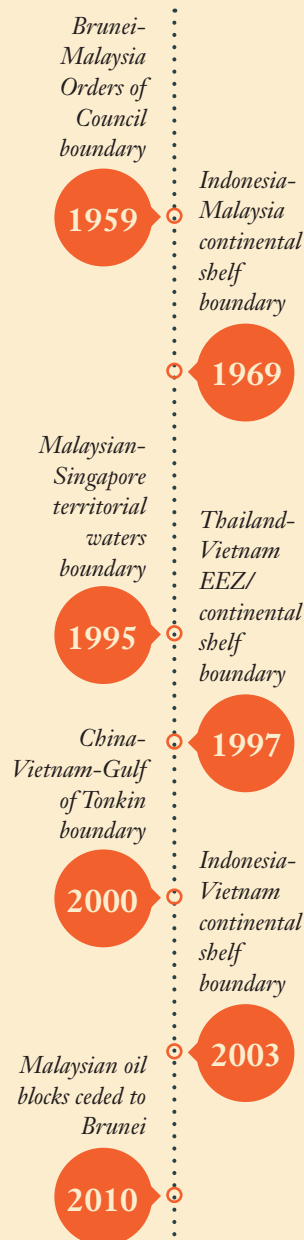
KEY

- Brunei's claims
- Nine Dash Line
- Malaysia's claims
- Philippines' claims
- Disputed features

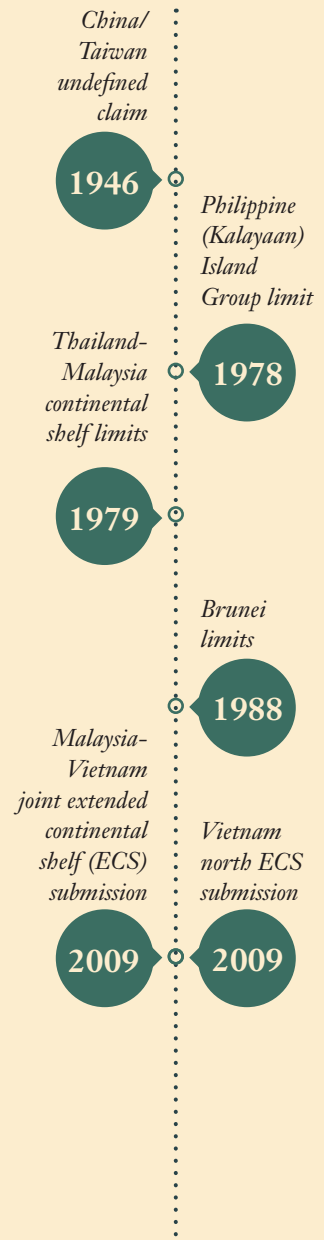
Note: The United States Government does not accept the validity of most of these straight and archipelagic baseline segments. China includes Pratas Island and Paracel Islands in its straight baseline claims; rendering of these baseline points does not denote acceptance or substantiation of these claims.

FORUM ILLUSTRATION

AGREED MARITIME BOUNDARIES



DECLARED LIMITS



Source: www.southchinasea.org



Royal New Zealand Air Force Capt. Flt. Lt. Timothy McAlevey flies over the southern Indian Ocean in a P-3 Orion maritime surveillance aircraft on a search for wreckage from Malaysia Airlines Flight 370 in April 2014.

Wings *of* HOPE

REUTERS

AIRLIFT CAPABILITIES REMAIN A KEYSTONE OF SEARCH AND RESCUE MISSIONS FORUM STAFF



Mapping a disaster area to locate life and deliver swift assistance can prove one of the most time-consuming aspects of a search and rescue operation. While new technologies frequently emerge to aid in this process, airlift capabilities remain one of the most reliable methods to alleviate human suffering, whether through evacuations or food and supply drops.

“Modern search and rescue helicopters ... provide an enormous advantage in search and rescue missions where every second counts,” according to the website airforce-technology.com. For disaster survivors, the sight of a military helicopter offers hope that their prayers have been answered.

When a massive earthquake struck Nepal on April 25, 2015, and a major aftershock followed May 12, Kathmandu officials requested helicopters from assisting militaries, their best chance at navigating the

damage through Nepal’s mountainous terrain and delivering aid.

“The need for a search and rescue system on aircraft and choppers to avoid delay in locating and carrying out rescue operations has become more pronounced,” the website DefenceNow.com reported in 2012.

When it comes to rescue and relief operations, U.S. Pacific Command’s unique resources play a key role in transporting people and equipment to remote locations and providing assistance not yet available through the humanitarian relief community, according to a May 2015 Defense Media Activity report.

Besides routinely responding to intense and frequent natural disasters across the Indo Asia Pacific, military personnel have found themselves dispatched recently on a series of search and rescue missions for missing commercial airplanes.

From left: A crew member looks out an observation window of a Royal New Zealand Air Force P-3 Orion maritime surveillance aircraft in April 2014 searching for debris from missing Malaysia Airlines Flight 370. REUTERS | Villagers and Indian Air Force officers carry relief food parcels from an Indian Air Force helicopter in north central Nepal, nine days after a magnitude-7.8 earthquake struck April 25, 2015. AFP/GETTY IMAGES | Muslim clerics flying in an Indonesian Air Force NAS 332 Super Puma helicopter help scan the Java Sea for wreckage of AirAsia Flight 8501 in January 2015. REUTERS



Nepalese tourists board an Indian Air Force helicopter in Dholka district in April 2015.

AFP/GETTY IMAGES

Militaries continue to adopt new technologies to improve response times to all classes of disasters. Indian Air Force officials, for example, reacted to a growing number of military aircraft crashes in the country in 2012 by procuring 7,000 search and rescue beacon systems designed to help military personnel locate aircraft up to 200 kilometers away should a mishap occur.

Without the beacons, some rescue teams took days to reach a crash site, DefenseNow.com reported. “The new generation search and rescue systems will accurately point out the location of a crashed aircraft and its crew.”

More recently, the Indian government proposed a National Aeronautical Search and Rescue Services Board to deal with the eventuality of a missing or crashed aircraft. The group would oversee efforts on land and sea, according to a July 2015 report by *The Economic Times* newspaper. No timeline for implementing the board has been set.

INTERNATIONAL URBAN SEARCH AND RESCUE (USAR) TEAMS RESPONSIBILITIES:

Preparedness:

1. Maintain a constant state of readiness for rapid international deployment
2. Maintain a capability to conduct international USAR operations
3. Ensure self-sufficiency for deployed responders for the duration of the mission
4. Maintain appropriate team member inoculations/immunisations, including search dogs
5. Compose the team of personnel that conduct USAR operations in their own country
6. Maintain appropriate travel documents for all team members
7. Maintain a capacity to staff and support the Reception Departure Centre (RDC) and On Site Operations Coordination Centre (OSOCC)
8. Maintain a 24-hour Operations Focal Point.

Mobilization:

1. Register the team's availability to respond and provide pertinent updates on the Virtual OSOCC (VO)
2. Complete the USAR Team Fact Sheet (Annex F) and have hard copies available for RDC and OSOCC upon arrival
3. Deploy a coordination element with its USAR team to establish or sustain a RDC and OSOCC
4. Maintain a 24-hour Operations Focal Point

Operations:

1. Establish or sustain a RDC and OSOCC as required
2. Ensure proper conduct of its team members
3. Perform tactical operations in accordance with the INSARAG Guidelines
4. Participate in OSOCC meetings regarding USAR operations
5. Provide regular updates on activities to home country

Demobilization:

1. Report its mission has ended to the assisting country
2. Coordinate its withdrawal with the OSOCC
3. Provide completed Mission Summary Report (Annex G) to the OSOCC or RDC prior to departure.
4. Become available (as required and possible) for other humanitarian operations — beyond the rubble
5. Consider in-kind donation of USAR team equipment left for the affected government

Post Mission:

1. The INSARAG Secretariat requests that a copy of the USAR Team Post Mission Report is received within 45 days of the teams return
2. Analyse its deployment performance and amend SOPs as required.

