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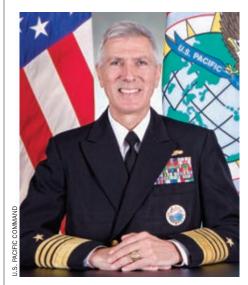
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ABOUT THE COVER:

Tomorrow's militaries will employ innovative security solutions. In this illustration, the artist envisions the future Soldier of the Asia Pacific.

FORUM ILLUSTRATION



Dear Readers,

ello and welcome to the latest issue of Asia Pacific Defense FORUM. This edition focuses on fascinating innovations in technology and training. It explores how our militaries and law enforcement agencies benefit from novel approaches to overcoming challenges and illustrates some truly inspired problem solving.

To anticipate the requirements of an ever-evolving security environment, organizations must innovate to counter both existing and

emerging threats. Innovation, however, is not only represented by new technologies. It may also take the form of fresh strategies and tactics, as well as previously unexplored approaches to problems or applications of existing technology.

Perhaps the most exciting aspect of innovation is technology that arises from the latest scientific discoveries and techniques. Can you imagine camouflage so effective it makes a soldier invisible? Scientists at the Defense Advanced Research Projects Agency are actively working to produce smart materials to do just that. Meanwhile, South Korean researchers have developed a robotic fish that could monitor pollution in the sea. While inventions like these have great potential, they are not the only means of harnessing change.

Clever evolution of existing strategies and tactics also allows countries to deal with security challenges in more cost-effective ways. For example, the government of India has enlisted local fishermen to serve as an extended coastal sensor net by giving them cellphones and asking them to report on suspicious ships and people. These fishermen, who are intimately familiar with local waterways, are ideally suited to recognize unusual activities that might portend a more serious threat. In similar efforts to seek savings and leverage low-tech solutions, many countries are using working dogs to augment their police and military forces. Indonesian dogs actually rappel out of helicopters!

Indonesia's creativity is not limited to its four-legged forces. The country is also finding new ways to use existing technologies like chat rooms to serve as information-sharing platforms. A longstanding partnership with Singapore has allowed the two nations to launch an Association of Southeast Asian Nations Information-Sharing Portal. The Portal supports languages like Bahasa Indonesia, Thai and Vietnamese and comes in desktop and mobile variants. This capability facilitates operational updates and is another demonstration of how innovation can help improve regional security in this theater.

A country's most valuable resource is the ingenuity of its people. Clearly, the nations of the Asia Pacific are rich in this regard.

We welcome your comments for improvements as we strive to keep *FORUM* current and intriguing. Please contact us at **contact-apdf@apdforum.com** with your thoughts.

Warmly,

SAMUEL J. LOCKLEAR, III Admiral, USN Commander, U.S. Pacific Command

APD FORUM

Military Innovation

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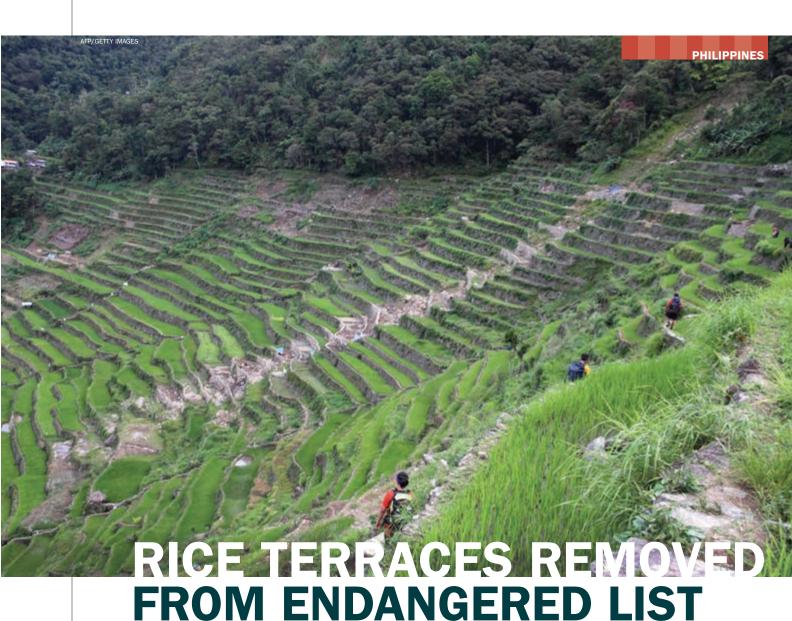
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he Philippines' ancient rice terraces, carved into mountains like giant green stairs, were removed from a United Nations list of endangered world heritage sites in June 2012. The 2,000-year-old living cultural monuments were put on the World Heritage Committee's danger list in 2000 at the Philippine government's request to rally local and international aid and for better management of their preservation.

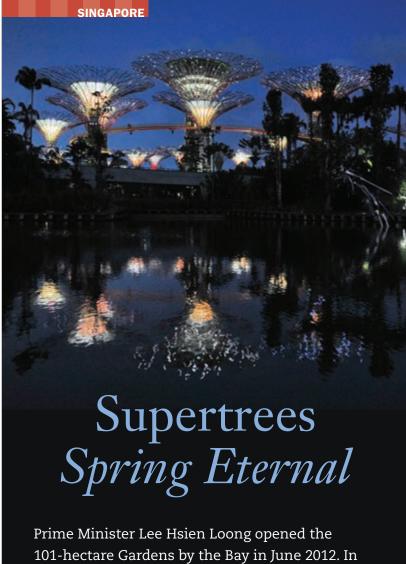
"Both actions were successfully undertaken, leading to the conservation of the remote high rice fields," the U.N. information office said. UNESCO said it had extended U.S.

\$153,200 to aid Philippine efforts to conserve paddies threatened by deforestation, disuse, climate change and earthquakes.

The terraces, located in five towns in the northern Cordilleras, were named a UNESCO world heritage site in 1995, citing the need to preserve the traditions of terrace-building people in Ifugao province.

"Once the tourists are convinced that there are still terraces left to see, more of them will come and visit us," said Jerry Dalipog, mayor of Banaue town, where two of the five terraced fields are located.

Agence France-Presse



Prime Minister Lee Hsien Loong opened the 101-hectare Gardens by the Bay in June 2012. In the heart of Singapore's new downtown at Marina Bay, the urban arboretum features man-made plantings up to 50 meters tall dubbed "supertrees," two greenhouses and more than 220,000 plants from almost every continent on the planet. The 18



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supertrees, modeled on the Karri trees of Western Australia, light up at night powered by solar energy.

Agence France-Presse

INDIA

Investment Promoted in Afghanistan

India hosted a summit in New Delhi in June 2012 seeking to persuade private Indian and foreign investors to help stabilize Afghanistan as NATO prepares to withdraw by 2014.

"Afghanistan may not be the easiest destination to sell to an investor," Indian Foreign Affairs Minister S M Krishna admitted at the summit, attended by companies from 40 countries, including Russia, Pakistan and Iran.

Despite security concerns,
Krishna argued there would be safety
in numbers if enough investors
committed to the country, and
he cited Afghanistan's mineral,
agricultural and human resources
as genuine investment material.
"We need to offer a narrative of
opportunity to counter the anxiety of
withdrawal, uncertainty, instability and
foreign interference," Krishna said.

Agence France-Presse



Afghanistan Foreign Minister Zalmai Rassoul, left, and Indian Foreign Affairs Minister S.M. Krishna during the Delhi Investment Summit on Afghanistan

ACTION VOWED on Child Soldiers

Burma signed an agreement in June 2012 with the United Nations pledging to prevent the use of child soldiers and allow access to military units to check for underage recruits, the U.N. said. The action plan, inked by senior military officials and U.N. representatives in the capital Naypyidaw, is the result of years of negotiation with the government, according to the U.N. office in Yangon.

"We will be able to work closely with the Ministry of Defense and visit various military units to identify underage children if any, have them registered and released, and provide assistance for their reintegration with their families," said Ramesh Shrestha, the country representative for the U.N. Children's Fund. "The signing also means serious commitments from the government to ensure that there will be no more recruitment of underage children in the military."

Thousands of people younger than 18 are believed to be in Burma's state army and ethnic armed groups. Save the Children Country Director Kelland Stevenson said children were often tricked by recruiters. "We know that children do not willingly join the military." Agence France-Presse



A child in Burma's Kokang region wears a uniform of the Burmese military.

NEPAL

RECORD CANNABIS BUST



Police in Nepal made their biggest ever cannabis bust in June 2012, seizing more than 2.5 tons from a jungle on the outskirts of the capital Kathmandu, a spokesman said.

Drug squad officers discovered 2,640 kilograms of the plant packed in 88 plastic sacks and bound for India, police superintendent Sher Bahadur Basnet said. He said the haul had a street value in Nepal of about U.S. \$155,000 but would fetch far more on the international market.

Five men in their 20s have been arrested and each face jail sentences of up to 10 years and fines of 100,000 rupees if convicted. Agence France-Presse

APD FORUM

SUSPECT ARRESTED

IN MUMBAI ATTACKS

REUTERS

ndian police arrested a man suspected of helping to plan a militant rampage through Mumbai in 2008 that killed 166 people, Foreign Minister S.M. Krishna said in June 2012.

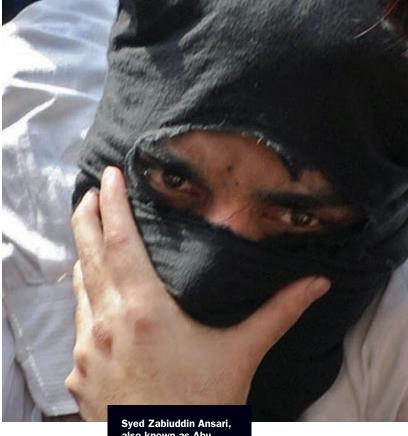
Officials suspect Indian-born Syed Zabiuddin Ansari, also known as Abu Jundal, is a member of Lashkar-e-Tayyiba, the Pakistan-based militant group that New Delhi blames for the attacks that stunned India and shattered fragile relations with neighboring Pakistan. Authorities believe Jundal is the voice of a previously unidentified man who was taped speaking by phone from Pakistan to the militants involved in the Mumbai attacks. He also allegedly coached the attackers in speaking Hindi, according to reports.

During the three-day rampage, 10 gunmen killed commuters, foreigners and some wealthy Indian businessmen in attacks on two luxury hotels, a Jewish center and a train station. A voice believed to belong to Jundal was recorded talking to the gunmen attacking the Jewish center in south Mumbai. According to the *Times of India* newspaper, he told the attackers to convey to the media that the "attack was a trailer and the entire movie was yet to come."

Jundal was deported from Saudi Arabia and was arrested upon landing at Delhi airport. In August 2012, he made a recorded statement before a Mumbai magistrate and confessed to his role in the attacks, according to local media.

Peace talks between India and Pakistan have resumed since the attacks, but New Delhi still suspects Islamabad of dragging its feet in bringing the perpetrators to justice, a charge Pakistan denies. "Let the Delhi police go through the investigation first, and then they will send a report to the government," Krishna said of how India would approach Pakistan over Jundal's arrest.

India has repeatedly called on Pakistan to take action against Hafiz Saeed, the Islamist blamed for masterminding the Mumbai attacks. In May 2012, U.S. Secretary of State Hillary Clinton authorized a U.S. \$10 million reward for information leading to his capture.

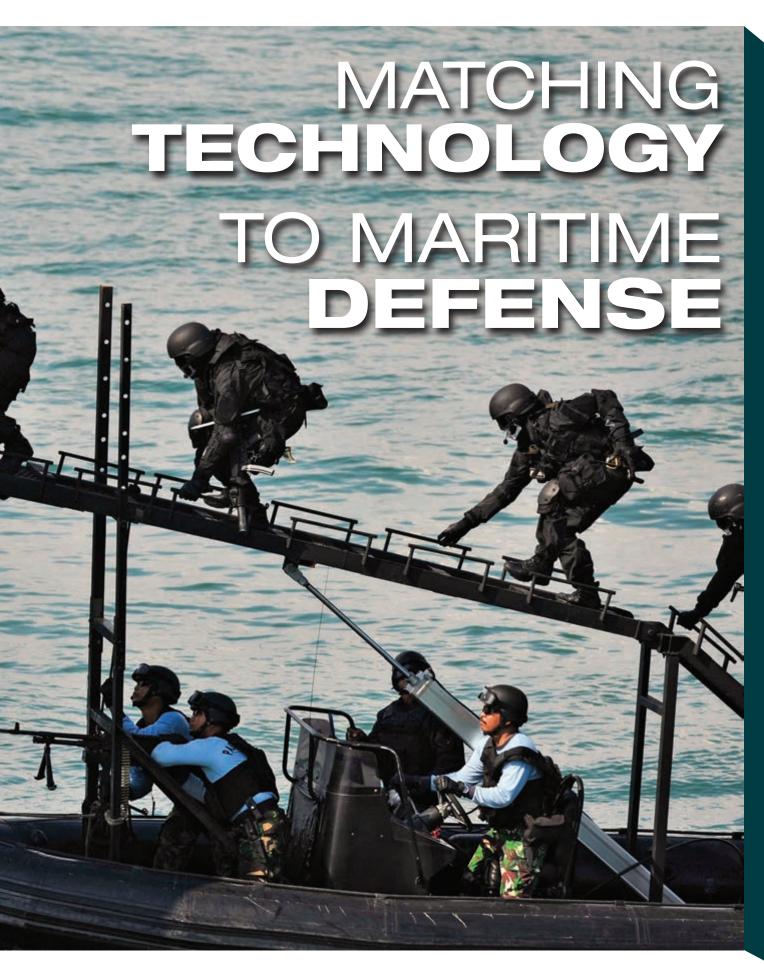


also known as Abu Jundal, a suspect in the 2008 Mumbai attacks, is escorted into a New Delhi court after his arrest in July 2012.

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Authorities adapt
a mix of high- and
low-tech solutions
to improve security
across coastal
communities

FORUM STAFF

heir boats are rickety, and their nets at times are barely strong enough to secure the day's catch. Yet, when it comes to navigating intimate coastal waterways across the Asia-Pacific region, local fishermen often possess the upper hand. They've spent their entire lives trolling the channels that give access to their shores. They know the routines of other vessels and have the potential to serve as first identifiers when suspicious activities arise at sea.

Navy and Coast Guard authorities across the Asia Pacific have begun taking advantage of this budding asset by equipping fishermen with communication tools and by grooming their skills as quasi-water police.

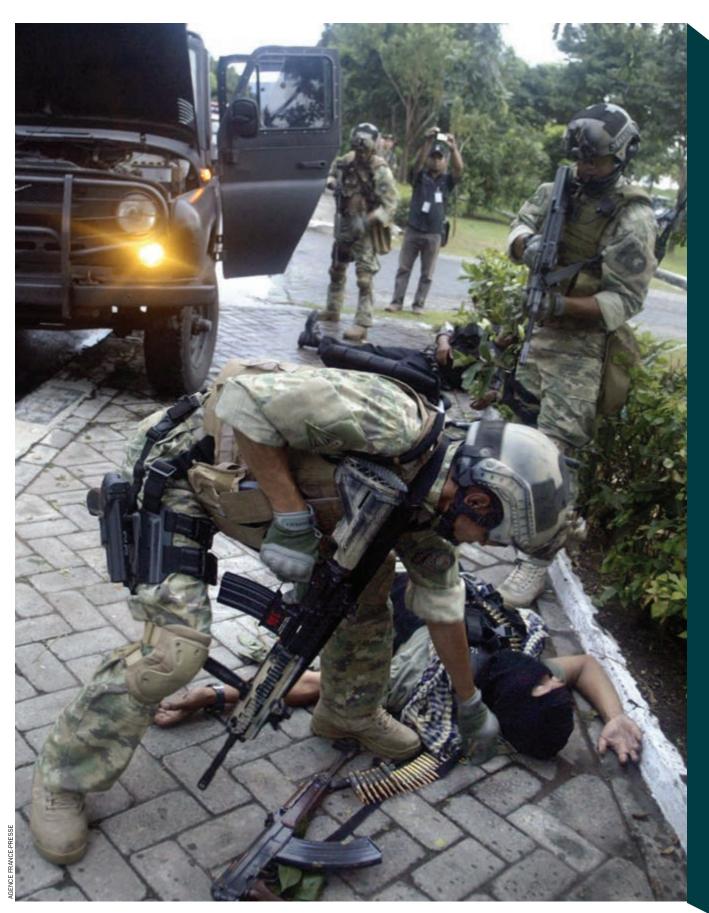
"Fishermen in the deep sea are like eyes and ears of Indian coastal security, for the protection of the entire 1,750 kilometers of coastline. Like in any other country, the Coast Guard in India too works with the cooperation of the local fishermen, for which communication is important," Indian Coast Guard Commandant K L Arun said during a June 2012 meeting on "Fisheries Protection Safety and Security Aspect," organized by his agency along with coastal security police and local fishermen. "The fishing community has to be aware of all the aspects relating to national security," Arun said, according a Daijiworld Media Network report.

Police in Mumbai announced in March 2012 that they had given more than 100 cellular phones to fishermen as part of a move to improve security along India's coastal borders.

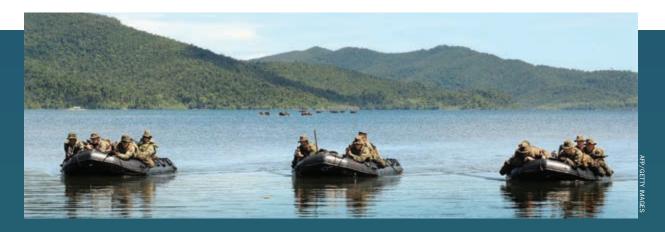
"In order to enhance intelligence gathering along the coast, the state government has roped in the fishing community. Over 100 fishermen have been given cellphones and asked to report to the police, Coast Guard or Naval officials if they [fishermen] come across anything suspicious," Indian Home Minister R R Patil said,



Marine reserve police in the western Indian state of Gujarat guard a boat that was carrying 21 foreign nationals who arrived on the coast of Dwarka in June 2011. Indian Navy and Coast Guard officials have asked police to train local fishermen to report suspicious activity and vessels along the coast.



Members of the Singaporean Navy Commando Naval Diving Unit participate in a joint exercise with Indonesian Navy personnel in Surabaya in East Java province in May 2012. The exercise aims to develop military and tactical cooperation between the Indonesian and Singaporean naval forces.



Philippines Expands Coast Watch

FORUM STAFF

s discussions over the South China Sea continue to evolve, the Philippines has increased its efforts to build maritime domain awareness by establishing a National Coast Watch Center. The center expands on a system developed in coordination with the United States in the southern part of the country, incorporating support from a variety of Philippine government agencies including the Navy, the Coast Guard and the Philippine Center on Transnational Crime.

"The Philippines faces serious maritime security challenges threatening not only its territorial integrity but the peaceful existence of the Filipinos and their inherent rights to be free from such threats as piracy, armed robbery, terrorism, proliferation of weapons of mass destruction, trafficking in persons, drugs and firearms trafficking, smuggling, illegal fishing, transnational crimes, national disasters, climate change, and marine environment degradation," President Benigno Aquino III declared in an executive order establishing the center in September 2011.

As in the past, the Philippine government is working with international partners to protect its waterways. "International and regional cooperation in maritime security enables the Philippines to develop needed capabilities at a faster pace," the president explained.

The United States has vowed to help the country set up the center. "Right now, we are discussing a range of options," Maj. Catherine Wilkinson told Agence France-Presse in June 2012.

The Philippines worked with the United States in 2010 and 2011 to launch a coastal watch system in the southern part of the country to monitor activity in the Sulu and Celebes seas. The system consists of nine radar towers with cameras that collect information about terrorist and criminal activity and relay that data via satellite to communication stations on the ground. The stations then feed information to the nation's Maritime Research Information Center to

help develop a comprehensive awareness of activity in the seas.

A similar approach could be used to monitor the rest of the island nation's coastline if the National Coast Watch Center can acquire the right equipment, President Aquino hinted in an interview with Reuters in July 2012. "We have 36,000 kilometers of coastline," he explained. "We don't have radar coverage for all of this."

However, even as the nation builds its maritime awareness, the president stressed that the Philippines' goal is to find a peaceful solution to the South China Sea dispute. "The Philippines has demonstrated time and again its interest to preserve the peace and the de-escalation of the situation," he told Reuters. "But we don't exist in a vacuum. We would want to see China reciprocate all of these moves that have been done as far as de-escalating the tensions."



Filipino and U.S. Soldiers participate in a joint exercise on Palawan island in April 2012. The Philippines is working to expand its maritime domain awareness.

according to *The Times of India* newspaper. "A fisherman can even share secret information he has with him regarding coastal security."

Patil said the government also asked police to meet regularly with local fishermen to remind them to remain alert and to inform authorities of suspicious people, ships and illicit activities. Police stations in some Indian states have also begun charging mobile devices for fishermen to ensure they maintain proper access to lines of communication.

In July 2012, India's shipping ministry pushed its Vessel Traffic Management System to the Chennai Port sea community and merchants. The system, already in use at other Indian ports, such as Mumbai, is designed to track ships' movements and alert them to possible dangers, such as underwater cables, according to *The Times of India*. The system can also notify authorities of oil spills. Port authorities share their incoming data in real time with the Indian Navy and Coast Guard.

SPEAKING THE SAME LANGUAGE

The diversity of the Asia-Pacific region can sometimes present an obstacle to nations with a desire to cooperate on a security problem. This is the case in Singapore and Indonesia. The two countries' navies historically exchanged information through traditional means, including emails, faxes and radio transmissions. A language barrier, however, prevented their navies from maximizing their coordination efforts — until recently.

An Internet portal called Surpic II has helped the two countries speak the same language, in effect. The portal translates back and forth between Bahasa Indonesia and English when the two sides use a group chat, according to a May 2012 article in *The Straits Times* newspaper.

The system is just one of the latest tools of the Indonesia-Singapore Coordinated Patrol, a 20-year-old operation between Singapore and Indonesia to deter sea bandits in the Philip Channel and Singapore Strait. The partnership between the two navies has helped decrease the number of sea robberies from 27 in 1992 to just eight in 2011, *The Jakarta Post* reported.

Singapore and Indonesia have taken what they've learned about information sharing and are teaching other Asia-Pacific navies to implement similar measures. In July 2012, the two countries co-hosted the first Association of Southeast Asian Nations (ASEAN) Maritime Security Information-Sharing Exercise.

During the gathering, attended by an estimated 60 personnel from ASEAN navies, Navy chiefs from Singapore and Indonesia launched a new ASEAN Information-Sharing Portal (AIP). The platform

Military Strategists Turn Their Attention to Waterways

REUTERS

Military brass from across Asia gathered in February 2012 at the region's biggest arms and aerospace bazaar, the Singapore Airshow, where much of the attention turned to maritime concerns.

Salesmen in business suits escorted visitors in the sweltering heat to mock-ups of the world's most advanced jet fighters, helicopters and transport aircraft parked on a tarmac. Nearby, inside a vast air-conditioned hangar, state-of-the-art radar and surveillance equipment were exhibited and deals for missile systems were being inked

Interest, however, is shifting away from ground weapons like tanks and guns, analysts said, to jet fighters, maritime patrol aircraft, radar and in some cases submarines.

Asia's mostly littoral nations are less concerned now with old neighborhood rivalries, focusing more on the need for force projection across seas, analysts said.

For many, a resurgent China is the main threat.

"Other than India-Pakistan and the Korean peninsula, the contested spaces in Asia are maritime spaces, particularly the South China Sea," said Andrew Davies, a program director at the Australian Strategic Policy Institute.

The vulnerabilities that countries feel are often maritime as well because of the dependence on energy supplies being shipped in by sea.

China's aggressive pursuit of claims to islands in the South China Sea is causing much concern in the region. Brunei, Malaysia, the Philippines, Taiwan and Vietnam also have claims and the row is seen as the biggest security threat in Asia.

According to IHS Jane's DS Forecasts, East Asia's spending on military aircraft will soar to U.S \$24.3 billion in 2015 from U.S. \$15.9 billion in 2012. Expenditure on ground forces and traditional land weapons will grow only to U.S. \$13.1 billion from U.S. \$11.2 billion.

Expenditure on navies will be mostly flat at U.S. \$12 billion, although spending on submarines will increase to U.S. \$3.1 billion from U.S. \$2.5 billion. The forecast includes China, Japan, the Koreas and the Southeast Asian nations.

Within three years, China's defense expenditure would exceed the combined spending of all other major countries in Asia, according to IHS Jane's.

The Latest Buzz in Scent Technology

Researchers train honeybees to sniff out contraband

FORUM STAFF

t first glance, the image appears staged. Dozens of honeybee heads pop out of ink cartridge-like objects stacked in formation like cubicles at a call center. A closer look reveals this is no "worker bee" parody but the latest buzz in "sniff" technology for bulk screening of cargo.

Researchers in the United Kingdom are adapting the same remote explosives scent tracing concept used in training dogs to identify explosive molecules, illegal drugs, food and other smuggled contraband through smell to train honeybees in sniffing out illegal agents in bulk cargo.

"These tiny creatures were shown to learn almost any odor and have subsequently inspired numerous researchers to explore the practical application of sniffer bees," according to Ivan Hoo, chief executive officer for Inscentinel, the United Kingdom research company specializing in the use of honeybees to detect illegal contraband. Honeybees are just as accurate and sensitive as dogs, but bees are easier to use and maintain and are cheaper, according to Hoo, who wrote about Inscentinel's research for the 54th edition of the journal Port Technology International.

"The advantage of the animal is that they have developed through evolution the optimal way of identifying odorants, categorizing them and putting them into patterns," Gary Beauchamp, a professor at the Monell Chemical Senses Center in Philadelphia, Pennsylvania, told BBC News in June 2012. "If we can understand this, we could build a device that could do much of this."

The technology has the potential to make cargo screening for ships, airplanes or even border checkpoints more thorough and cost-effective.

"The training of bees requires only sugar water (no more expensive than dog food)," Hoo wrote in *PortTechnology International*. "The cost of a honeybee itself is relatively cheap. A beehive can contain up to 60,000 bees and a local beekeeper can manage 20 hives single-handedly — that is 1,200,000 bees. Imagine housing that many dogs."

Inscentinel researchers say they can train a honeybee to react to a single odor in six seconds (though slower learners may require repeated sessions). Hoo says his training unit can train up to 500 sniffer bees in five hours compared to the six months it could take to train a single sniffer dog.

"I press a button to give the bee a scent, then use a cotton bud to put sugar by its antennae," Inscentinel bio-sensor scientist Stacey Kendall told BBC News in June 2012. "When they stick their tongue out, you can feed them. Pairing the sugar with the smell means they will learn."

Researchers load the honeybees into an ink-cartridge-like holding chamber or "bee hotel," then insert them into a handheld device with a computer that monitors the bees' reactions to scents. The device is similar in shape and size to a hand-held vacuum cleaner.

What the future holds for the availability of such technology has yet to be revealed. Hoo hopes what his company has developed so far will generate the continued buzz it needs for funding and practical use in the marketplace.

"Inscentinel is at the stage of attracting investors to raise finance to complete the prototyping and looking for security companies to run this technology in a field test," Hoo wrote in *PortTechnology International*. "I have no doubt that the bees will perform brilliantly — after all, sniffer bees were not developed only in the last decade but over millennium to achieve their level of sensitivity."