Source: the International Search and Rescue Advisory Group Guidelines and Methodology, United Nations Office for the Coordination of Humanitarian Affairs

TRAINING TOGETHER

At the heart of preparing for search and rescue operations remains a highly skilled and regularly trained set of troops able to deploy. While no two missions are alike, rescue teams must be properly equipped with a knowledge set they can adapt to meet specified needs.

“The importance of thorough training for all personnel employed on [search and rescue] missions cannot be over-emphasized,” according to the *Australia National Search and Rescue Manual*. “Failure of a single link in the often complex chain of action required in [search and rescue] missions can compromise the success of the operation, resulting in loss of lives of [search and rescue] personnel, lives of those that might otherwise have been saved and/or loss of valuable resources. “The purpose of training is to meet [search and rescue] system objectives by developing [search and rescue] specialists. Since considerable experience and judgement are needed to handle [search and rescue] situations, necessary skills require significant time to master. Training can be expensive but contributes to operational effectiveness. Quality of performance will match the quality of training.”

Increasingly, relief missions are multinational, given the size and scope of natural disasters. “The Pacific Theater and Pacific Command cover an enormous span of area, and every day we’re encountering new issues,” U.S. Air Force Capt. Mark Nexon, the Cope North 15 humanitarian assistance and disaster relief mission commander, said during the February 2015 exercise in Guam.

More and more countries are recognizing the need for joint training to optimize such relief operations. The U.S. Air Force, Navy and Coast Guard partnered with the Japan Air Self-Defense Force, Royal Australian Air Force, South Korean Air Force, Royal New Zealand Air Force and the Philippine Air Force for Cope North 15. (Members from the Singapore and Vietnam air forces also observed this portion for the first time.)

Attendees participated in scenarios to meet seven main objectives — airfield assessment team insertion, deployment of contingency response Airmen, expeditionary medical support, multinational aeromedical evacuations, substandard airfield operations, humanitarian assistance airdrops, and search, rescue and redeployment of the contingency response Airmen.

“Natural disasters are very common — there’s a lot of volcanic activity, there’s earthquakes, tsunamis and typhoons that remain a threat throughout the region,” Nexon said. Therefore, practicing capabilities, improving capacities, and working together means more can be accomplished, he added. □



A Royal Australian Air Force AP-3C Orion returns to RAAF Base Pearce in March 2014 after searching the southern Indian Ocean for Malaysia Airlines Flight 370.

THE ASSOCIATED PRESS

Shared Awareness and Deconfliction Initiative

CAN THE SUCCESS STORY BE APPLIED TO SOUTHEAST ASIA?

DR. P.K. GHOSH



The increased dependency and density of the shipping trade has fueled the rise of maritime crime around the globe. Threats such as piracy, maritime terrorism, drug trafficking and gun running have become more potent and given rise to strident calls for effective law enforcement and maintenance of maritime order.

These challenges highlight the need for cooperating across political boundaries along with the necessity of sharing intelligence. This holds special significance for anti-piracy patrols off the Horn of Africa. They operate in a vast area looking for small bands of pirates that attack from highly maneuverable and powerful skiffs, under the umbrella of nearby mother ships. Without intelligence sharing between patrols, it is unlikely they would have much success in achieving their objectives.

The Shared Awareness and Deconfliction (SHADE) initiative was born out of this necessity as a number of foreign navies operated in the Gulf of Aden to prevent attacks from pirates from Somalia and Puntland.

Originally conceived to help bind together counterpiracy task forces through the European Union Naval Force (EU NAVFOR) Somalia Operation Atalanta, the U.S.-led SHADE initiative began in 2008 to coordinate activities between the coalition task forces and maximize efficient use of naval forces in the Indian Ocean region. It later included independently operating navies.

Individual navies such as those from China, India and Japan became part of the initiative in 2012, when it was first implemented. They coordinated their merchant vessel escort convoys through the Internationally Recognized Transit Corridor, with one country being “reference nation” for a period of three months on a rotational basis. In June 2012, South Korea joined the initiative.

SHADE was not designed to coordinate any naval or military operations; instead, it has held meetings in Bahrain attended by military and civilian representatives from 33 countries, 14 international organizations, maritime industry groups and several governments. The meetings are co-chaired on a rotational basis by three

key groups: Combined Maritime Forces, NATO, and EU NAVFOR. The idea is to share information and intelligence and best practices against the scourge of piracy.

Two types of intelligence have been shared at these meetings: strategic and tactical long-term information and data. Immediate tactical intelligence, however, is shared between ships on secure communication networks such as the Mercury platform for providing assistance in convoy security.

Dubbed the Facebook of counterpiracy, Mercury provides chat facilities as well as daily operational updates. This network led to the formation of an Escort Convoy Coordination Working Group primarily to hold regular meetings and communicate on Mercury if required.

In addition to sharing information, SHADE has also provided support to the implementation of the fourth version of the shipping industry’s Best Management Practices (BMP4) for Protection against Somali Based Piracy, which was also endorsed by EU NAVFOR.

INDIAN PERCEPTIONS

Since joining the initiative, the Indian Navy participated in SHADE meetings despite reservations from certain sections in the Indian government. Those sections were keen to broaden the fight against piracy, and Indian delegates also attended meetings of the United Nations contact group on piracy in New York. This was obviously a preferred destination for the delegates.

However, for the Indian naval warships in the region, SHADE provided an opportunity to imbibe information for their piracy patrols, and active participation by the delegates was the norm. In most cases, the inflow of information was much more than the outflow, given the variety of inputs available to the initiative.

The importance of SHADE increased recently when it was tasked to provide an expert opinion about the feasibility of reducing the high-risk area (HRA) for piracy as denoted in the BMP4 document.

The number of piracy attacks has dropped precipitously in the region, but due to the denoted HRA, merchant ships traversing the area continue to pay higher insurance premiums. This has led to demands for a drastic reduction and a reappraisal of the denoted HRA.

While a debate exists about the suitability of using SHADE for such an exercise, the salience of the initiative has greatly been enhanced from the perspective of the Indian government. As it awaits the initiative's report on the sensitive HRA issue, it is evident that SHADE wields considerable influence in determining the economic compulsions of commercial shipping — an aspect that may well go beyond its charter.

THE INHERENT GAPS

While the initiative for exchange of information/intelligence is an essential tool against transnational crimes like piracy, all such efforts are essentially constrained by certain systemic gaps.

Basic trust is a bedrock of any cooperation or information exchange, but such exchanges may suffer in the Southeast Asian region where mutual trust is at a low level and the universal “need to share” policy followed at a minimum by most navies.

All navies operating in the Gulf of Aden have their own rules of engagement that reflect national priorities and are mostly classified. This causes barriers to the exchange of information and the ability to act in consonance with provided intelligence.

Most naval forces are loathe to consider the

personal ambition among young “upcoming” warship captains on patrols as a factor in information sharing. They fail to realize that many captains would often prefer to carry out operations against pirates themselves (unless acting in a formation under a superior officer present afloat), thus bringing personal glory rather than providing information for other foreign navies to act.

Timing is also crucial in the exchange of tactical intelligence. Any such information is time dependent, and its value is entirely time based. While strategic intelligence has a longer shelf life, any delay in sharing tactical intelligence would probably render it useless.

Moreover, navies have a particular ethos of operation and a methodology of working that is unique to that force. Frequent combined or joint exercises can bridge these gaps, but they are unlikely to eliminate them altogether. Hence, achieving a degree of interoperability between coalitions and between ships on independent patrol is dependent on assorted variables, such as the degree of professionalism displayed and interoperability achieved.

Given these inherent gaps in such initiatives, it is worth looking at the viability of applying SHADE in the other regions of Asia such as Southeast Asia.