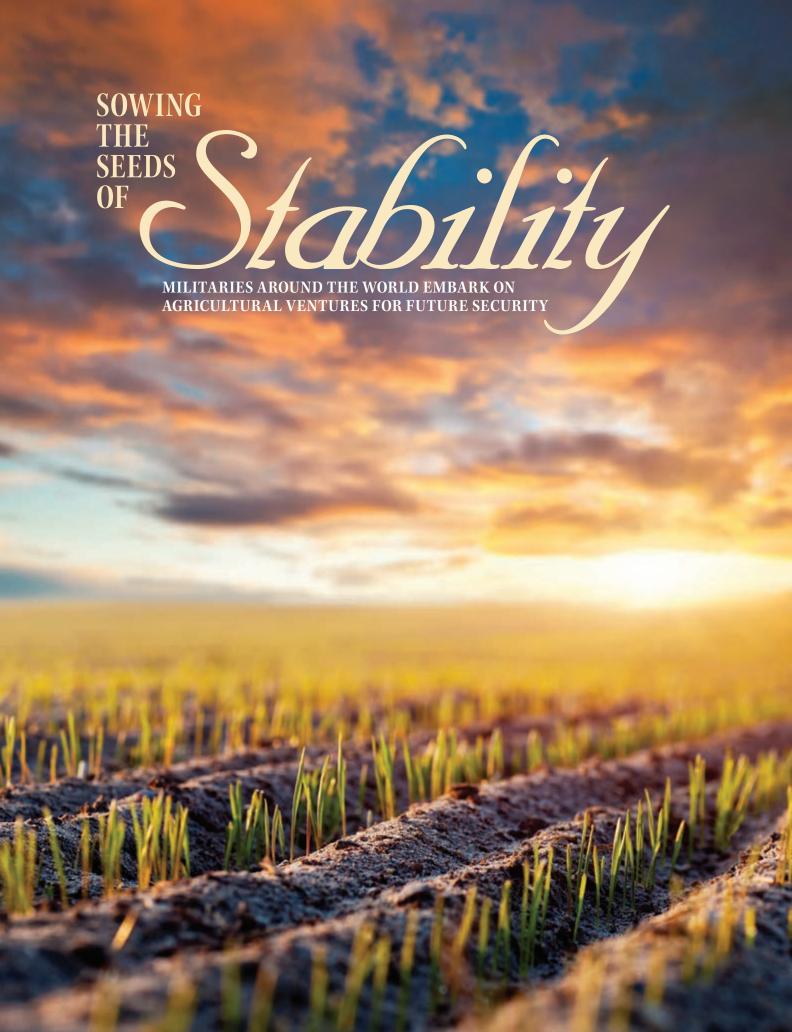


gives ASEAN navies a forum for sharing maritime security-related information (much like the one used bilaterally).

Here's how the Singapore Ministry of Defence described the way the new technology operates:

- Real-time chat function and translation: The AIP facilitates real-time exchange of information among various operation centers and operational commanders in the ASEAN region through a group chat function. This enables daily operational updates of maritime activity in the ASEAN region. The portal also provides real-time translation between English and participating countries' native languages in the chat function, enhancing communication and interoperability among the ASEAN navies. The portal supports such languages as Bahasa Indonesia, Thai and Vietnamese.
- Enhanced accessibility: The AIP is a Web-based platform, allowing it to be mobile and easily accessible. It has two variants the AIP (Desktop) and the AIP (Mobile). The AIP (Desktop) variant is used primarily in the countries' operation centers to facilitate the exchange of information. The AIP (Mobile) is an application that can be installed on the commanders' smartphones or mobile devices. This enables commanders to receive maritime security alerts and carry out group discussion while on the move for timely decision-making in operational situations. □

A fisherman speaks on his mobile phone on the outskirts of Chennai, India. India's Navy and Coast Guard authorities have given fishermen cellphones and trained them to report suspicious activities along the coast.



"If planning for one year, it is best to cultivate crops; if planning for 10 years, it is best to cultivate trees; if planning for life, it is best to cultivate the people."

— Guan Zhong

FORUM STAFF

he plan is simple: Every Soldier, office worker and official within the Philippines Department of National Defense will plant at least 10 seedlings each year. The overall goal: 1.5 billion new trees sprouting over 1.5 million hectares across the Philippines by 2016.

It may not seem like a plan that would call for military involvement, but the Armed Forces of the Philippines knows all too well the havoc that can result from soil erosion and flooding when there are not enough trees to lock down the land. The preventive approach of planting trees now could save lives later, officials say.

"The Department of National Defense remains steadfast in its commitment to help in the preservation of our environment," Defense Secretary Voltaire Gazmin announced in January 2012, when the department dedicated 12,000 hectares of land from military reservations to be used as part of the National Greening Program. "This will be our legacy to the succeeding generations of Filipinos."

Projects such as this illustrate innovative agricultural approaches that militaries have taken to mitigate potential security problems such as natural disasters, food shortages and insurgent recruitment. Creative problem-solving allows security forces to expand their arsenal and reveals that in some cases the best weapons can be grown.

In contrast to the Philippines' simple but effective approach to use agricultural applications to protect against natural disasters, India has taken a high-tech route to prevent climate variations such as droughts and cold snaps from affecting food security. For example, scientists with India's Defence Research & Development Organisation have genetically modified tomatoes to withstand the stress of high altitudes and water shortages. On a broader scale, researchers are engineering rice, wheat, sorghum, maize, chickpeas, pigeon peas, groundnuts, sugarcane, potatoes, mustard and cotton to better withstand stresses caused by forces of nature, according to a report by K.C. Bansal of India's National Research Centre on Plant Biotechnology.



Arkansas National Guardsmen inspect a wheat crop growing on the outskirts of Shahr-e-Safa, Afghanistan. The troops are working with local farmers to resolve agricultural issues and ensure that people don't turn to the insurgency to support themselves.

Engineering crops to survive climate complications can prevent security problems that would eventually surface from massive crop loss, officials say. Rampant malnutrition and diseases, farmer suicides and starving populations, and mass migrations of people often follow food shortages, according to the Intergovernmental Panel on Climate Change, the leading international body for assessment of climate change established by the U.N. Environment Programme and the World Meteorological Organization.

SUSTAINING SOLDIERS

In addition to preventive approaches to protect the general population, some agricultural projects aim to directly impact force sustainability. For example, Soldiers in the Democratic Republic of the Congo have formed an "Agriculture Company" to build and run a farm to provide food for the military.

"Food security for the FARDC [Armed Forces of the Democratic Republic of the Congo] has been a continuous problem — not only for the Soldiers but also for the communities around them. The FARDC are chronically underpaid and underfed due to funding shortfalls within the national government," Amanda Edgell, a program coordinator for the agricultural initiative, explained in her blog for the Norman Borlaug Institute for International Agriculture in September 2011. The institute partnered with the military to help develop the Agriculture Company at a camp outside the city of Kisangani. "After decades of conflict, the Congolese government is now working to integrate thousands of former rebels into the FARDC. While this is a sound strategy from a security standpoint, the rebel integration program also creates added strain on an already underfunded military apparatus."

To sustain the growing force, the Borlaug Institute worked with Soldiers in the Agriculture Company to teach them how to plant crops, farm fish, raise livestock and maintain farm equipment. Soldiers aspire to continually produce enough food to feed their camp.

The Armed Forces of the Philippines also aimed to benefit its troops by boosting funding through a joint venture with the Department of Agriculture in 2009. At the Kibaritan Military Reservation in Bukidnon,



Drought and low temperatures can hurt India's tomato crop, but scientists with the country's Defence Research & Development Organisation have genetically modified tomatoes to withstand the stress of high altitudes and water shortages.

the camp's commander had been allowing local farmers to use vacant land to grow crops. The joint venture converted 10,000 hectares to a rubber plantation, which continued to provide work for those farmers as well as generate money for the armed forces, the Department of Agriculture reported in August 2009.

EMPOWERING THE PEOPLE

Security forces can also pass on newly gained agricultural know-how and creative applications to civilian populations at risk for unrest. Members of the U.S. National Guard have paired with Afghan farmers over the past few years to help revive the country's agriculture sector. The guardsmen give guidance on proper soil, irrigation techniques, strategies for building, equipment maintenance and livestock health. They hope that eventually the farmers can sustain the operations on their own.

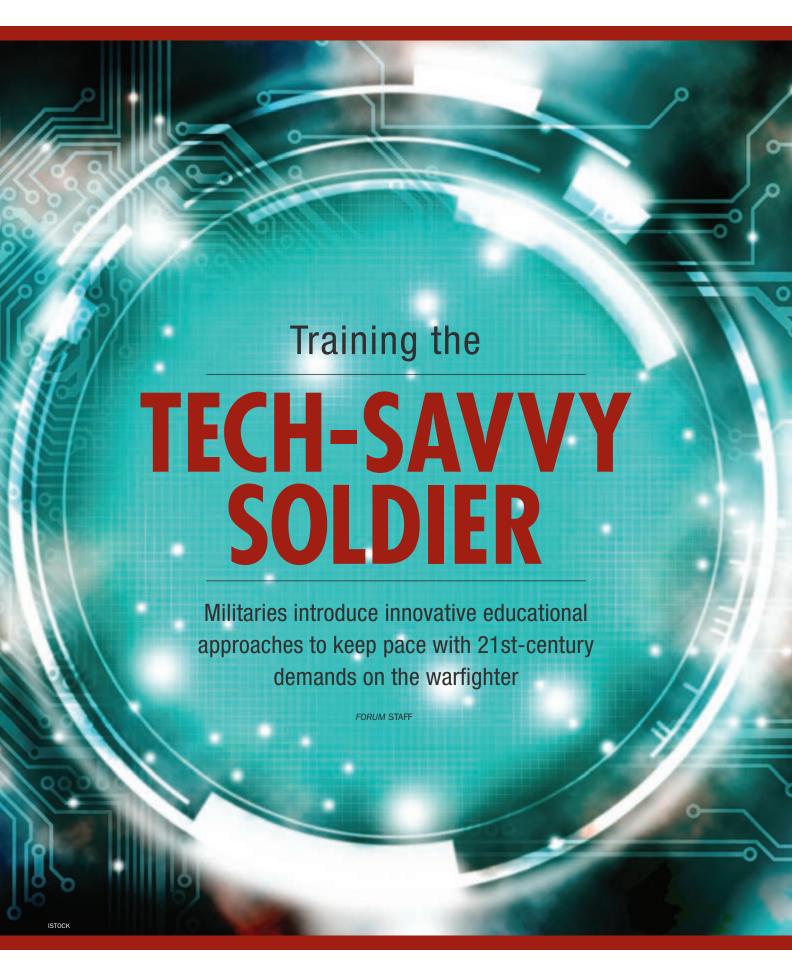
"We are giving the Afghans a choice," Col. Bill Williams told *The Atlanta Journal-Constitution* newspaper in February 2011 before his unit was deployed. "We are giving them hope. We are giving them options to choose from instead of having to turn to the insurgency to try to

support their families and die trying to do it."

In Zimbabwe, the military has partnered with Chinese businesses to help farmers who could not afford to work their land. As part of the partnership, the Chinese companies provide funding, and the farmers tend to the land in exchange for a share of the profits. The military and the state also get a cut of the proceeds, and the crops can be exported throughout the region.

"We decided that we were not just going to sit and watch from a distance. To us it was just going to be a recipe for disaster in the future," Brig. Gen. Douglas Nyikayaramba of the Zimbabwe Army told the Zimbabwe Independent newspaper in July 2011. "We wanted sufficient food to be produced in the country and a solution to ensure that we are able to feed the whole population."

For Zimbabwe and other nations around the world, agricultural endeavors such as this are as much a part of the military's duty as fighting a war. "As you are aware, a hungry nation is an angry nation," Nyikayaramba said, "and that can become a precursor for any potential conflict."



xactly when the changes occurred is difficult to say — when smartphones became less of a luxury and more of a necessity and when emails and text alerts supplanted Morse code.

Somewhere along the way, military recruits traded VHS tapes of combat strategies for streaming videos on iPads.

Meet today's Soldier: many of them are, or soon will be, digitally adept individuals who learn as fast as a Web page can download. Fewer physical confrontations on the battlefield have allowed militaries across the globe to focus more on honing recruits' critical thinking skills and to seek education to advance their military careers. Interconnectivity through the Internet and foreign military officer exchanges have also helped nations learn more about each other and embrace their similarities rather than focus on their differences.

Digital classroom

Trainees in the Singapore Armed Forces (SAF) represent the latest evolution of 21st-century military recruits. Defense officials announced in June 2012 that SAF trainees will soon learn independently and at their own pace using a digital training platform called Learnet, which Soldiers can access from laptops or tablets.

"Learnet helps me to synchronize everything," Officer Cadet Sampson Lim told AsiaOne.com. "There's an instant messaging feature. You can chat up one of the trainees simultaneously."

The platform, piloted in 2009 at four sites, houses tutorials and allows instructors to host lectures online, according to AsiaOne.com.

Singapore Defense Minister Ng Eng Hen said the platform reduces classroom time by 10 percent, while allowing Soldiers to complete 30 percent of their course work, AsiaOne.com reported.

"The demographic of the SAF serviceman is changing. We will have less of them, and therefore more will be required from each of them," the defense minister told AsiaOne.com, adding that less time spent in the classroom

means trainees can spend more time doing outdoor trainings.

Virtual exploration

"Simulation technology has traditionally been a resilient and stable market due to the essential requirement for flight simulation trainers for the world's air forces; however, technological developments in emerging submarkets have acted to spur extensive growth within a diverse range of simulation and training areas," according to "The Military Simulation and Virtual Training Market," a June 2012 report published by Visiongain, a business information provider based in the United Kingdom. "These advances have led many major nations to purchase military simulation technology, viewing it as an essential component in their military capabilities."

Visiongain estimates that the market value for military simulation and virtual training will exceed U.S. \$9 billion globally in 2012.

"The military simulation market will continue to be led by the U.S. and major European states; however, their position as leading national markets will be challenged by emerging powers in the Middle East and Asia in the years to come," according to Visiongain. "The rising economic powers of Asia will represent a strong element of the growth which will drive the military simulation market throughout the decade."

On the basis of these predictions, countries across the Asia Pacific may soon join Singapore in a quest to digitalize training new recruits.

The people's Soldier

Despite all that technology offers to advance today's Soldier, the importance of developing human relationships and of acquiring knowledge about other nations and cultures remains. That's where foreign military officer exchanges and multilateral training, such as Exercise Suman Warrior, play a key role.

In 1971, Australia, Malaysia, New Zealand, Singapore and the United Kingdom established Suman Warrior, a Five Party Defense Arrangements exercise, to enhance



A New Zealand
Army Soldier
decontaminates his
boots after spending
the day cleaning oil
off Papamoa Beach
in October 2011
as salvage workers
pumped oil from a
stricken container
ship. New Zealand
participates in a fiveparty arrangement
that allows its
military to exchange
response skills with
other nations.

working relationships among the countries' armies. More than four decades later, the exercise continues to provide an important opportunity for the countries to collaborate on humanitarian assistance and disaster relief, important issues for every country in the Asia Pacific.

"We worked closely with our partners and put into practice what we have learned," said Maj. Fairoz bin Hassan of the 7th Singapore Infantry Brigade, according to an article published on Singapore's Ministry of Defense website. "The

exercise taught our Soldiers how to work in an unfamiliar environment, and they also learned best practices from their foreign counterparts."

Lt. Col. Norsham bin Md Tap, head of the Malaysian Armed Forces delegation during Exercise Suman Warrior in late 2011, said in the Singapore Defense Ministry article that the multilateral exercise proved vital, given the vulnerability to natural disasters by many countries in the Asia Pacific.

"This HADR [humanitarian assistance and disaster relief] exercise has allowed us to come together to enhance mutual understanding and strengthen ties among the five nations," the Malaysian colonel said.

"THE RISING ECONOMIC POWERS OF ASIA WILL REPRESENT A STRONG ELEMENT OF THE GROWTH WHICH WILL DRIVE THE MILITARY SIMULATION MARKET THROUGHOUT THE DECADE."

— Visiongain, a business information provider based in the United Kingdom

A new approach to training

Critical thinking skills and the ability to act as a self-sufficient Soldier have also become routine in basic military training. Instructors are teaching Soldiers how to make those decisions when it comes to deciding to return fire on an enemy or retreat, how to evacuate civilians effectively and calmly, and



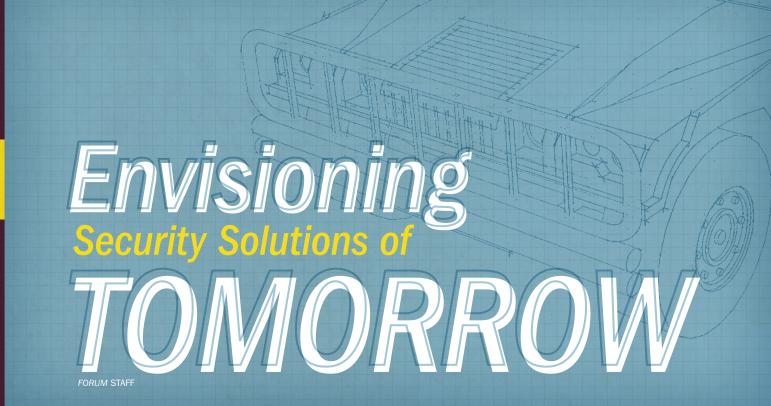
how to provide medical attention.

"You don't really just want the most physically fit or just the smartest. It's got to be a very well-rounded, intelligent, articulate individual that's going to get through this," Command Sgt. Maj. John R. Calpena of the U.S. Army's Fort Eustis training facility in Newport News, Virginia, told The Associated Press in July 2012. "Much like our basic training has changed from being a mindless basic training, really all about blind obedience, to more of teaching them to think and make decisions under stress. In the fight they're in, they can't be looking back for the sergeant to know what they're going to do when they come under fire in a marketplace. They have to make a decision, shoot or don't shoot and report. Same with our drill sergeants."

Gone are the days of a one-size-fits-all military in many respects. Recruits these days, and their trainers, understand that there's room for individuality and new ideas to emerge. For some, that paradigm shift and new training method comes with a lot less screaming and yelling.

"I really consider myself a new generation of drill instructor. I mean, unless you do something really, really out of place, I don't think there's any need to do the whole yelling and screaming," Staff Sgt. Danneit R. Disla of the 98th Reserve Division based in Rochester, New York, told The Associated Press in July 2012. "I just think if you talk to them like a person, like a man, they will act like a man, like a grown man." □

Soldiers from Australia, New Zealand, Singapore, Malaysia and the United Kingdom stand in formation during the opening ceremony at Exercise Suman Warrior in September 2011.



FORUM ILLUSTRATION

What will the future Soldier and battleground look like in the Asia Pacific?

As societies advance, the rules of engagement continue to be revised to address changing means and conditions for conducting military operations. Given that the security environment is constantly evolving, militaries and law enforcement agencies must continually adapt to counter new threats, whether in the form of natural disasters, climate change, resource competition, or electronic and cyber warfare.

Sometimes, innovation can be simple. Technology often but not always leads the way. Innovation can mean using off-the-shelf devices in novel ways. It can come in the form of improved versions of tried-and-true technologies or in the form of entirely new capabilities.

Emerging technologies and planned developments also enhance the contemporary warfighter. Advances include surveillance and cognitive technologies, manned and unmanned vehicles, communications devices and cloud computing, and pharmaceutical interventions.

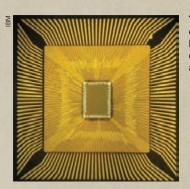
Government research labs and commercial enterprises are developing better and faster modes of transportation, such as robo boats, jet packs and exoskeletons. Militaries and security agencies are devising better tactics and strategies, such as 3-D battle planning and virtual reality training programs, as well as better weapons and defensive systems, from lasers to nonlethal weapons, such as stun guns and sonic microwaves. In the United States, the Defense Advanced Research Projects Agency (DARPA) promotes many cutting-edge notions.

Meanwhile, researchers across the Asia Pacific and around the globe continue to generate innovative military solutions. Many technologies developed for militaries have applications in the commercial world, and these technologies are coming on line every day. What was once science fantasy is becoming reality.

Shaping the Future Theater

Electronic Warfare

Whoever controls information technology and communication systems will dominate the battle space. Neural electronic architectures will function like human brains, and networked and embedded computer systems will enhance fusion, analysis and dissemination of data.



This electronic chip represents a key building block of neuromorphic architecture.

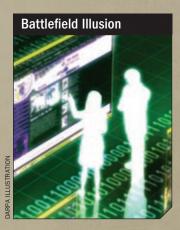
Robotic Rescuers

Robots will help save the day during natural and man-made disasters. Semiautonomous saviors will lift patients to safety, climb through rubble and secure dangerous chemical sites.

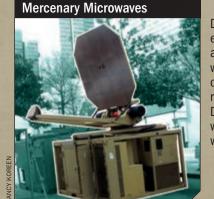


DARPA ILLUSTRATION

MORE POWERFUL NONLETHAL WEAPONS



Militaries plan to employ elaborate auditory and visual hallucinations to fool the enemy. Battle planners will use 3-D holographic displays that move in real time to map out and test combat strategies and tactics.



Devices that fry the enemy's electronic gadgets and weapons systems will be all the rage in counterterrorism. Heat rays, such as the Active Denial System 2 (pictured), will also deter invaders by warming their skin.

Focused Energy

High-powered lasers that disrupt missile guidance systems and attack enemy targets will stop ground vehicles in their tracks and redirect planes. Missile guidance systems will become increasingly accurate, although today's systems already hit within a square meter.



Sonic Defenses

Weapons that use sonic microwaves will inflict auditory pain on divers under water or cause electronic malfunctions of ships, *Wired* magazine and the BBC reported in January 2012.



Shaping the Future Warrior

MODES OF TRANSPORTATION



DARPA has been testing hypersonic vehicles such as the Falcon HTV-2

hypersonic flight will make such craft, Soldiers will fly less than an hour, moving stealth obsolete. Aboard anywhere in the world in at 20 times the speed of Someday extreme sound.

or cruise across water Individual propulsion will empower special soar through the air behind enemy lines. technologies that forces on raids et Packs AGENCE FRANCE-PRESSE

Jet pack inventor Glenn Martin shows his creation in Christchurch, New Zealand, in 2011.

Amphibious Vehicles

safely bring Soldiers

tsunami survivors.

assist flood and to any shore to

Craft that excel on

land and sea will

The Captive Air Amphibious Transporter has airfilled pontoons on a tank tread-like design.

Situational Awareness

orientation even in environments void of GPS inertial sensors will help Soldiers determine The fog of war will dissipate. Technologists that interact with sensing devices. Atomic will create 4G networks for the battlefield

Net-Zero Forces

cells, future Soldiers will power equipment and even purify water on patrol. Humvees and other vehicles will be fueled by clean

Tags and Trackers

UNMANNED DEVICES

Various tagging, tracking and locating everything from marker chemicals to micro radio transmitters that rely on devices include mini-radar and human scent to follow targets.



more than 30 kilometers without refueling. The critters can carry up to 181 kilograms

Dynamics' Legged Squad Support System

famous in the Star Wars movie series, Like the Imperial Walker robots made

robotic pack mules such as Boston

(pictured) will carry supplies on missions.





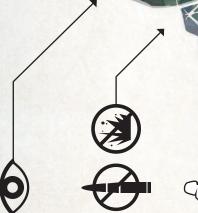
DARPA

nvisible Infantry

battlefield by constantly changing Soldiers invisible on the



power, obsoleting fuel convoys and resupply Using solar energy and next-generation fuel missions.



armor made from new composites

Enhanced and even smart body

Impervious Armor

through" space lenses to gather

Soldiers will use binoculars

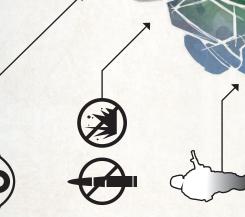
Reconnaissance

that read minds and "peer

information on any location.

and improvised explosive devices. will protect Soldiers from bullets

uniform patterns and colors. Smart materials will render



Push-Button Parachutes

cargo parachutes to exact longitudes and latitudes to deliver supplies and Tomorrow's Soldier will maneuver ammunition precisely to targets.



Contaminant-Proof

and other pathogens from the blood and Portable devices will quickly detect and remove deadly bacteria, viruses, toxins save Soldiers' lives in the battle space. Other countermeasures will instantly neutralize high doses of radiation.



Power Lifting

ГОСКНЕЕD МАВТІИ СОВР.

ease. Worldwide, defense contractors (pictured) gives Soldiers superhuman are perfecting hydraulically powered Soldiers will carry heavy loads with kilograms for tens of kilometers on the battlefield. Lockheed Martin's exoskeletons that enable wearers to lift and carry as much as 100 Human Universal Load Carrier strength and endurance.



unmanned autonomous vehicles to combat creating a flurry of devices to change the enemy submarines, technologists are From robo fish (pictured) to fleets of complexion of sea skirmishes.



FORUM ILLUSTRATION

disposable fliers that fit inside a backpack Weighing in at less than 20 grams, it can will crowd the air. For example, DARPA's nano air vehicles, personal drones and Nano Air Vehicle (pictured) can climb, Various unmanned aircraft including dive and hover like a hummingbird. send real-time video back to base.



DARPA

POWERFUL FORGE

Militaries
explore
alternative
energy
solutions

FORUM STAFF

A dog with a small generator strapped to its back wags its tail. A cord running from the dog's tail transfers the motion energy to a fuel cell battery inside the dog's backpack. On the side of the pack, a plug allows people to tap into the wagging power source. "Scratching two dogs behind the ears for 10 minutes can power a small home or office for six hours!" reads the caption on the cartoon by Andy Singer.

Although this alternative energy idea is a bit facetious, creative solutions for energy independence increase daily. Flexible solar packs that resemble stickers, portable wind turbines the size of desk fans and jet fuel derived from algae are all on the horizon as militaries look for ways to reduce their dependence on fossil fuels.

This type of independence is necessary for "sustainable security," Gregory D. Foster, a professor at the Industrial College of the Armed Forces in Washington, explained in a presentation titled "The Case for Greening the Military" at the Alternative Energy for Defense conference in June 2012. The military of the future will need to be a "self-contained, self-sufficient, full-service enterprise capable of being projected over long distances and sustained for long periods of time to deal successfully with a full range of complex emergencies," Foster argued.

SOLAR SOLUTIONS

Several countries in the Asia Pacific have put a priority on increasing their energy independence through solar power production. Australia, China, Japan and South Korea have made major investments in infrastructure. In April 2012, India celebrated the opening of its Gujarat Solar Park, touting it as the largest in Asia. The park, which spans about 1,200 hectares in the Patan district of Gujarat state, is expected to save about 900,000 metric tons of natural gas each year, *The Economic Times* newspaper reported.

Outside of major infrastructure developments aimed at tapping into the sun's power, portable solar technologies have given birth to a range of possible military applications. Global positioning systems, perimeter lighting and lithium-ion battery backpacks can all be powered by portable solar panels. Researchers at the Australian National University have developed flexible solar panels that stick to Soldiers' tents or clothing and can be used to recharge devices such as night vision goggles. The panels are thinner than a piece of paper, so they are easy to transport. "You are looking at being able to carry hundreds of watts of power generation around in a small space, so it's especially good for remote areas," Professor Andrew Blakers told The Sydney Morning Herald newspaper.

Going beyond the smaller gadgets, India announced a plan in 2011 to develop solar-powered, unmanned aerial vehicles (UAVs).



These lightweight solar panels, developed in Australia, stick to a Soldier's uniform and can be used to generate power in the field.

Opposite page: Wind turbines dot the landscape near a Japan Ground Self Defense Force base by the Sea of Japan. Across the Asia Pacific, governments have put a priority on developing alternative energy sources.

REUTERS





"Initial work is in progress for such a drone which can undertake a 15-day continuous flight over 30,000 feet," Dr. C K Prahlada, of India's Defence Research & Development Organisation, told the *Times of India* newspaper. Another solar-powered UAV being developed in the private sector is expected to be able to stay airborne for five years, the newspaper reported.

RIDING THE WIND

The sun isn't the only potential source of renewable energy. Wind farms have sprouted across the Asia Pacific as countries such as South Korea, Thailand and the Philippines develop plans to meet their energy needs. In Japan, after the devastating earthquake and tsunami created a nuclear incident in March 2011, the government has been making plans to build the world's first floating wind farm off the coast of Fukushima prefecture, according to a report from *The Epoch Times*.

Militaries have also recognized the potential power of wind. China's Commission of Science, Technology and Industry for National Defense has encouraged development in the sector, the official state news agency Xinhua reported. "China should fully exploit technological advantages in the military industry sector to upgrade its wind power sector and make wind power equipment a new economic growth point for the military industry," the commission urged in a statement in September 2007.

In recent years, the quest for wind power portability has been fulfilled, with several companies offering ways for security forces to harness the power of the wind without setting up permanent turbine farms. In late 2011, for example, Arista Power introduced a line of "micro wind turbines designed to provide battery-charging capability at remote and off-grid locations for military and other applications." One of the portable turbines weighed less than 15 pounds and could be carried in something the size of a suitcase, the company said.

GROWTH IN BIOFUELS

Although wind and solar farms are providing a steady harvest of green energy, more traditional types of farming are yielding alternative fuel sources as well. Plant products and agricultural waste have proven a possible alternative to fossil fuels, with grains, sugars, vegetable oils, animal fats, wood byproducts and even algae being processed into biofuel.