SOUTHEAST ASIA APPLICATIONS

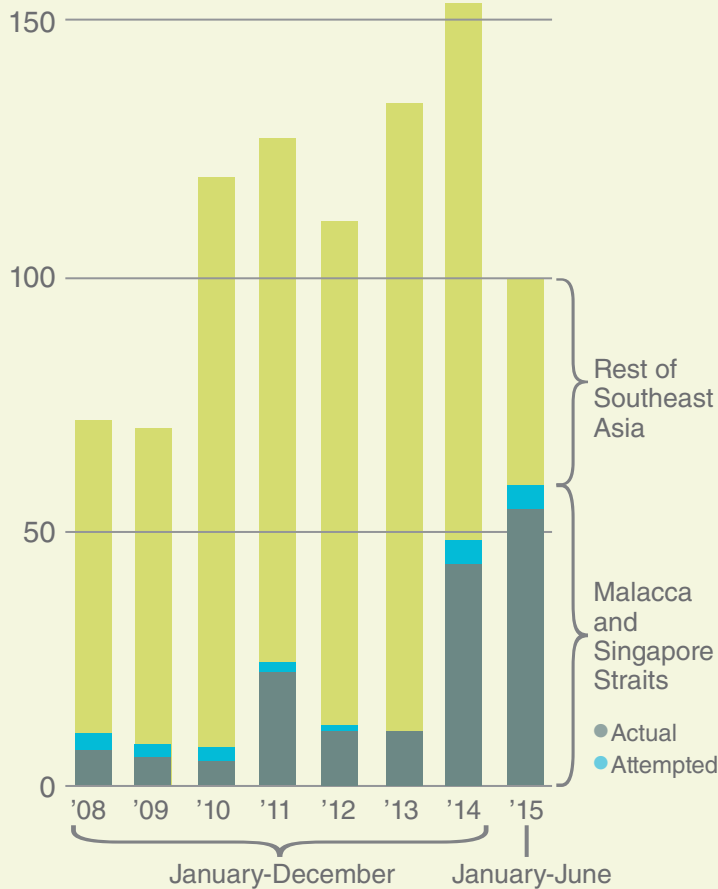
The rising number of piracy incidents in Southeast Asia has undoubtedly created a dire need for a formalized information-sharing mechanism, such as SHADE. The region, however, is congested by littorals with a strong sense of sovereign responsibility and is



Masked Somali pirate Abdi Ali stands near a Taiwan fishing vessel in September 2013 that washed ashore in Hobyo, Somalia, after pirates were paid a ransom and released the crew. THE ASSOCIATED PRESS

Pirate Attacks Soar in Southeast Asia

Actual and attempted attacks



SOURCE: REGIONAL COOPERATION AGREEMENT ON COMBATING PIRACY AND ARMED ROBBERY AGAINST SHIPS IN ASIA

home to some of the most contested waters in the world. That was likely the reason programs such as the Malacca Strait Coordinated Patrol by Malaysia, Singapore and Indonesia and various phases of Eyes in the Sky air patrol suffered serious problems in the initial years apart from operational availability. These problems were subsequently overcome.

Given the possible hurdles that initiatives could face in the region, it is pertinent to examine issues that still need to be overcome.

- Regional rivalries between nations often erode trust between the littorals. For example, Malaysia and Indonesia are still at odds despite having an effective Prevention of Incidents at Sea Agreement between the navies. Thus, with the waxing and waning of mutual trust despite having the Malacca Strait patrol in place, exchange of active intelligence may prove difficult at times.
- All the littorals have widely differing maritime capacities, which is likely to produce friction between the navies when they are operating in close quarters and acting on the available intelligence.
- Differing national geostrategic priorities naturally assume significant proportions in any joint

operations at sea. This would have an effect on exchange of information and intelligence. It's important to develop a common matrix and find a common interest to help in information exchange.

d) Another primary factor in the exchange of intelligence will be the posturing toward China and the South China Sea issue. Each country's nuanced approach could affect the exchange of information.

While these hurdles may be faced by any new, well-intentioned initiative in the region, others could affect its operation:

- The region already has the Information Fusion Centre operating from Singapore successfully since April 2009. The charter of the new initiative would do well not to duplicate its task.
- As part of anti-piracy measures in the region, the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP) has been particularly active. Its success has fostered the growth of an expanded ReCAAP, which is likely to have a wider geographical range and more members. The new initiative should not duplicate the task of the existing systems and should help in anti-piracy measures.
- The formalized information exchange architecture of the Association of Southeast Asian Nations (ASEAN) could also function under the aegis of the existing ASEAN Defense Ministers Meeting (ADMM), which is the highest defence consultative and cooperative mechanism in ASEAN. It could also work for the bigger ADMM plus, which is a platform for ASEAN and its eight dialogue partners to strengthen security and defence cooperation for peace, stability and development in the region.

CONCLUSION

Cooperation between maritime forces, along with an active exchange of information and intelligence, are potent weapons to fight against the rise of transnational maritime crimes, including terrorism, illegal migration, drug/arms running and piracy. SHADE has been particularly successful in the Gulf of Aden in fighting piracy.

Given the spurt of maritime crimes in Southeast Asia, such an effort would not only improve maritime domain awareness but also help stabilize this turbulent region and serve as a practical confidence-building measure. The new initiative could help overcome the various gaps and prove beneficial for the common good while helping to maintain order at sea. □

Pacific Air Forces Keep

EYES ON THE SKY

Air domain monitoring capabilities evolve

TECH. SGT. JAMES STEWART/U.S. AIR FORCE

PHOTOS BY DVIDS



**U.S. Air Force Gen.
Herbert "Hawk" Carlisle**

Sharing a computer nestled inside a cramped workspace, a five-man team rallied to start up Pacific Air Forces' (PACAF) first 24-hour air watch.

Despite its limited number and lack of equipment, the squad of intelligence Airmen began building PACAF's first air watch capability in 2014. From the team's workspace at Joint Base Pearl Harbor-Hickam in Hawaii, the Airmen began providing real-time monitoring of military air or missile activity throughout the vast Indo-Asia-Pacific region.

"Before the watch began, I'd compare our regional awareness to a game of whack-a-mole," said Capt. Justin Ross, the air watch officer in charge. In the arcade game, players use a mallet to strike toy moles that pop up randomly and send them back in their holes. In a real military scenario, Ross explains, "an event would pop up, draw our attention, and then we would react. We had limited visibility on what was going within the Pacific, and that put us in a reactionary position."

The PACAF mission covers about 259 million square kilometers and more than half the world's surface. The Indo-Asia-Pacific region contains 60 percent of the world's population across 36 nations and encompasses one-third of the global economic output.

"The size and scope of what PACAF does every day is absolutely incredible," said Col. Eva Jenkins, its intelligence, surveillance and reconnaissance director. "Having awareness, from an air perspective, is vital."

As of January 2014, the information that the air watch began collecting and analyzing made its way to PACAF's commander at the time, Gen. Herbert "Hawk" Carlisle. As it happens, Carlisle also fulfilled U.S. Pacific Command's joint force air component commander role. Suddenly, the small air watch team of enlisted and commissioned Airmen found that their data was directly impacting mission decisions.

"The Pacific air watch team became the eyes and ears of the JFACC [joint force air component command]," Jenkins said.



Pacific Air Forces F-22 Raptors fly over the Pacific Ocean. PACAF recently started up its first 24-hour-a-day air watch, providing real-time monitoring of military air and missile activity throughout the Indo-Asia-Pacific region.



U.S. Air Force Gen. Lori J. Robinson succeeded Gen. Carlisle as Pacific Air Forces commander.

The monitoring and reporting of the air watch delivered round-the-clock situational awareness.

“Generally, we were the first heard, the first ones to tell the JFACC what was happening,” Ross said.

The air watch began monitoring all manner of military air or missile activity, collaborating with the Joint Intelligence Operations Center, in addition to other centers and units throughout the Indo Asia Pacific. It fed that information to the JFACC.

That process gives the commander options, said 2nd Lt. Jacob Beeman, the air watch deputy. “For instance, if we detect certain air or missile activity, that information can then help the air component commander position assets or change procedures in response to a given activity.”

Several times during the Pacific air watch’s short existence, Ross said, its activity reports have driven operations in the Pacific, as well as U.S. State Department actions.

Throughout its first year, attention and support for the

air watch began to increase. Backing from both Carlisle and his successor, Gen. Lori J. Robinson, instigated the need for the air domain monitoring capability to grow.

The original team of four watch-standers is expanding to 16. In 2015, the entire Pacific air watch evolved and realigned with the 613th Air Operations Center at Joint Base Pearl Harbor-Hickam as the Senior Intelligence Duty Officer (SIDO) team. This move exponentially increased air component monitoring and reporting capability.