The 21 member economies of the Asia Pacific Economic Cooperation (APEC) organization have been developing the region's biofuel-production capacity. In recognition that land needed for biofuel production could compete with land needed for

Not letting energy go to waste

FORUM STAFF

Imagine a small forward operating base filled with Soldiers going about their everyday activities — eating, drinking, reading, writing, unpacking supplies, maintaining equipment. Now imagine the amount of trash they produce. Bags and bags full of waste that can't just be thrown out for security and safety reasons. Enemies could go through the trash to gather intelligence, or surrounding villagers could be injured while picking through it. So, the Soldiers have to burn the waste in the middle of the base, or the military has to pay someone to haul it away.

This is a scenario Donn Murakami, science advisor for the U.S. Office of Naval Research, is trying to avoid with the development of the Micro Auto Gasification System (MAGS), a portable machine that converts waste to energy. The system, which was first used on ships, essentially bakes waste rather than burning it. When temperatures reach about 1,000 degrees Celsius, the trash turns to gas, which can then be used for fuel, Murakami explained to *FORUM*.

"Not only are we going to get rid of our trash problem, but we are going to reuse some of that energy that we got out of that trash," Murakami said.

In addition to the gas, MAGS produces heat as a byproduct of the process. Eventually, the military aims to make use of that as well, to cook food or heat tents, for example. Another byproduct is a harmless, carbon-based ash that could be used as gardening compost. For every 100 pounds of garbage that MAGS takes in, about 5 pounds of ash is produced.

The key for military use, Murakami said, is the potential portability of MAGS, which Murakami and his team are adapting to fit into a 20-foot shipping container for easy deployment. The small-scale nature of the system could also prove useful in civilian life, particularly for remote island nations that have plenty of waste but not much room for landfills. As Murakami explained, "You could use one of these units for an office or a hospital or a school or a small community."

For now, MAGS is being tested at Camp H.M. Smith in Hawaii, but the Office of Naval Research aims to have it developed in time to roll out during Exercise Lava Viper in January 2013.



growing food, APEC has focused on the "development of marginal and underutilized lands that are poorly suited to conventional agricultural crops (due to limited water, poor soil quality and other factors) but well suited to the production of non-food biofuel feedstocks," according to a report on its website.

These biofuels can prove valuable for militaries in search of clean energy alternatives to power jets and naval ships. In February 2012, for example, the Australian government's biofuel pilot plant at Queensland University of Technology in Brisbane hosted the U.S. Navy director for operational energy, who was researching options for fueling the U.S. Navy's "Great Green Fleet" of aircraft and ships. The fleet, which is expected to be deployed in 2016, runs on a blend of traditional petroleum and biofuel that does not require modifications to engines.

FUEL CELLS AND HYBRIDS

For troops on the ground, hybrid electric and hydrogen fuel cell vehicles have emerged as popular alternatives to traditional gasoline-powered ones. South Korea has been building a combat hybrid electric vehicle that will increase





its military's efficiency and energy independence. With the country's rugged terrain and lurking threat from the North, researchers are designing the vehicle to handle mountainous landscapes and operate silently for short distances, retired Col. Jong Soo Kim, vice president of South Korea's Agency for Defense Development, explained at the Pacific Operational Science and Technology Conference in March 2012.

U.S. Army Pacific (USARPAC) has also debuted a fleet of 16 vehicles that rely on fuel cell technology. The fuel cells, which create electricity to power vehicles through a chemical reaction, do not produce harmful emissions and are run on a renewable resource, hydrogen. "These fuel cell vehicles will help move the U.S. Army in the Pacific toward a sustainable path that reduces energy security challenges and strengthens our energy independence," Lt. Gen. Francis J. Wiercinski, commander of USARPAC, explained at the unveiling ceremony in Hawaii in February 2012.

AN ONGOING ENDEAVOR

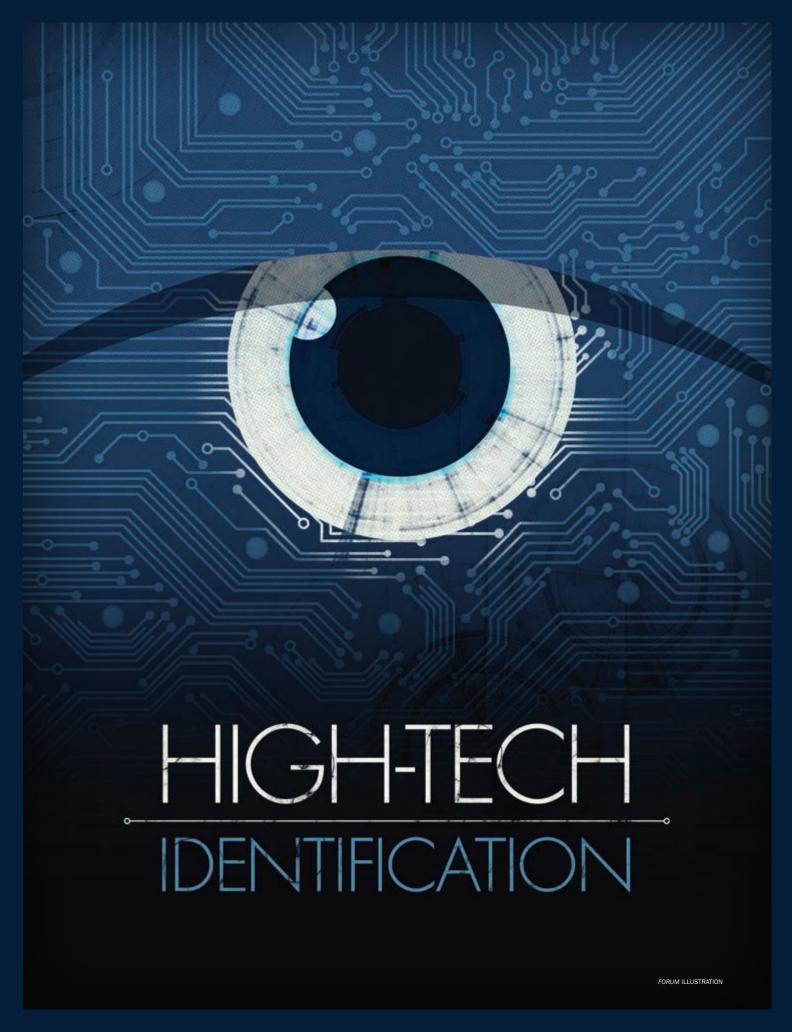
The more than 40-year-old quest for energy independence and sustainable

security marches on. Globally, military investments in renewably energy are expected to hit U.S. \$26.8 billion by 2030, compared with U.S. \$1.8 billion in 2010, according to Pike Research, a consulting firm that specializes in global clean technology markets. These investments are expected to serve "both as a means of improving energy independence as well as for purposes of increasing the efficiency and performance of all aspects of operations across multiple domains, including base and facility operations, transport, and portable Soldier power," Pike reported.

These advances are expected to hold great potential for applications in the civilian world, as well. "Military investment in renewable energy and related technologies, in many cases, holds the potential to bridge the 'valley of death' that lies between research and development and full commercialization of these technologies," explained Clint Wheelock, president of Pike Research. "As such, the myriad of military initiatives focused on fostering clean tech is anticipated to have a substantial impact on the development of the industry as a whole."

- 1. Biofuel is pumped into a car outside Kuala Lumpur, Malaysia. In addition to powering ground vehicles, fuels made from biomass such as algae or sugars have been used to power military jets and ships.
- 2. Lines of solar panels stand at attention at Nellis Air Force Base in the United States. Militaries around the world have tapped alternative energy sources as they strive to be more energy independent.
- 3. Wind turbines tower over part of the Great Wall of China. The country's growing demand for energy has pushed it to explore renewable alternatives, experts say.

REUTERS



BIOMETRIC SCREENINGS ARE SECURING EVERYTHING FROM AMUSEMENT PARKS TO BATTLEFIELDS AND STOPPING BAD GUYS AT THE BORDER

FORUM STAFF

hen citizens of the African nation of Gabon head to the polls for their 2013 local elections, they won't need to carry identification. Instead, they will wait a few seconds while hand-held computers scan their fingerprints and facial features. Similarly, many Japanese bank customers will no longer need to carry cash cards or passbooks. Pressing their palms against the screens of the latest automated teller machines will release their cash. By 2014, an estimated 500 million people in India who lack legal credentials — nearly half the population — will be able to receive state and federal funds and benefits with practically a blink of an eye, or flash of an iris, that is.

India is building the largest biometric ID database in the world and at a rapid pace. More than 200 million of its 1.2 billion citizens had volunteered their 10 fingerprints, two iris images and photos as of February 2012. When completed, the database will enable the government to crack down on fraud and graft by increasing accountability in federal and state programs that deliver resources to people in need. Besides creating convenience and efficiencies, the database "makes the system much more transparent because the UID [unique identification] ensures that only the intended beneficiary gets the money, and the whole system can easily be monitored," Rajesh Bansal, assistant director general of the Unique Identification Authority of India, told the BBC in February 2012.

Iris imaging and biometric passports are no longer the province of science fiction. In recent years, technologies that track and match standardized measures of physical and behavioral features, such as blood vessels in the palm or the gait of a person's walk, have not only become more pervasive but highly accurate. Although Malaysia became the first country to issue biometric passports in 1998, other countries lagged behind. Now many nations are catching up. Private and public security professionals are using such devices worldwide at airports, border crossings, business headquarters, theme parks and elsewhere to protect everything from financial resources to the integrity of elections.

Tracking terrorists

Biometric identifiers have become increasingly powerful in countering extremists in particular. Law enforcement and military professionals are successfully using these scanning devices to track and catch criminals and terrorists. U.S. Soldiers, for example, used a portable biometric tool kit as well as DNA analysis to identify Osama bin Laden in his Pakistani hideout in May 2011.

A month earlier in April 2011, Afghan security forces rounded up scores of fugitives, including Taliban fighters and commanders, who just days before had escaped from the massive Sarposa Prison in Kandahar province. More than 485 prisoners crawled through a kilometer-long tunnel dug by Taliban operatives and equipped with battery-powered lights and air pipes. How could officials be certain they had recaptured the right renegades? A month before the breakout, the Afghan government recorded the prisoners' biometric data, the International Security Assistance Force reported. The troops even captured one of the fugitives while he was seeking to enroll at a recruiting station for Afghan security forces.



STAMPING OUT PASSPORT FRAUD FORUM STAFF

ake IDs are critical weapons in a terrorist's arsenal. Biometrics are also improving detection of fraudulent passports and other identification documents, further restricting the movement of insurgents. "The number one risk confronting airlines and countries around the world is the risk terrorists or other dangerous persons will carry a fraudulent identity document and move from one country to another," Ron Noble, the secretary-general of Interpol, told *The Telegraph* newspaper in June 2011.

To help render such forgeries obsolete, more countries are upgrading their travel documents with biometric indicators. The European Union requires its 27 member countries to issue second-generation biometric passports with data stored on radio-frequency identification (RFID) chips. Meanwhile, the United States requires foreign nationals to show biometric passports and submit to a fingerprint check before entering the country.

The list of countries now issuing biometric passports

continues to grow. Australia and New Zealand introduced biometric passports in 2004; Japan and Singapore launched them in 2006. India started using them in 2008, and the Philippines began using them in 2009. Brazil began issuing passports with RFID chips in November 2010. In January 2011, Mexican President Felipe Calderón signed an order requiring citizens age 17 and younger to get a national identity card with biometric information embedded, including an iris scan. Indonesia also launched its e-passport program in January 2011, as did China.

International cooperation and advancing technologies are also enhancing nations' capabilities to share information through Interpol's lost and stolen passport database and through databases pinpointing terror suspects. Much work remains, however, to build these database systems and forge reciprocal relationships to share biometric and travel-related information in order to curtail travel of known or suspected terrorists, experts purport.



The use of biometric data denies freedom of movement for insurgents and prevents Taliban agents from infiltrating the Army, NATO Training Mission-Afghanistan commander Lt. Gen. William Caldwell told *Wired* magazine in September 2010. The capability "allows the Afghans to thoroughly screen applicants and recruits for any potential negative past history or criminal links, while at the same time it provides an additional measure of security at checkpoints and major facilities to prevent possible entrance and access by malign actors in Afghanistan," he explained.

During the Iraq War, coalition forces first used biometric data to secure the peace after the intense battle of Fallujah, 40 miles west of Baghdad, in November 2004. Once U.S., Iraqi and British forces wrested control of the city from insurgents, perimeter guards allowed only residents with a biometric identification badge to return to Fallujah. The guards also compiled a biometric database that allowed them to look for patterns. Combined with capabilities of military forensics labs to study fingerprints found on improvised explosive devices (IEDs) and weapons, the archived data became a powerful tool.

KEY STEPS IN BUILDING CAPACITY TO PREVENT TERRORIST TRAVEL

- Share information about known and suspected terrorists through international databases.
- Address the use of fraudulent travel documents by increasing penalties and improving detection.
- Upgrade passport security by replacing easily counterfeited documents with ones that meet international standards and include biometric information.
- 4. Combat corruption in passport issuance and immigration agencies.

Source: U.S. Government Accountability Office

BIOMETRIC DATA "IS VIRTUALLY IRREFUTABLE AND GENERALLY IS VERY HELPFUL IN IDENTIFYING WHO WAS RESPONSIBLE FOR A PARTICULAR DEVICE IN A PARTICULAR ATTACK, ENABLING SUBSEQUENT TARGETING."

- Gen. David Petraeus

Since Fallujah, multinational forces have applied biometric screening across Iraq and Afghanistan to aid in force protection, counterterrorism, and fraud and corruption prevention. Registering biometric data also helps hold recruits accountable for their actions, which is vital to winning the trust of the people, military experts contend.

FINDING FOES

Biometric data is "virtually irrefutable and generally is very helpful in identifying who was responsible for a particular device in a particular attack, enabling subsequent targeting," now retired Gen. David Petraus told The New York Times newspaper in July 2011. He backed the expansion of biometric data collection when he became commanding general of Multi-National Force-Iraq in 2007 and in Afghanistan as commander of the International Security Assistance Force and U.S. Forces Afghanistan. Databases operated by American, NATO and local forces contain

TYPES OF PASSPORT FRAUD

- Counterfeit passport created by a vendor
- Passport with altered photo (photosubbed passport)
- · Blank passport stolen and filled in
- Genuine passport intentionally issued in a false identity by a government
- Genuine passport issued based on fraudulent identification documents (birth certificate, driver's license, etc.)

Source: Stratfor

biometric information on several million Afghans and Iraqis, various news agencies reported in April 2011. U.S. Soldiers and the Afghan government have collected such data on more than 2.5 million Afghans, *The Economist* magazine reported in July 2012.

By February 2011, a court had convicted the first terrorist on the basis of biometric evidence collected by patrol officers in Afghanistan. "We had at least one guy convicted and put in jail. We used concrete evidence linking him to a string of IED placements," James Davis, a law enforcement officer with Route Clearance Patrol 38 in Afghanistan, told the Combined Joint Task Force 101.

Natullah Asidullah, an Afghan anti-terrorism police officer with Route Clearance Patrol 38, conducted searches and obtained biometric samples during a 2011 mission. "I have learned the concept of [biometrics] and how to do it correctly," Asidullah said. "The tactical movements the U.S. Army taught me were especially valuable to me."

Counterterrorism forces also use biometric scans for forensic applications. Soldiers successfully identified a suicide bomber who destroyed a Kabul restaurant near Qargha Lake on June 21, 2012, by comparing his fingerprints with those in the database, *The Economist* magazine reported in July 2012. Biometric scans can be collected up to six hours after death, according to the report.

SCANNING FAST AND FURIOUS

Each day, biometric databases grow to include more criminals, terrorists and insurgents, allowing security forces to better identify and confront the enemy, whether at the bank, the border or on the battlefield. Biometric data are also being compiled to identify military personnel for security and for forensic purposes if Soldiers are captured or killed.

Some experts warn, however, that biometrics databases themselves are vulnerable to access by criminals or even corrupt officials. "There is precedence for identification systems being used



AFP/GETTY IMAGE

in very bad ways," Jim Harper of the Cato Institute told Homeland Security Newswire in August 2010. For example, identification cards issued in Rwanda that included tribal affiliations contributed to the deaths of Tutsis and moderate Hutus during the 1994 genocide, he said. Implementing encryption and data-access standards could mitigate such concerns.

Although the potential for malevolent use accompanies every new technology, other experts contend that on the battlefields of Iraq and Afghanistan, the benefits so far have outweighed the possible risks. In the combathardened trenches, biometrics have helped reduce IED casualties, improve security forces

and recapture prisoners, they maintain.

Perhaps some of the strongest evidence of their success is revealed in a tragic event, the June 2012 attack by a suicide bomber on a biometric screening post in Khost, Afghanistan, which killed 16 civilians and three members of the NATO-led International Security Assistance Force and wounded 30 others, including women and children. The nature of the attack not only exemplified a new, desperate breed of asymmetric warfare but revealed that insurgents may perceive biometric technologies to be working — and well enough to present a serious threat to their malicious enterprises. \Box

With reporting by Ágora magazine staff.

Travelers have their biometric passports checked against a new face recognition system at the Amsterdam Airport Schiphol in March 2012.

BIOMETRIC MODALITIES

FORUM STAFF

Regardless of maturity, certain modalities work better than others, depending on location, risk, circumstances and tasks involved in the implementation. In many applications, several modalities work better than others, depending on location, risk, circumstances and tasks involved in the implementation. In many applications, several modalities work better than others, depending on location, risk, circumstances and tasks involved in the implementation. In many applications, several modalities work better in tandem. Standardized biometric passports, for example, use facial, iris and fingerprint recognition. Here's an overview of some of the most commonly used approaches.



VOICE RECOGNITION

Different from speech recognition, the voice modality relies on unique aspects stemming from the physical structure of an individual's vocal tract such as quality and pitch as well as the motion of his mouth and pronunciations.



FINGERPRINT RECOGNITION

Weighing in at roughly a kilogram, hand-held devices with faster processing speeds have brought the old technique of fingerprint matching into new territory. Widespread use of the portable scanners has made building the biometric database easier, and with advanced software, scans can take mere seconds and finding matches mere minutes. Matches for many commercial systems that use only one finger take less than a second.

HAND GEOMETRY

Images of the top and side of the hand are used to compare measurements of the digits with existing data. Because hand geometry is not highly unique, this application works best as a secondary method for verification.

PALM PRINT RECOGNITION

This method traces back to Sir William
Herschel's work for the Civil Service of India
in 1858 when he systematically used inked
handprints for identification purposes to
distinguish employees on payday. Contemporary
methods use handprints much like fingerprint
recognition capabilities.



FACE RECOGNITION

This modality, which uses sophisticated mathematical representations and matching processes, is helping to stop passport fraud, find missing and trafficked children, close borders and more.

FACIAL THERMOGRAPHY

Sweat much? This technique measures how heat dissipates off an individual's face.

IRIS RECOGNITION



The technology takes an illuminated picture of the colored portion of the eye, usually using near-infrared light, and matches patterns in the iris. Scientists first realized in 1987 that an individual's irises are unique despite that the coloration is genetically linked. Even identical twins have distinct iris patterns and structures.

RETINA RECOGNITION

This approach snaps an image of the back of the eye to compare blood vessel patterns with data on file.

VASCULAR PATTERN RECOGNITION



Japanese researchers first contemplated bouncing near-infrared light off blood vessels in the early 1990s. Vascular patterns are specific to individuals and static throughout life. They don't change as people age.

GAIT ANALYSIS

This method relies on the way an individual moves. Humans intuitively use the technique to recognize people they know.

DYNAMIC SIGNATURE



Devices measure the speed and pressure an individual uses when signing his name and not the appearance of his writing.

KEYSTROKE DYNAMICS

This method analyzes the typing patterns of an individual.





FORUM STAFF
PHOTOS BY AFP/GETTY IMAGES

MILITARIES ACROSS THE ASIA PACIFIC TRUST DOGS AND HORSES — EVEN CAMELS — TO HANDLE IMPORTANT JOBS

Aggressive. Smart. Loyal. Athletic. Military recruiters consider these highly desirable traits for any new enlistee — including ones with four legs.

"We expect so much of them that we need them to be strong and athletic," U.S. Army Col. David Rolfe, director of the U.S. Defense Department's Military Working Dog Program, told American Forces Press Service. "We want a high-strung dog with aggressive tendencies because that's what the mission demands."

Whether during times of war or times of peace, military dogs have proven invaluable to Soldiers by exhibiting bravery and natural instincts to complete a mission where human emotions or fear may have resulted in a Soldier's hesitation or inability to act.

Troops also say the sheer presence of a dog sometimes calms a potentially hostile situation.

"We are hoping that it [a dog] serves as a psychological deterrent," said Staff Sgt. Kyle Stout, a 36th Security Forces military dog handler in Guam. "If we did have to release our dogs in a real-world situation, we're talking about 900 kilograms to 1,800 kilograms per square meter of pressure. The dog will bite and hold, and it will crush the entire bone in their arm."

Aside from the dogs' capabilities in apprehension, the military uses the dogs' keen sense of smell to improve war-fighting capability.

"A dog's nose can recognize a chocolate chip cookie, but it can also recognize all the ingredients of the cookie and single in on one ingredient," Stout said. "Putting the dog around explosive ordnance is how they are trained."







Philippine Soldiers march with their dogs during the celebration of the 112th anniversary of the proclamation of Philippine independence.
 Mounted Soldiers attend the 78th Army Day parade in Kuala Lumpur, Malaysia.
 A highly trained combat dog runs with its handler in Bangalore, India. The dog, along with others trained at the Central Police Reserve Force's dog breeding and training school, is capable of taking remote orders over wired communication, biting and disarming a terrorist, and sniffing out narcotics or explosives.



Dogs in Stout's unit train and work with their handlers for 12 to 14 hours a day. A dog may be partnered with a handler for years, depending on the circumstances and the length of their tours.

"The training process all depends on the handler and the dog and the motivation that you have to get the training done," said Staff Sgt. Tina Stelly, a military dog handler with the 36th Security Forces. "Some dogs learn quicker than others. Some, you're going to have to work with. A lot of times, it's definitely worth it."

China's military estimates it has more than 10,000 dogs serving its armed forces in peacekeeping missions, search and rescue, and border patrol, the Indo Asian News Service (IANS) reported in December 2011.



DOGS IN STOUT'S UNIT TRAIN AND WORK WITH THEIR HANDLERS FOR





From left: Indonesian anti-terror Army special forces K-9 unit take part in a counterterrorism drill in Jakarta. | A dog jumps through a ring of fire during a National Cadet Corps commissioning ceremony in the Sri Lankan central town of Kandy.



hundreds of cases," said Wang Han, an official with a Beijing-based war dog breeding and training center, according to IANS. "They have been playing a key role in the Army that could not be replaced by modern technology or human efforts."

Not to be outdone by man's best friend's role on and off the battlefield, horses also have a rich military history. A warrior's love affair with the noble steed can be traced back to ancient Greeks, who used horses to pull their chariots into battle. While the horse may play less of a practical role today than the dog, military officials around the world still don their formal uniforms and trot through the streets on horses during festive celebrations.

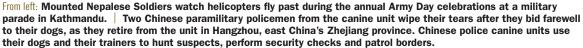


IN THE PAST, OUR MILITARY WORKING DOGS HAVE HELPED SOLVE **hundreds** OF CASES. "



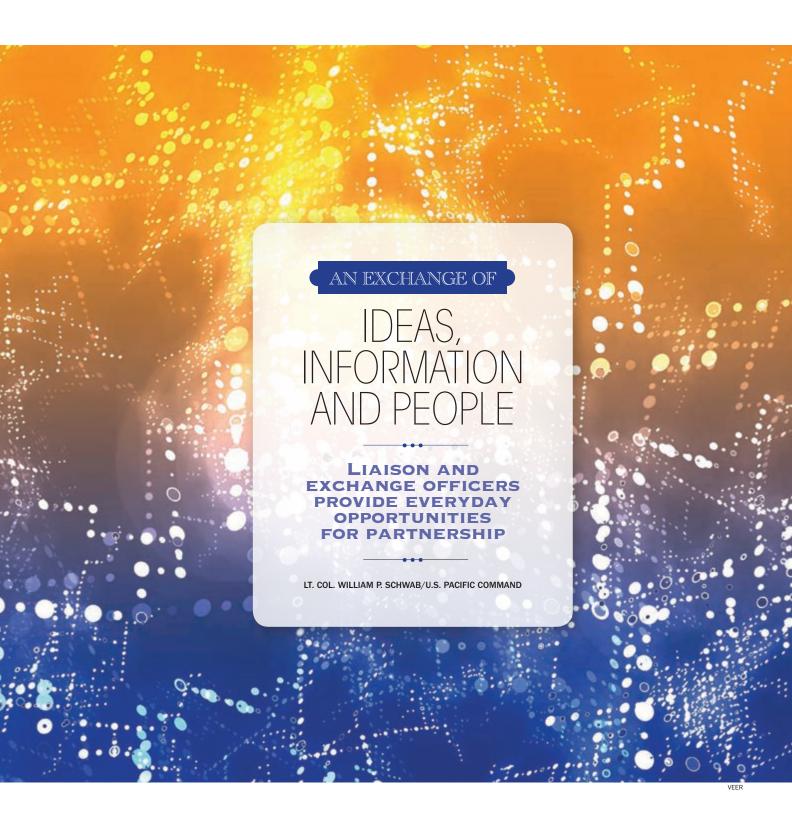
WANG HAN, an official with a Beijing-based war dog breeding and training center





Beyond the pomp and circumstance, elephants that have less practical roles in the military today have been instrumental in battlefield strategies. Elephants, for example, helped troops gain access to areas hard to reach by vehicles. Camels were much preferred over horses to traverse mountainous regions and sandy regions, particularly given their lesser reliance on water. Even mules and oxen proved useful to militaries, given the animals' ability to carry heavy equipment through difficult terrain. \square

This story contains reporting by Airman 1st Class Marianique Santos, 36th Wing Public Affairs, U.S. Pacific Command.





Global partnerships can be built one interaction at a time. At U.S. Pacific Command (PACOM) headquarters in Hawaii, officers from various partner nations prove this daily.

Staff and visitors at PACOM, for example, may find themselves directed to a Canadian Army officer when inquiring about the U.S. response to a natural disaster in the Asia-Pacific region. Similarly, questions about force posturing on the Indian Ocean island of Diego Garcia may be answered by a British Naval officer. A New Zealand Army major may be the contact for those looking to understand how the U.S. shares information with allies and partners. Meanwhile, an Australian may lead a team on the defense plan for an influenza pandemic.

Liaison, exchange and embedded foreign (non-U.S.) officers play a crucial role in the PACOM staff. The command relies on these foreign officers and partner nations to share expertise with PACOM staff.

Canadian Lt. Col. Jim Follwell has proven invaluable as the contact for PACOM's disaster response team. He wrote Canada's disaster response plan and led that nation's response to the Haiti earthquake in 2010. "I was also part of a team of Canadian government first responders [who] would conduct an assessment on the ground and validate any military response — everything from the size of force needed to where they will sleep and how long they will be there," he explained. Although Follwell reports to the Canadian Defence Headquarters, the expertise he shares with his colleagues at PACOM improves

the humanitarian assistance efforts of multiple nations.

In addition to sharing expertise, these officers help facilitate understanding of the nations they represent. United Kingdom Cmdr. Steven Waller R.N. sees his role as balancing PACOM endeavors, answering questions on the



Naval liaison officers from Malaysia and Thailand coordinate efforts aboard the amphibious dock landing ship USS Harpers Ferry during an intercept exercise.

U.K. footprint throughout the region, and providing reports to the U.K. to analyze and assist with coordinating PACOM activities. "I liaise and am the point of contact for all U.K. issues," he said. "I cover any issue across the command and have links back to the European Union as well as the U.K."

Liaison versus exchange officers

There are two types of foreign officers embedded with U.S. military staffs: exchange and liaison officers. Exchange officers are a one-for-one exchange between the U.S. and another nation. For example, the U.S. sends an officer to Australia, and Australia sends an officer



Two Indian liaison officers — Navy Cmdr. Ajay Daniel Theophilus, left, and Lt. Cmdr. Madhavdas Ravikant, center — work with U.S. Lt. Dan Mitzner, right, during an exercise aboard the aircraft carrier USS Carl Vinson in April 2012.

to the U.S. The exchange officer works for the foreign headquarters, just as if he or she were a member of that nation's military.

A liaison officer is not a billet exchange and is not reciprocated. The liaison officer continues to work for and report to the nation of origin. He or she does not have a

contributing role or duties on the staff to which he or she is assigned. However, the liaison officers are still of great value to the U.S. and to the specific headquarters to which they are assigned.