“We are all looking forward to the SIDO evolution; it means great things for an already proven capability,” Beeman said. “We’ll have space and systems to conduct our monitoring.”

“If you look at what the original team accomplished with the resources they had a year ago, I get filled with excitement thinking about the future of air domain monitoring. We’ll be capable of doing so much more for our commander, combatant commander and the Pacific region.” □

BANGLADESH ARMY

MAJ. GEN. MOHAMMAD MAHFUZUR RAHMAN

ENABLING THE TRANSITION TO A KNOWLEDGE-BASED ECONOMY



GENERAL STAFF BRANCH

FORUM STAFF

Maj. Gen. Mohammad Mahfuzur Rahman was commissioned into the Bangladesh Army in 1981 and promoted to major general in 2011. He has commanded an infantry battalion, two infantry brigades and an infantry division. He has also served as brigade major, general staff officer grade one and director of military operations at Bangladesh Army headquarters. A graduate of Defense Services command and Staff College and Armed Forces War Course in Mirpur, Bangladesh, he is also an alumnus of the National Defence College in New Delhi and the Royal College of Defence Studies in London. He holds a doctorate from Jahangirnagar University in Bangladesh and a master of philosophy degree from Madras University, in India as well as master's degrees in defense studies, war studies and business administration. He has edited books on Indo-Bangladesh trade relations and authored 'nontraditional security strategies to address trans-border crime,' which is awaiting publication.



**Sniper in a
operational
hide out**

GENERAL STAFF BRANCH

What are your key responsibilities with the Bangladesh Army?

I look after the welfare of the Army and the discipline of the forces. I'm responsible for close to 140,000 military personnel-including 15,000 civilians and another 100,000 retired personnel. I'm in charge of personnel administration including officers and men and career development and career planning of troops. I oversee five directorates: medical, which covers health, hospitalization and medication; provost, which looks after discipline and ceremony; personnel administration, which includes all recruiting, pay and pension, which looks after pay and pension of the forces. This includes documentation and the welfare and rehabilitation. For example, when people retire, they also remain with us, so we need to take care of their welfare as well.

You mentioned military welfare. So you supplement the government's social security program?

We have a little business that we undertake through Bangladesh Army Welfare Trust, which is administered by active duty military. The Trust was founded in 1998 to take care of the welfare of military personnel (both serving and retired). We have a business house that has factories and trade houses and some real estate. We

have a bank that has 100 branches, so it is quite big. From there, we get some revenue and also rehabilitate retired personnel.

One hundred percent of the revenue goes for charity and welfare of serving and retired personnel. When health insurance does not cover the treatment expense, this is also an area to which we assist to military personnel and their families. Soldiers must serve a minimum of 15 years to get pension. Every rank has a service period with a mandatory retirement age for every level. If somebody wants a second career, whenever possible and if there is a vacancy in a professional position with the Trust, we call them and accommodate them.

Do you also offer training?

We have various institutions to train people in the military. We also have six medical colleges, three engineering universities, two business schools, two nursing schools. Five dental colleges are up coming. It's a matter of our social responsibility to contribute in national education.

We also run 12 cadet colleges. The primary idea was to develop the leadership from these institutions. Those are the people to take over the leadership in various segments. They are trained to be leaders. Discipline, leadership training, physical activities, extracurricular activities are part of the curriculum.



A female officer leads a contingent in a national parade.

GENERAL STAFF BRANCH

What is your approach to your current role?

I've been in this job six months (through May 2015). It's a very busy desk. Every day is important to contribute. A lot of people come to meet me. It's very important to listen to them and be part of their solution. It's also important that I remain unbiased.

What goals do you hope to achieve in your current role?

I hope to contribute in two areas: women empowerment and education. Women are important to the Army. We have a vision of making women 25 percent of the total forces. We are already in the process of doing this, but it will take time. We started taking women in the military about 14 years ago. The Army commissioned the first batch as Female Soldiers in early 2015.

The other thing is educating our people in the Army-their intellectual development. It's very important to build an educated, knowledge-based military. In the international environment we face a global, knowledge-based economy. You need to compete. Somebody in Bangladesh is competing with someone in China. So if economy is not knowledge-based, we can't compete, but we are seeing our business developing just fine. We have averaged a GDP [gross domestic product] growth rate of over 6 percent for the past few decades. So our economy is knowledge-

based otherwise it could not perform.

So we need to be a knowledge-based military as part of the knowledge-based society. Otherwise military will trail behind. We have implemented more educational programs and reconfigured our training and education system to achieve this. Politics may fail you, economics may fail you, but education will never fail you. If you educate your people, if you educate your nation, the politics will not fail you, economy won't fail you.

Your doctoral dissertation addressed drug trafficking. What are some of the challenges that you identified, and how are they still relevant to the region?

Cooperation is necessary but politically is very different between Bangladesh and its neighbors (such as India and Burma) because the political platforms of these three countries are very different. So negotiation is not easy between these three countries. Unfortunately, within security forces, we fail to communicate and we fail to collaborate with one another even though we have the same regional interests. We cannot cross the border. So often we are trailing behind drug proliferators. It's very difficult for a single country to respond effectively.

These days, nontraditional security is coming into the driving seat. It is taking over. We need collaboration of the international community.



**Air defence firing
at Cox's Bazar, Air
Defence Range**

GENERAL STAFF BRANCH

What are the biggest challenges for the Bangladesh Army?

To remain nationally and globally a professional organization, we seek to maintain our stance as a disciplined force that is not only regarded as the finest in the country, but it also should be regarded internationally as one of the most disciplined and finest armies. That is very important for us. We have implemented programs to allow Soldiers to seek educational opportunities and understand their space in a democratic society.

Any other challenges?

Prevention of terrorism is still very important. We have been very successful so far, but we must remember who we are. When Islam was introduced on the subcontinent, it did not contradict our culture. That is possibly why Bangladesh has remained moderate. The Bangalees as a nation and Bangladesh as a country do not want extremism. But in this globalized era it remains as a potent threat for us as well.

Are there any other programs you'd like to mention?

We are doing a lot of exchange programs with U.S. Special Forces. We are doing counterterrorism exercises and capacity building of our forces with many

countries. We are training with Nepal, India, Kuwait, Qatar and Turkey.

Have you participated in any U.N. peacekeeping missions? And what was the biggest lesson you learned through participation?

I have twice served in peace support operations under the United Nations in Mozambique and Sierra Leone. Bangladesh has participated in the most U.N. missions and is one of the leading troops contributing countries.

In Mozambique, to my understanding the greatest takeaway was that particular society somehow lost its culture. Somehow, the colonists forced them to forget their language, forced them to forget their religion, and forced them to forget even their names. They were suffering from an identity crisis, so they could be exploited by demotivated leaders. So this example emphasizes how important identity is and maintaining your culture.

What specific goals do you have for Bangladesh?

It's very important for us to know who we are and we understand that for 5,000 years we were living peacefully. There will be difference and there are differences. What is possible now is collaboration and cooperation to live peacefully in our part of the world for social, political and economic emancipation. □

*ASSESSING THE
IMPLICATIONS of*
CHINA'S
MISSILE ARSENAL

EVAN BRADEN MONTGOMERY



Ways to preserve a forward defense

The security environment in the Indo Asia Pacific is experiencing a number of worrisome trends, including the escalation of maritime territorial disputes in the East and South China seas, the proliferation of advanced military capabilities to a number of local actors, and a shifting balance of power. China's efforts to strengthen its armed forces are at the center of each one.

For decades, China has been preparing the People's Liberation Army (PLA) to fight local conflicts against technologically superior opponents. As part of this effort, it has been developing a variety of anti-access/area-denial systems, which could exploit vulnerabilities in the American style of expeditionary warfare to impede U.S. power-projection during a crisis or conflict.



LEFT: U.S. Navy personnel stand near a guided missile launcher during Cooperation Afloat Readiness and Training, a maritime exercise between the Philippine and U.S. navies in June 2014.

AFP/GETTY IMAGES

RIGHT: A Chinese surface-to-air missile is parked near old Chinese fighter planes at the Shanghai Aerospace Enthusiasts Center.