"Our Japan and Korea [liaisons] here at PACOM play an important role," said Lt. Col. Cory Hanna of the U.S. Air Force. "They provide a conduit back into their joint staffs, which can smooth the bureaucratic challenges that come from working within a bilateral and multilateral construct. They assist with VIP visits from their respective nations, usually when we're stretched thin working other supporting issues for the events and supporting our leadership. They also provide valuable insight into their countries' unique cultural background and policymaking mechanisms."

A vital role

As valuable as these officers are at the PACOM headquarters in Hawaii, they can be equally vital in the field. After the devastating earthquake and tsunami in March 2011, Japanese liaison officers were invited aboard the USS Essex to help the 31st Marine Expeditionary Unit (MEU) with disaster relief efforts. The three liaison officers helped translate information requests and coordinate relief efforts between the U.S. and the Japan Self Defense Force (JSDF).

"When I arrived here, I found that the 31st MEU was focusing on Oshima Island," Capt. Masanori Ide, one of the Japanese liaison officers, told U.S. Lance Cpl. Garry J. Welch in a 2011 interview. "There were so many things that needed to happen, and it was my job to coordinate them. I sent a lot of information to the JSDF headquarters that was needed to make the operation happen.

"Because of the efforts of the MEU, we got power trucks to the island," Ide said. "No one else could do that. The entire island had been without power for 16 days, and the MEU got it turned back on in one night,

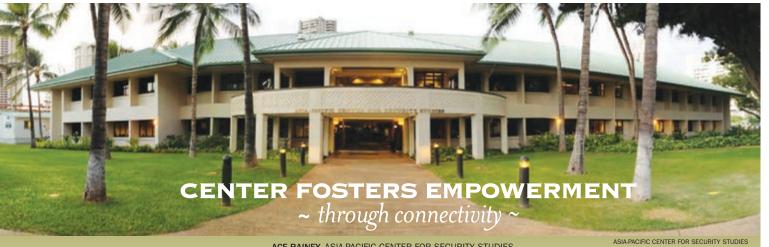
which gave the people light and heat."

Whether easing communications amid a disaster or sharing lessons learned from previous experiences, liaison and exchange officers foster a type of international partnership that grows stronger with each interaction. Their ongoing work shows how day-to-day cooperative efforts help build long-term relationships. \square

Lt. Col. William P. Schwab is Oceania branch chief and country director for New Zealand, Papua New Guinea, Tonga and Fiji in the South Asia and Oceania Policy Division of PACOM. This article includes information from the U.S. 7th Fleet's website.

A DETAILED ARRANGEMENT

Exchange and liaison officer partnerships follow the guidance of an international memorandum of agreement (MOA), which outlines the duties and responsibilities of officers from both nations. The MOA is often viewed as a significant pact between the nations. In considering an MOA, both nations weigh the benefits of such a partnership. An MOA frequently can only be approved at a government's highest levels. The process can take months or even years.



ACE RAINEY, ASIA-PACIFIC CENTER FOR SECURITY STUDIES

he Asia-Pacific Center for Security Studies (APCSS) has a specific mission: to build capacities and communities of interest by educating, connecting and empowering security practitioners to advance security throughout the Asia-Pacific region. To meet its goal, the center brings together military and civilian representatives to exchange ideas, create solutions and return to their

APCSS plays a key role in the Asia Pacific by addressing transnational security issues at the strategic level. Located in Honolulu, Hawaii, the center invites military and civilian representatives to participate in education in Hawaii. Faculty also travel across the Asia Pacific and U.S. to facilitate programs.

jobs having built personal relationships and established new resource links.

To date, the APCSS has connected more than 6,200 alumni. Among them is Ung Eang, undersecretary of state for counterterrorism in Cambodia.

"I learned a lot from the first course I attended at APCSS and

the networking from it, and I used my knowledge to set up exercises very successfully," said Eang, who attended the APCSS Advanced Security Cooperation Course. "After my first time here, we held our own exercise. We invited the defense attaché office from the American Embassy to be the observers and held a joint exercise with Japanese agencies as well. So, during my time away, I was very successful because I contributed my knowledge from the courses here to exercise planning for the national terrorism committee, and it went very well."

In 2012, APCSS continued holding workshops in Hawaii and across the Asia-Pacific region. Seeking to establish a series of focused security discussions with India, the center successfully partnered with the Observer Research Foundation in Delhi to co-host a three-day workshop in Mumbai in February 2012. The workshop, "Exploring India-U.S. Cooperation: Safeguarding Prosperity in the Indian Ocean," brought together experts from the United States and India to discuss themes related to the maritime domain of the wider Indo-Pacific region.

"This workshop helped to build a shared understanding of opportunities in the Indian Ocean across a far-flung maritime community," said APCSS Professor Kerry Nankivell, the workshop lead.

Throughout 2012, the U.S. Pacific Command's (PACOM) interests in global security and stability across

the Asia Pacific continued to grow. One integral way PACOM manages these tasks is through the positive relationships among security practitioners around the region that are built at the Asia-Pacific Center for Security Studies.

A U.S. Department of Defense venue for bilateral and multilateral research, communication and exchange of ideas, APCSS plays a key role in the Asia Pacific by addressing transnational security issues at the strategic level. In December 2011, 24 senior-ranking military and civilian representatives from 21 countries and one international organization took part in the Transnational Security Cooperation Course. During the course, fellows learned about the impact of current and future change in the region, shared perspectives and further identified cooperative approaches to transnational security issues of common concern.

"I'm fortunate to be going through the course for the second time," said Lt. Gen. Thomas Conant, deputy commander of PACOM. "It was a tremendous benefit to go out into the AOR [area of responsibility] and meet our partner nations and run into our fellows and our alumni and our partnerships that we made in class. It's extremely important. And you meet the best and brightest here from our partner nations. It's very impressive."

In January 2012, APCSS welcomed retired U.S. Air Force Lt. Gen. Dan Leaf as its new director. A former PACOM deputy commander, Leaf said that he "developed great respect for the mission and the people of the center during my time at PACOM. The focus on the Pacific region is growing; the APCSS team provides national security outreach and education that significantly enhances peace and stability in the region."

In addition to educating and empowering the growing number of alumni, the center has joined with its four other counterpart regional centers for security studies in upgrading their alumni portals. APCSSLink, which resides on the GlobalNET platform, is a secure, trusted and collaborative resource managed by the Defense Security Cooperation Agency. Through this improved virtual community, APCSS connects its alumni with access to focused resources, research and people to advance their professional and personal goals for security cooperation. □



MOUNTING A ROBUST

MISSILE DEFENSE

IN THE PACIFIC

Emerging technologies, coordination and mutual support in theater provide protection

MAJ. MICHAEL LINDER/U.S. AIR FORCE

of a ballistic missile from North Korea in April 2012, the U.S. military presence in the Asia

Pacific is of renewed importance to security in the region. This defensive posture in the Pacific rests on the capability to defend U.S. and allied facilities from air-breathing and ballistic missile threats. This capability relies on excellent coordination among service components and allies, fielded defensive systems and new systems becoming available. This foundation, combined with mutual support across

all the available defense forces in this theater,

provides a shield of protection readily available to

maintain the safety of U.S. and allied personnel.

ith the provocative failed launch

Cooperation on air and missile defense in the Pacific has achieved many milestones in recent years. The recently executed command post exercise Keen Edge stands as a leading example. Completed at the end of January 2012, Keen Edge was mainly focused on the overall interoperability of U.S. military forces and the Japan Self Defense Force. However, much of the training centered on coordination of joint missile defense. This exercise gave forces from both nations the opportunity to address and overcome challenges that arise when operations are integrated between two nations. U.S. staff forces worked with various Japanese staff agencies such as the Japan Joint Staff, ground, air, maritime and intelligence offices.

"The U.S.-Japan cooperation is not just a slogan or an image," a Japan Self Defense Force

member participating in the exercise told *Stripes Kanto*, a weekly newsletter, in February 2012. "Each participant understands the importance of the exercise. Although there are more challenges to overcome, as true *tomodachi* (friends), this type of exercise allows us to work on [the challenges] together with the U.S. military," the Japanese Soldier told *Stripes Kanto*. This realistic training environment produced a better coordinated joint force able to synchronize command and control of the many air and missile defense forces in the Western Pacific, participants said.

Cooperation and integration between the U.S. and Republic of Korea (ROK) also advance air and missile defense in the region. The U.S. and the ROK militaries exercise regularly, from live-fire artillery exercises to large combined force readiness exercises such as Key Resolve, an annual joint and combined command post exercise, and Foal Eagle, a field exercise held in conjunction with Key Resolve. These exercises demonstrate commitment between the ROK and the U.S. to the security of the region and the resolve to enhance the readiness of both nations' militaries. "The ROK-U.S. alliance is the strongest military alliance in the world, built on a foundation of more than 60 years of service and sacrifice," said Lt. Gen. John D. Johnson, 8th Army commanding general, in March 2011 at the end of Exercise Key Resolve in South Korea, according to the www.army.mil website. "And exercises like Key Resolve and Foal Eagle only make this alliance stronger."

A missile is launched toward a target on October 5, 2011, during a test of the Terminal High Altitude Area Defense system at the Pacific Missile Range Facility on Kauai, Hawaii.



Gen. Jung Seung-Jo, chairman of the Republic of Korea Joint Chiefs of Staff, right, and Cmdr. Justin A. Kubu, commanding officer of the guided-missile destroyer USS Chafee, discuss exercise Foal Eagle 2012 aboard Chafee.

ENSIGN MELISSA PELOSI/U.S. NAVY

Demonstrated interoperability between forces at exercises such as these builds a stronger coordinated defensive posture, including the now re-emphasized air and missile defense on the Korean peninsula. The ROK is upgrading its organic air and missile defense capabilities with systems such as the newly announced cruise missile program. However, through their alliance with the United States, they are just one component of a larger regional defense construct.

A host of sensors, intercept aircraft and surface-to-air missile systems such as the Patriot make up the integrated network of air and missile defense forces in the Pacific. Though other ballistic missile intercept systems are available or becoming available, the Patriot units along with the U.S. Navy's Aegis cruisers represent the face of today's ballistic missile deterrent.

In December 2011, Maj. Gen. Jim Rogers, commander of the Aviation and Missile Command, traveled to the Pacific to visit aviation and defense artillery units. In South Korea, his team spent time with members of the 8th Army, 19th Expeditionary Sustainment Command, 2nd Combat Aviation Brigade, 35th Air Defense Artillery Brigade and the 6-52 Air Defense Artillery Battalion, the www.army.mil website reported in December 2011. After Korea, the team traveled to Okinawa, Japan, to meet with personnel from the 1-1 Air Defense Artillery. These visits highlight the desire of U.S. military leadership to keep a robust, mobile and current defensive posture.

Keeping a current defensive posture also entails making new technology available to the forces in theater, and great strides in this area have been made. Consider the recent success with the Terminal High Altitude Area Defense (THAAD) missile

system. On October 5, 2011, from their deployed location in Hawaii, members of the 4th Air Defense Artillery Regiment successfully executed a THAAD test designated FTT12. With the successful intercept of a sea-launched ballistic missile, this test represents the ninth in a string of 100 percent successful intercepts since 2005. "It was, by far, THAAD's most challenging flight test to date and demonstrates the system's advanced capabilities," Tom McGrath, THAAD vice president and program manager at the prime system contractor Lockheed Martin, told The Huntsville Times newspaper in October 2011. According to Lockheed Martin, the Soldiers operating THAAD didn't know the day or time of the test in advance. The crews were alerted to their posts and operated the weaponry in time to make a positive real-world intercept, according to The Huntsville Times' account.

Using U.S. Air Force mobility aircraft, this highly mobile, incredibly accurate missile defense system can be quickly moved anywhere in the world as required, and represents one of the newest arms of U.S. Pacific Command's air and missile defense structure.

As the United States refocuses attention on the Asia Pacific, the capability of the U.S. and its partners to protect allied facilities in the region from air-breathing and ballistic missile threats becomes paramount. The U.S. air and missile defense structure is already robust and well-positioned to achieve this mission with superior command and control coordination across a joint and multilateral domain. Increased resources devoted to U.S. Pacific Command, as well as emerging technologies, will certainly prepare this region for any future adversarial force.



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Asia Pacific Defense FORUM caters to military and security personnel in the 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.

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India's DECADEOF NOVATION

NATIONAL INNOVATION COUNCIL OF INDIA

nnovation is increasingly seen as the currency of the 21st century. Innovative solutions will impact not only competitive advantages in business and markets, but will provide answers to the most significant challenges facing the world we live in. Governments across the globe are making a concerted effort to design focused strategies for driving innovation. With the impressive development graph of the past two decades, India is at the right stage to galvanize its disparate efforts and policies on innovations into a more concrete national-level strategy that is oriented toward shaping the future of the country.

The future prosperity of India in the new knowledge economy will increasingly depend on its ability to generate new ideas, processes and solutions, and through the process of innovation convert knowledge into social good and economic wealth. In a globally competitive world, India's challenge is to unleash its innovation potential to increase capacity, productivity, efficiency and inclusive growth. If innovation capacity is to become endemic to the ecosystem of India's growth and development, it has to permeate all sectors of the economy from businesses and government, to people at all levels and universities.

India today has a number of strengths: a strong research and development base; academic talent; it is a leading innovation player in certain key economic sectors such as biotechnology, pharmaceuticals, automotive components, software, information technology and information-technology-enabled services; and a stable and supportive macroeconomic climate. However, India has 300 million citizens living below the poverty line and huge disparities in terms of access to development initiatives. The Indian innovation strategy, therefore, has to be focused on looking beyond

competitive advantage to generating inclusive growth, with opportunities for people at the bottom of the pyramid. This focus on inclusive innovation is critical if India is to create a sustainable growth agenda for the future and move away from a subsistence economy to a knowledge-based economy.

Innovation can be a critical driver not only for increasing productivity and competitiveness but for poverty alleviation through collaborative approaches and inclusive growth. More than this, innovation has always been the way people solved the significant challenges facing society.

The world is increasingly facing the prospect of depleting resources and of demand outstripping supply. The global food system is struggling to meet rising demands, yet the World Bank projects a rise of 50 percent in global demand for food by 2030. Similar gaps will be seen in water supply, and increasing energy consumption will create huge strains on the system. Asia's share of energy consumption alone is projected to double over the next 20 years — to about 48 percent for oil and 22 percent for natural gas. Such significant challenges can only be addressed through innovative solutions.