AFP/GETTY IMAGES

Since the end of the Cold War, the United States has grown accustomed to facing opponents that are too weak to seriously threaten its overseas bases, air and naval forces, and battle networks, all of which underpin its ability to conduct and sustain large-scale military operations abroad.

Today, however, Beijing is fielding capabilities that can hold at risk fixed forward bases, menace high signature air and naval platforms, and disrupt the United States' ability to collect, store and transmit information. In particular, the PLA has amassed a large arsenal of ground-launched ballistic and cruise missiles for land-attack, sea-denial and anti-satellite operations.

Why has China placed so much emphasis on ground-launched offensive missile forces to support its "counterintervention" strategy, and why are these systems such a cause for concern in the United States and among local nations?

Initially, mastering missile technology offered the PLA a way to compensate for the limitations of its air and maritime power-projection capabilities. Yet ground-launched offensive missiles have a number of inherent advantages over combat aircraft and naval platforms — advantages that could allow China to deliver a significant amount of firepower against critical targets in a relatively short period of time.

Specifically, ground-launched offensive missiles are:

- *A cost-effective way to generate combat power in the early stages of a campaign.* Ballistic and cruise missiles are far less expensive to procure than aircraft or ships, much cheaper than most existing air and missile defenses, and orders of magnitude cheaper than many prospective targets.

- *Difficult to locate, interdict, or otherwise disrupt before and immediately after being launched.*

Well-trained operators can deploy mobile platforms to hide sites that are hard to detect, maneuver them to pre-surveyed positions when they are ready to fire their payloads, tear down their equipment within minutes of executing an attack, and relocate them before being discovered. They can also transmit and receive information over hardened, dedicated, and closed systems like buried fiber optic networks, which are more difficult to jam than radio frequency transmissions and less vulnerable to attack than air- or space-based communications systems.

- *Difficult to intercept once in flight.* Ballistic missiles have high terminal velocities and can be designed to maneuver or can be equipped with penetration aids.

Alternatively, cruise missiles are often relatively slow, but stealthy, and can be programmed to follow complex flight paths that stress air defense systems.

TURNING THE TIDE

There are a number of steps the United States could take to preserve its military power: fielding a new penetrating bomber to supplement and eventually replace the aging B-2; acquiring a carrier-based surveillance and strike platform that significantly extends the range of the air wing; building undersea warfare systems with greater payload capacity; and investing in new active and passive defenses to protect forward operating locations. It could also emulate China by developing ground-launched missile forces of its own.

Ground-launched missile systems are more difficult to hold at risk than aircraft or ships, however, and



A Chinese People's Liberation Army Navy guided missile destroyer arrives at Joint Base Pearl Harbor Hickam, Hawaii, to participate in the multinational military exercise Rim of the Pacific in June 2014.
REUTERS

cannot easily be withdrawn. What specific roles might ground-launched missiles play? Anti-ship missiles could be used for sea-denial, including chokepoint defense and open-ocean targeting. The former might entail blocking hostile surface naval forces from exiting China's "near seas" and operating in the waters between the first and second island chains, where they could encircle allies such as Japan or interdict U.S. forces en route to the region.

The latter might involve holding at risk hostile surface naval forces that attempt to seize disputed territory, impede freedom of navigation, or enforce a maritime blockade against a local nation. Alternatively, land-attack missiles could be used for deep-strike: holding at risk surveillance systems,

command-and-control facilities, air bases and other potential targets located on an adversary's territory.

The United States could modify existing or planned systems to fill these gaps. For instance, it could extend the range of the Army Tactical Missile System and/or give it the sensor package necessary to strike maritime targets. It could also adapt air- or ship-launched weapons such as the Long-Range Anti-Ship Missile for use with ground-based delivery system. To date, however, there are no publicly announced plans to do so.

RECONSIDERING THE INF TREATY

Despite the potential virtues of missile forces, there are a number of barriers that could prevent the United States from pursuing this option. The U.S.

Army might oppose taking on new missions that could draw resources away from its traditional areas of emphasis, such as combined-arms maneuver warfare. That barrier could erode over time, however, as the Army searches for a major role in the western Pacific.

In addition, local allies might balk at the idea of hosting missile forces on their territory given domestic political constraints and the potential for Chinese retaliation. Yet they might become increasingly receptive in the near future, particularly if China becomes more assertive, the U.S. military posture becomes more vulnerable, and tensions in the region continue to rise.

Finally, certain types of missile forces are prohibited by the 1987 Intermediate-Range Nuclear Forces (INF) Treaty, which bars the United States and Russia from testing and deploying surface-to-surface ballistic and cruise missiles — whether they are nuclear-armed or conventionally armed — with ranges between 500 and 5,500 kilometers. The INF Treaty is under duress, however, and might not persist in its current form, if it survives at all.

In July 2014, the U.S. State Department publicly revealed what many already suspected — namely that Russia was in violation of its INF obligations. Washington has accused Moscow of testing a prohibited ground-launched cruise missile, although it has not revealed the system in question.

Some observers have also raised concerns that Moscow has tested a surface-to-surface ballistic missile at ranges that exceed INF's restrictions (technically making it an intercontinental ballistic missile that is exempt from INF but captured by the New START Treaty), as well as at ranges that fall within INF's bounds (indicating that it might be used as an intermediate-range weapon irrespective of its treaty classification).

By most accounts, this would be a circumvention of the INF Treaty rather than a violation, although it does raise additional concerns about Russian intentions. Moscow's lack of compliance with both the letter and spirit of the INF Treaty is not surprising, given that senior Russian officials proposed withdrawing from it nearly a decade ago.

Nevertheless, Russian cheating has prompted a host of arguments for how the United States should respond, from urging Moscow to resume complying with the treaty to withdrawing from it in retaliation.

A third option is worth considering as well, especially if Russian noncompliance appears unavoidable: modifying the treaty. For instance, Washington and Moscow could agree to sanction the development of intermediate-range missiles, preserve the ban on missile deployments in Europe, and lift the ban on missile deployments in Asia.

Given Russia's eroding military position relative to China, historical tensions between the two neighbors and their competition for influence in the Russian Far East, there are reasons to suspect that Moscow's interest in exiting INF stems more from the need to counterbalance Beijing than the desire to coerce Brussels.

An "Asia option" could have at least two potential benefits:

- *It would enable the United States to develop and deploy ground-launched missile forces in the western Pacific.* As described above, this could enhance deterrence and improve crisis

stability as China's military becomes more powerful.

- *It would drive a wedge between China and Russia.* In this scenario, there would be little doubt that Moscow's pursuit of new missiles was directed squarely at Beijing.

Pursuing this option would certainly raise concerns about the reaction of U.S. allies in Asia, the possibility that Beijing might accelerate its own missile deployments in response, and Washington's ability to monitor and verify the new arrangement. All of these concerns are reasonable, but they are not necessarily unmanageable. For instance, if China's military power continues to grow, allies like Japan and the Philippines



Chinese People's Liberation Army Air Force's anti-aircraft and ground-to-air missile systems are displayed before an international aviation and aerospace exhibition in Zhuhai, Guangdong province, in November 2014. REUTERS

might become increasingly receptive to hosting U.S. missile forces, as well as more willing to tolerate Russian weapons that are aimed primarily at China.

In addition, while Beijing could certainly field more missiles in response, it might not be willing to run an arms race with two major powers at the same time. Finally, monitoring the location of mobile missiles in a country as large as Russia would certainly be a difficult task. If Russia has no interest in adhering to the existing treaty, however, then the United States will have to address this challenge irrespective of INF's status and provisions.

CONCLUSION

The United States has several core interests in East Asia: preventing a single actor from dominating the region, protecting allies and security partners, and preserving freedom of the commons. China's growing missile arsenal could enable Beijing to challenge them all. To sustain a military strategy of forward defense despite a shifting balance of power, Washington might need to consider steps it has avoided in the past, including the development of new ground-launched missile forces.

That could require taking a hard look at the INF Treaty, which has served U.S. interests for nearly three decades but might soon be obsolete. □

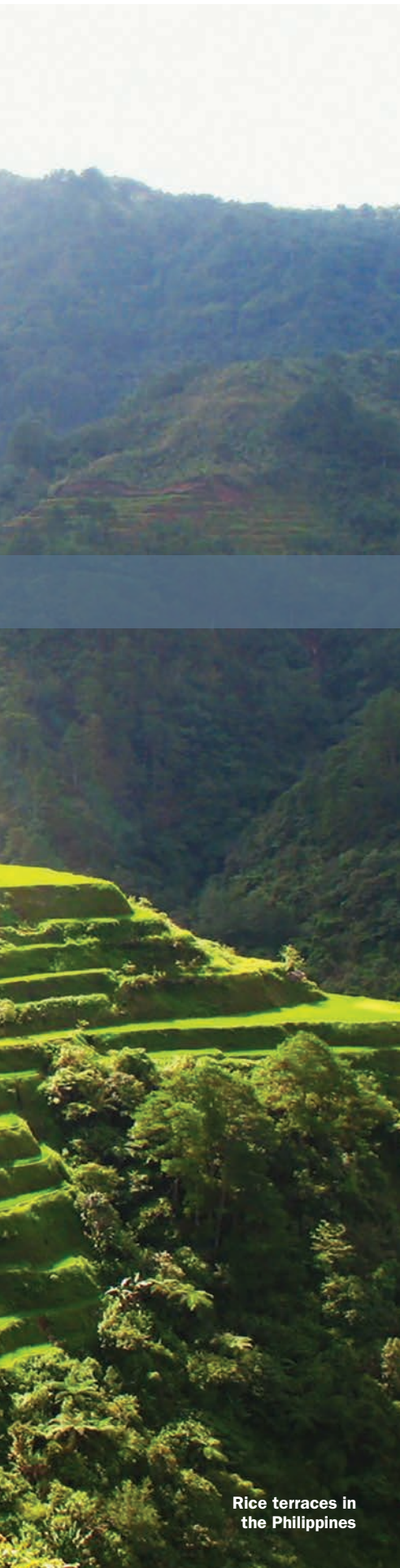
This opinion piece was excerpted from testimony presented by the author, a senior fellow at the Center for Strategic and Budgetary Assessments, before the U.S.-China Economic and Security Review Commission Hearing on "China's Offensive Missile Forces Implications for the United States" in March 2015. It has been edited for length and to fit this format.

Famed ancient

RICE TERRACES

FACE MODERN THREATS

istock



Rice terraces in the Philippines

AGENCE FRANCE-PRESSE

It is fiesta time in the famed rice terraces of the northern Philippines. Young men in colorful tribal clothing pound ancient rhythms on brass gongs as wild boars squeal ahead of slaughter.

The annual festivals, held in remote mountain communities after the planting of the rice that's at the core of their existence, are a vital way of passing centuries-old customs to new generations. Those traditions are the soul of the Cordillera ranges, one of the Philippines' most spectacular regions, where Ifugao tribespeople are custodians of World Heritage-listed rice terraces.

The stepped paddy fields, built 2,000 years ago and the highest in Asia, as well as the Ifugao's traditional lifestyles, are facing unprecedented threats amid the relentless forces of modernity.

"There is a danger of these beautiful areas turning into urban jungles," said Edison Molanida, World Heritage sites manager for the Philippines' culture commission. "One of the main threats is the rapid pace of development in the area."

In its description justifying World Heritage status, the United Nations Educational, Scientific and Cultural Organization (UNESCO) describes the region as "a living cultural landscape of unparalleled beauty." On misty mornings, when the first rays of pale orange sunshine fall across the stone walls that follow the mountains' contours, the terraces look like giant staircases climbing to the heavens.

UNESCO also praises the Ifugao people for having remained in harmony with nature for so long. They use herbs instead of pesticides, eschew fertilizers, and generally show great care for limited natural resources. Their irrigation system, which taps water from mountaintop forests and shares it equitably throughout the communities, is hailed as a "mastery of engineering."

A generation or two ago, many of the Ifugao villages and the lifestyles of the people who lived in them largely resembled those of centuries ago. Today the region, home to roughly 100,000 people and a day's drive from the capital, Manila, retains many of the aspects celebrated by UNESCO.

CHANGE AFOOT

Radical change is underway. Introduced pests, including giant Indonesian earthworms, are causing damage to the structures of the terraces, leading some to collapse.

In Mayoyao, one of the region's most scenic villages, local officials say the worms, as well as snails originally brought in as a food for

protein, are the biggest dangers to the terraces.

Molanida, the World Heritage sites manager, described the "abandonment of the rice growing culture" by significant numbers of Ifugao as one of the biggest dangers for the region. "If the younger generation are no longer interested in the rice culture and move to cities or adopt modern lifestyles, who will be left to tend to the terraces?"

LOCALS OPTIMISTIC

In a lengthy interview from his mountaintop office overlooking the terraces, Mayoyao Vice Mayor Jimmy Padchanan insisted local elders were working hard and successfully to control the march of modernity.

"We cannot deny the effects of modernization on our culture," Padchanan said. "But it is not all bad. We are blending old societies with the new, while maintaining many of our values."

Padchanan said he was confident the rice terraces and ancient traditions could survive the onslaught of the 21st century. "The Mayoyao rice terraces will continue to be handed down from generation to generation. The rice terraces shall endure for as long as the Mayoyao are here," he said.

Locals also pointed out they had a right to develop and enjoy modern society, and should not have to live in fossilized communities. Standing in traditional tribal clothes during a recent festival, Mayoyao elder and rice farmer Mario Lachaona spoke passionately about preserving customs but cautioned against overromanticizing the old days.

"Life before was so hard," said Lachaona, who is in his late 60s, a wiry father of six and grandfather of 18. He said his grandchildren had much better nutrition and education than his generation, and their opportunities to find work other than subsistence farming were much greater. "Life is a lot easier now," Lachaona said.

The expected paving in the next few years of the only road to Mayoyao will make life easier again in many ways. Padchanan said there were plans to sell vegetables in faraway towns, providing a welcome source of extra income for rice farmers.

Only a few hundred foreign tourists visit a year, and the paved road would hopefully bring a lot more. However, Molanida feared those sorts of developments would not be managed well. "It is up to the Ifugao people to decide if they want to fight harder to conserve their culture and prevent chaotic development," he said. "Otherwise the rice terraces may become grass terraces."

Populating the New World

Native American ancestors reached the New World in a single, initial migration from Siberia almost 23,000 years ago, only later differentiating into today's distinct groups, DNA research has revealed.

Most scientists agree the Americas were peopled by forefathers who crossed the Bering land and ice bridge that connected modern-day Russia and Alaska in Earth's last glacial period.

Humans were already present in the Americas 15,000 years ago, other archaeological finds reveal; however, many questions remained. When did the migration take place? In one or several waves? And how long did these early pioneers spend in Beringia — the then-raised land area between Asia and America?

New analysis of Native American and Siberian DNA, present-day and ancient, is filling in the blanks.

A University of Copenhagen study found there was only one initial migration, no more than 23,000 years ago.

This ancestral pool split into two main branches about 13,000 years ago, coinciding with glacier melt and the opening of routes into the North American interior, researchers found.

These became the groups that anthropologists refer to as Amerindians (American Indians) and Athabascans (a native Alaskan people). Previous research had suggested that Amerindian and Athabaskan ancestors had crossed the strait independently. *Agence France-Presse*



AFP/GETTY IMAGES

COLOMBIA

TRUTH OR CONSEQUENCES

Colombia's government plans to carry out lie detector tests on senior civil servants who allocate contracts to private companies, as the country tries to clamp down on widespread corruption and embezzlement of public funds.

Polygraphy will be used initially to test executives in the 72 government departments that have so far signed on to a transparency pact. The executives will be tested before and after concluding contracts for provision of goods and services to the government.

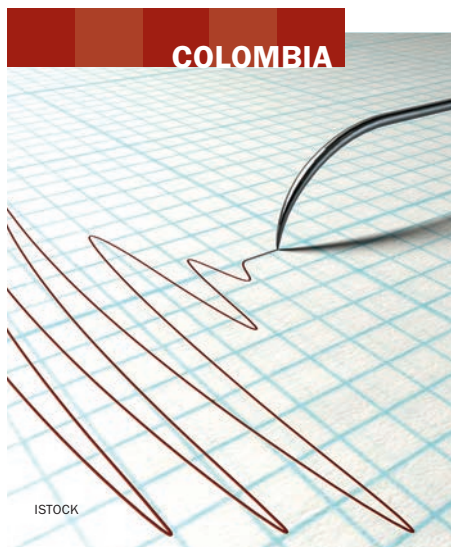
The Andean country's vice president, German Vargas Lleras, is promoting the lie detector tests as a means of boosting investor

confidence as the government allocates contracts to upgrade the national road network, estimated to cost more than U.S. \$20 billion.

In one of Colombia's most shocking public corruption scandals of the past decade, a family with links to a former mayor of Bogota made off with up to U.S. \$1 billion after the family's company won contracts that were barely executed, claiming it ran out of cash.

In 2014, Colombia ranked 94 out of 174 countries for severity of corruption in a listing compiled by Transparency International.

Reuters



ISTOCK

ITALY

Silky SMOOTH revival



Clusters of silkworms munch on piles of locally grown mulberry leaves in Italy's northern Veneto region. They are nourishing hopes of a revival of Italy's 1,000-year-old silk industry.

Decades after Veneto's last silk mills were shuttered as a postwar economic boom lured farmers to cities, budding silk-makers are trying to spin a niche around a traceable supply chain of high-quality material.

"This is a new beginning for a sector that was vital until 50 years ago," said Giampietro Zonta, a jeweler who started producing his own silk to create a line of bracelets and necklaces made of interwoven gold and silk.

Still, Italy's budding silk industry is minuscule compared to the 130,000 tons of silk that China manufactured in 2013.

Italy, which is one of the world's major importers, uses mainly Chinese silk to make finished fabric, neckties, scarves, shirts and dresses.

The effort speaks to a gradual shift in the economics of overseas production as rising salaries in Asia nibble at fat profit margins that have long lured European companies to produce abroad.

Silkworm eggs and rearing techniques came to Europe from Asia along the trade routes known as the Silk Road. They arrived around the year 1000 in Italy.

Two world wars in quick succession at the beginning of the 20th century, however, changed the social and economic fabric of Europe. Soon after the second conflict, Italy began a period of industrialization that spelled the end of silk-making.

Italians aren't the only Europeans who are reviving silk production in Europe; Swiss silkmakers started production in 2009. Reuters



ZIMBABWE

CASH AS *souvenirs*

On the online auction site eBay, a 100 trillion Zimbabwean dollar note is a collector's item fetching up to U.S. \$35, a small fortune compared with the U.S. 40 cents offered by the country's central bank as it seeks to officially bury the worthless currency.

The unloved Zimbabwean dollar, ravaged by hyperinflation that peaked at 500 billion percent in 2008, ceased to be legal tender in mid-2014 when the southern African country switched to the U.S. dollar.

Few people, however, have been bringing their quadrillions of local dollars to Zimbabwe's banks to cash in old notes — especially since they could get a better deal elsewhere.

"I would rather sell the money to tourists," said former currency trader Shadreck Gutuza. "Most people either burned that money or dumped it."

Online, one seller was offering a hundred 50 trillion Zimbabwean dollar notes for U.S. \$1,000.

Zimbabwe's hyperinflation was considered by the International Monetary Fund as the worst for any country not at war, and the 100 trillion Zimbabwean dollar note was the single largest known note to be printed by any central bank.

Tourists are known to pay U.S. \$20 for a single note in the resort town of Victoria Falls.

The government set aside U.S. \$20 million to mop up Zimbabwean dollar notes. Citizens with bank accounts with balances of up to 175 quadrillion Zimbabwean dollars — that's 175,000,000,000,000,000 — are being paid U.S. \$5. Those with higher balances are getting a rate of 1 to 35 quadrillion Zimbabwean dollars. Reuters

BANGLADESH Cellphones Can't Ring National Anthem

Bangladesh's Supreme Court has banned the use of the country's national anthem as a ringtone for mobile telephones or for any other commercial purpose.

"The national anthem can't be used as a business tool," the Supreme Court said, upholding a 2010 high court ruling.

The national anthem, Amar Shonar Bangla, or My Golden Bengal, is based on the first 10 lines of a 1905 song written by Rabindranath Tagore, the first non-European to win the Nobel Prize for literature. The song was adopted as the anthem in 1972.

Bangladesh is one of the fastest growing telecom markets in the region, with 124 million mobile phone users. Reuters

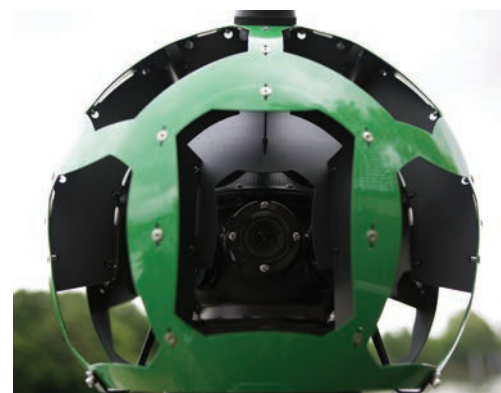
GOOGLE STREET VIEW COMES TO MONGOLIA

Google's Street View service, which features images of towns and cities around the world, has arrived in Mongolia.

The U.S. technology giant used a horse-drawn sled to carry its image-capturing camera to remote locations in the vast, sparsely populated country, including Lake Khovsgol, Asia's second-largest body of freshwater.

To capture the expanses of the Gobi Desert, a trekker carried the camera in a backpack, Google said as it launched the service in the Mongolian capital, Ulaanbaatar. "Google hopes that bringing Street View to Mongolia will raise awareness of the country as an emerging destination for visitors around the world and support the country's economic growth moving forward," said company representative Susan Pointer.

Local officials welcomed the opportunity to preserve vanishing traces of Mongolia's traditional nomadic culture and boost tourism in a country well off the beaten path. With a population of only 3 million and a territory more than twice the size of France, Mongolia is the least densely populated country in the world. Agence France-Presse



GETTY IMAGES

Universal Flu Vaccine Shows PROMISE

Scientists have taken a major step toward creating a vaccine that works against multiple strains of influenza, according to two studies published in August 2015 in top journals.

A "universal vaccine" is the holy grail of immunization efforts against the flu, a shape-shifting virus which kills up to half a million people each year, according to the World Health Organization.

There have been several killer pandemics in the last century — the 1918 Spanish Flu outbreak claimed at least 20 million lives.

Existing vaccines target a part of the virus that mutates constantly,

forcing drugmakers and health officials to concoct new anti-flu cocktails every year.

In the two studies, published in *Nature* and *Science*, researchers tested new vaccines on mice, ferrets and monkeys that duplicate another, more stable, part of the virus.

Scientists have long known that the stem of haemagglutinin — a spike-like protein, known as HA, on the surface of the virus — remains largely the same even when the tip, or "head," changes.

Until now, they have not been able to use the stem to provoke an immune reaction in lab animals or

humans that would either neutralize the virus or allow the body to attack and destroy infected cells. To make that happen, a team led by Hadi Yassine of the Vaccine Research Center at the U.S. National Institutes of Health grafted a nano-particle-size protein called ferritin onto a headless HA stem and tested it on animals.

Other scientists not involved in the studies described them as a major step toward a universal vaccine, but cautioned that a lot of work has to be done, possibly over many years, before a vaccine can be tested on humans. Agence France-Presse



ARE WE ALONE IN THE COSMOS?

REUTERS

Scientists are about to embark on the biggest search yet for alien life, sweeping the skies for signals of civilizations beyond our solar system with U.S. \$100 million from a Russian billionaire and the backing of physicist Stephen Hawking.

The question whether we are alone in the universe has engaged minds across the ages, and the recent discovery that there may be tens of billions of habitable planets in our galaxy alone has added urgency to finding an answer.

“There is no bigger question. It’s time to commit to finding the answer — to search for life beyond Earth,” Hawking told reporters at the program’s July 2015 launch in London.

himself a physicist by training, who made his fortune from savvy early investments in startups such as Facebook Inc. He said he aimed to bring a Silicon Valley approach to “the most interesting technological question of our day.”

As a 10-year-old in Moscow, Milner became fascinated by the notion of extraterrestrial life after reading astrophysicist Carl Sagan’s *Intelligent Life in the Universe*. He believes other civilizations could teach us how to handle challenges such as allocating natural resources, he said. If we don’t find other beings, we can learn other lessons.

“If we’re alone, we need to cherish what we have,” he said. “The message is, the universe has no backup.”

The new project dwarfs anything else in the field, known by the acronym SETI for the “search for extraterrestrial intelligence.” Globally, less than U.S. \$2 million annually is spent on SETI, said Dan Werthimer, an advisor to Milner’s project who directs the SETI@home program affiliated with the University of California in Berkeley, which asks volunteers to run software on their home computers to analyze data.

Today, due to technology improvements, including in computing power and telescope sensitivity, U.S. \$100 million will go much further than in the early 1990s, the last time SETI had significant funding. The advances allow scientists to monitor several billion radio frequencies at a time, instead of several million, and to search 10 times more sky than in the early 1990s.

Any signals the scientists detect will have been created years ago, perhaps even centuries or millennia earlier. Radio signals take four years simply to travel between Earth and the nearest star outside our solar system. Breakthrough Listen will book time at radio telescopes, including at Australia’s Parkes Observatory in New South Wales and the Radio Astronomy Observatory in Green Bank, West Virginia. Milner plans to book about two months a year at each site, a boon to scientists who normally might get two days a year on the telescopes.

The team, led by scientists such as Peter Worden, who until early 2015 directed the NASA Ames Research Center, will organize the radio signals they find, make the data public, and examine it for patterns. The goal lies less in understanding the signals than in establishing whether they were created by intelligent life rather than natural phenomena.

Scientists say the fact that humans have developed radio signaling makes it a good bet that others may use it as well. “It doesn’t tell you anything about the civilization, but it tells you a civilization is there,” said Frank Drake, another of the project’s supporters.



Some of the world’s largest radio telescopes will be used to scan for distinctive radio signals that could indicate the existence of intelligent life. Astronomers will listen to signals from the million star systems nearest to Earth and the 100 closest galaxies, although they do not yet plan to send messages back into space. Hawking said some form of simple life on other worlds seemed very likely, but the existence of intelligence was another matter, and humankind needed to think hard about making contact.

“A civilization reading one of our messages could be billions of years ahead. If so, they will be vastly more powerful and may not see us as any more valuable than we see bacteria,” he said.

The 10-year project, dubbed Breakthrough Listen, is funded by Russian Internet entrepreneur Yuri Milner,



Modern-day Knights Fight Medieval-style

Wielding swords and halberds, knights in heavy armor attack each other in scenes that could easily be mistaken for a staged reconstruction. On the grounds of a vast brick castle in northern Poland, the battles are real, however.

Men and women from 25 countries gather by the hundreds at Malbork Castle for full-contact medieval fighting. Though less bloody than tournaments fought centuries ago, the battles are refereed matches, scored like boxing, in which the objective is to get one's opponent to the ground.

There are one-on-one fights, as well as bigger tournaments with groups of three, five or as many as 16 people on each side.

The fighters use swords, shields and polearms as they try to floor the opposition, cheered on by spectators.

Preparations can be a long, hard and expensive slog. Participants train several times a week. Their equipment must follow strict authenticity rules.

Reuters

CUSTOM WATERMELONS *in Japan*

Japanese consumers are used to paying through the nose for fruit, and now there's another way for them to empty their wallets: cube- and heart-shaped watermelons.

This pricey produce, however, is not intended to tempt taste buds. It's more of an ornament than the perfect picnic food.

Over at the Shibuya Nishimura luxury fruit shop in downtown Tokyo, a cube-shaped watermelon, about the size of a baby's head, sells for 12,960 yen (U.S. \$105).

Don't like cubes? Well, how about a heart- or pyramid-shaped melon to sit on that chic living room coffee table?

"This fruit is meant to be a feast for your eyes, but they don't taste very good," admitted the shop's senior managing director, Mototaka Nishimura. "They should be displayed as ornaments, maybe mixed with flowers."

Farmers plant young watermelons inside acrylic containers to get the desired shape.

While the price may sound high, it's actually something of a bargain in Japan where people traditionally exchange gifts, including expensive fruit, with clients and relatives a couple of times a year.

Agence France-Presse



Small is Beautiful for South Korean Weddings

The night before their wedding, Kim Kwang-yoon and Cho Jin-oh were up until 2 a.m. with the bride's mother, setting tables. Their marriage venue: a room in the basement of Seoul's city hall, rented from the government for U.S. \$60.


With South Korea's average wedding expenditure in 2014 at nearly U.S. \$64,000, or about double the U.S. average, more citizens are spurning lavish events for smaller functions as the economy slows, the age at marriage rises, and parents nearing retirement have less money to splurge.

South Korean weddings are typically a show of status, with hundreds of guests and expensive gifts. Huge marriage expenses prompt more young people to delay marriage, and consequently children, worsening one of the world's lowest birthrates in a population that is aging the fastest in the industrialized world.

To boost marriage rates from an all-time low in 2014, the government is renting out public buildings cheaply. The small-wedding trend also brings relief for parents, because South Koreans in their 50s and 60s are the most heavily indebted in a country whose household debt ranks among the world's highest.

Reuters

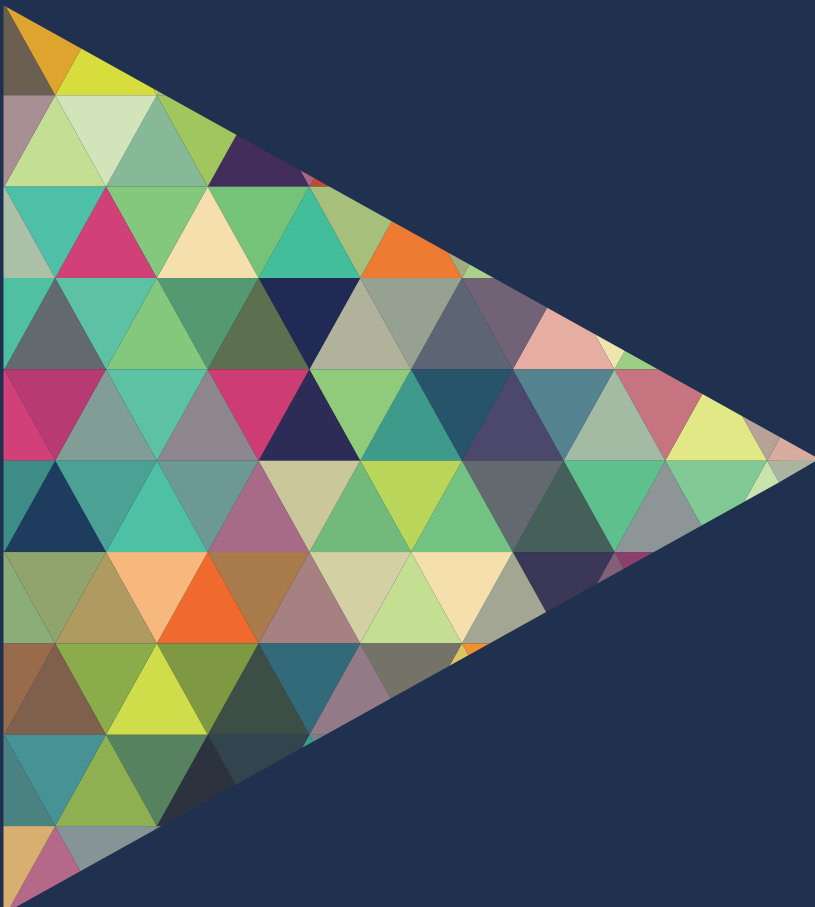
STANDING TALL



Indian Navy Sailors line up during a guard of honor on aircraft carrier INS Viraat in Mumbai, India in April 2015. India's Chief of Naval Staff Adm. R.K. Dhowan presided over a naval investiture ceremony awarding medals and unit citations at Mumbai's naval dockyard. The oldest aircraft carrier in service in the world, the INS Viraat is the last British-built ship serving with the Indian Navy and is one of India's two aircraft carriers.

Photo By: **INDRANIL MUKHERJEE** | AFP/Getty Images

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