Today, innovations in diverse areas from science to politics, and education to business, can enable engineering of solutions in food, water, health care access, education and affordable housing; find environmentally friendly energy sources; and expand access to knowledge that can enable a more secure future. These solutions, which benefit a critical mass of people, will be crucial if India is to bridge its widening disparity. In this context, the strategies and actions initiated by governments, educational institutions, industry, communities, regions and nations, especially based on innovative thinking, will become critical.



APD FORUM



Returning HOME

Thousands of Angolan refugees trekked home in 2012 hoping for a new start in life a decade after the end of brutal wars that drove them to neighboring countries. On June 30, 2012, their refugee status expired, so many returned to Angola. There they face an uncertain future in a country plagued by poverty despite its booming oil-rich economy.

About 4,000 Angolans had lived at the Osire refugee center in central Namibia under the protection of authorities and the United Nations. Thousands more returned from Zambia and the Democratic Republic of the Congo. The refugees returned with plans for a new life. Alexandre Mote, 54, wants to get a job and reunite his family, which has been scattered between Angola and Namibia. "I'd like to find a job to have social security and be a dignified citizen. I also hear Angola's economy is growing very quickly, so I'd like to benefit from that," he said. Agence France-Presse

HACKER STING

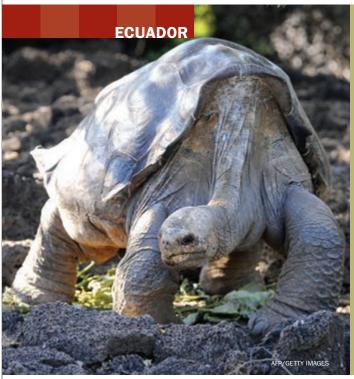
U.S. law enforcement officials in June 2012 said 24 suspected hackers had been arrested on four continents in a sting operation targeting online financial fraud involving stolen credit card and bank information.

The two-year investigation, in which FBI agents posed as hackers on Internet forums, prevented more than U.S. \$205 million in losses on more than 411,000 compromised consumer credit and debit cards, U.S. authorities said.

Eleven people were arrested in the United States, officials said. The 13 others were arrested in countries spanning from Britain to Japan, the authorities said.

"Clever computer criminals operating behind the supposed veil of the Internet are still subject to the long arm of the law," Manhattan U.S. Attorney Preet Bharara said. Reuters





GOODBYE, GEORGE

Lonesome George has died, leaving the world one species poorer. The only remaining Pinta Island tortoise and celebrated conservation icon passed away in June 2012, the Galapagos National Park Service said in a statement.

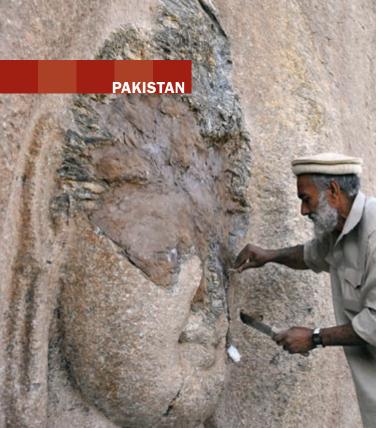
Lonesome George's longtime caretaker, Fausto Llerena, found the tortoise's remains stretched out in the "direction of his watering hole" on Santa Cruz Island, the statement said.

Estimated to be more than 100 years old, Lonesome George was discovered on Pinta Island in 1972 at a time when tortoises of his type were already believed to be extinct. Since then, the animal had been part of the park service's tortoise program.

Repeated efforts to breed Lonesome George failed.

"Later two females from the Espanola tortoise population [the species most closely related to Pinta tortoises genetically] were with George until the end," the park service said. Agence France-Presse





BUDDHA **Restored**

When the Taliban blew the face off a towering, 1,500-year-old rock carving of Buddha in northwest Pakistan about five years ago, an intrepid Italian archaeologist came to the rescue. Thanks to the efforts of Luca Olivieri and his partners, the 6-meter-tall image near the town of Jahanabad is getting a facelift, and many other archaeological treasures in the scenic Swat Valley are being excavated and preserved.

The Jahanabad Buddha, etched high on a huge rock face during the 6th or 7th century, is one of the largest such carvings in South Asia. The Taliban defaced it in 2007 when the Pakistani Taliban swarmed the valley. In June 2012, Olivieri and his team from the Italian Archaeological Mission in Pakistan began fixing the cracks and what's left of the face. The Associated Press

THE QUEEN'S TIME TO SHINE

Britain's landmark Big Ben clock tower adjoining the Houses of Parliament will be renamed Elizabeth Tower to mark Queen Elizabeth's 60th year on the throne, a parliamentary official said.

The announcement in June 2012 followed four days of celebrations to mark the 86-year-old queen's Diamond Jubilee, only the second to be celebrated by a British monarch.

The ornate, 96-meter-high, neo-Gothic tower features four gilded clock faces and was completed in 1859. The tower took its name Big Ben from the giant bell inside, which chimes the famous bongs heard around London's Whitehall government district. Reuters



REUTERS

ove over, cars and high-tech. Japan, long renowned for its innovative autos and gadgets, now hopes to turn sake and other local spirits into export hits as well. Tokyo looks to make its traditional rice wine part of the national growth strategy, aiming at an overseas marketing push to help bring tourism and investment to struggling rural areas.

Economics Minister Motohisa Furukawa had a eureka moment at the World Economic Forum in Davos,

Switzerland, where he witnessed sake's popularity among the attendees. This led him to set up the Enjoy Japanese Kokushu (national alcohol) project, whose six-member advisory council first met in late May 2011. Its goal: to enhance international recognition of sake and shochu, distilled spirits made from grains such as barley or potatoes, and promote their export.

Sake experts gave the idea cautious praise. "Things that are really valuable to countries are ones that are clearly unique to that particular country, which is certainly true for sake," said Philip Harper, a master sake brewer from Great Britain. "It makes a lot of sense as a national strategy to promote sake in that way."

With a history of more than 2,000 years, sake is as much a part of Japan as sumo wrestling and sushi. A loss of popularity at home in recent years, as more drinkers opt for wine, beer and cocktails, however, has led many brewers to look overseas.

The project aims to show Japanese consumers the popularity of their national drink in places such as the United States and reinvigorate demand for sake in its homeland.

Sake has a long way to go before gaining the export clout of French wine or Scottish whisky, and government participation is essential because many breweries are too small to market their products overseas by themselves, Harper said. Still, even without government efforts, sake exports have doubled over the past decade to hit a record of roughly 14 million liters in 2011, bringing in U.S. \$110 million, according to Finance Ministry data. That's just a fraction of domestic consumption, which totaled more than 600 million liters in the past fiscal year, according to industry data.

Export revenues are also nowhere near what Britain brings in from whisky sales. Overseas Scotch sales hit a record U.S. \$6.6 billion in 2011, according to the Scotch Whisky Association.

Sake has other hurdles to clear, including educating



drinkers. Many people in foreign markets still believe it must only be served hot, though brewers say it can be served cold or lukewarm as well, depending on the sake and the food it is served with.

Wine "sommeliers have authority at restaurants overseas," said Kosuke Kuji, whose Nambu Bijin sake is exported to more than 20 countries. "It is important to establish a sake sommelier system by a government-endorsed third party, so they can explain about sake with credibility."

The Sake Service Institute, a Japan-based private entity, organizes tasting events, holds seminars and provides certifications to sake and shochu sommeliers, but it has no overseas branches. Other sake experts urge the establishment of a government-affiliated or private institution with overseas branches like Sopexa, a global marketer of French food and wine, partially backed by the government. Sopexa has agencies in more than 30 countries.

Such an organization could develop websites in foreign languages and allocate trained local staff members at branch offices so people know where to get information.

Not everyone appreciates the government's idea, however. John Gauntner, a Japan-based sake expert who has published five books on the traditional drink, argues Japan should focus on the domestic sake market first, since the export market is so small there won't be much gain even if it doubles or triples.

"The problem of sake is image. No consumers here think it's fashionable, they don't think it's trendy, they don't think it's sexy," said Gauntner, who holds sake expert assessor and master of sake testing certifications. "The best would be marketing efforts and changing the image of sake among consumers, probably using traditional [public relations] efforts."

Healthy fun

eet Roxxi — a feisty and fully armed virtual nanobot. Billed as "medicine's mightiest warrior," she's fighting an epic battle deep inside the human body where she launches rapid-fire assaults on malignant cells.

Or, if it's not cancer but diabetes you're fighting, why not join Britney and Hunter, two digital kids whose adventures to other worlds are spurred on by regular and timely updates of your blood sugar levels.

They are a far cry from chemotherapy, diabetes medications or aspirin, but Roxxi, Britney and Hunter are some of the buzz products from the brains of those who want to promote health and sell medicines.

Gamification — turning boring, unpleasant

but necessary tasks into an online game — is a new way of thinking that is gaining momentum among drug makers and health campaigners.

It's an idea that seeks to use natural human instincts — playing and learning — to help patients to get to know their illness better and adhere properly to treatment regimens or disease monitoring programs.

"We all grew up learning through play," said Christian Dawson, strategy director at Woolley Pau Gyro, a London-based health care advertising agency. "Gamification is a way pharma can use that basic human instinct to get the right information into peoples' heads." Reuters



The Didget blood glucose meter by Bayer pharmaceutical company connects to Nintendo DS gaming systems to help kids manage their diabetes in an engaging way.



Police loaded almost 3,000 images onto a smartphone app in June 2012 and invited the public to help identify people suspected of taking part in the 2011 riots in the United Kingdom.

The London Metropolitan Police force loaded 2,880 closed-circuit television images onto its app and urged people to sift through them and confidentially send the names and addresses of any people identified.

"This is a great opportunity for the public to help us fight crime and bring those who remain outstanding to justice," said the force's Mark Rowley. "We need Londoners to browse through the app every week or so as new images will appear regularly."

A fatal police shooting sparked an outbreak of violence in the north London district of Tottenham on August 6, 2011. The riots spread to other cities, causing widespread destruction and five deaths.

Agence France-Presse

DANGER lurks in CYBERSPACE The Russian malware hunter whose firm discovered the Flame virus said in June 2012 that there could be plenty more malicious code out there and warned that a disastrous cyber attack could be coming.

"It's quite logical that there are new cyber weapons designed and maybe already computers infected that we don't know about," Eugene Kaspersky, founder of Kaspersky Lab, said on

the fringes of a Tel Aviv University cyber security conference.

Kaspersky Lab, one of the world's biggest producers of anti-virus software, said its experts discovered Flame during an investigation prompted by the International Telecommunication Union. Iran appears to have been the main target of the attack, which was discovered just a month after the Islamic republic said it halted the spread of a data-deleting virus targeting computer servers in its oil sector.

Kaspersky warned that computer viruses are relatively inexpensive to develop but that the potential damage caused by such programs can be enormous.

"Cyber weapons can replicate, and there could be random victims anywhere around the globe; it doesn't matter how far you are from the conflict," he said. "It's not cyber war, it's cyber terrorism, and I'm afraid it's just the beginning of the game." Agence France-Presse

new in news

Even as global economies and print journalism industries have suffered over the past few years, digital newsgathering technologies have seen a boom, according to a study released in June 2012 by Horn, a top digital communications agency.

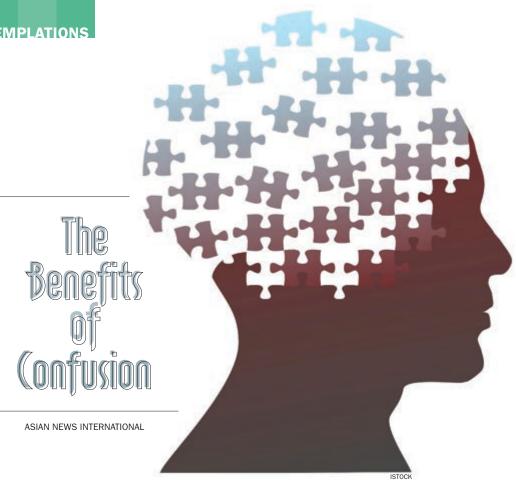
Mobile devices, digital media platforms and social networking sources all play a growing role in journalism today, according to the study, which included more than 600 journalists from 16 countries in the Asia Pacific, Europe and the Americas.

"Digital is fundamentally changing media and reporting on a global level," explained Sabrina Horn, president and chief executive officer of Horn. The study cited media outlets' continued investment in video and mobile applications, as well as their use of blogs, Facebook pages

and Twitter feeds.

Although journalists have increasingly turned to social media to gather research and spot trends, they have maintained their traditional reliance on using known, trusted and verified sources in reporting, the study noted. FORUM STAFF





hen it comes to learning complex information, most people probably think confidence and certainty are preferred over uncertainty and bewilderment. However, a recent study suggests that confusion when learning can be beneficial if it is ultimately resolved.

Two U.S. researchers from the University of Notre Dame and the University of Memphis have found that by strategically inducing confusion in a learning session on complicated conceptual topics, they could help people actually learn more effectively and be able to apply their knowledge to new problems.

In a series of experiments, subjects learned scientific reasoning concepts through interactions with a computer-animated tutor and student. The animated agents and the subjects engaged in discussions on the merits of sample research studies that were flawed in one critical aspect. One hypothetical case study, for example, touted the merits of a diet pill but was flawed because it did not include an appropriate control group.

Confusion was induced when the animated agents sometimes disagreed with each other and expressed contradictory or incorrect information. The agents then asked subjects to decide which opinion had more scientific merit. This forced the subjects to make a decision with incomplete and sometimes contradictory information.

In the end, subjects who were confused scored higher on a difficult post-test and could more successfully identify flaws in new case studies.

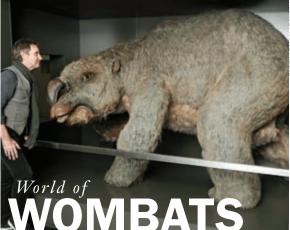
"We have been investigating links between emotions and learning for almost a decade and find that confusion can be beneficial to learning if appropriately regulated because it can cause learners to process the material more deeply in order to resolve their confusion," said Sidney D'Mello, a psychologist and computer scientist from Notre Dame.

However, D'Mello does not advise instructors to intentionally confuse students who are struggling or induce confusion during high-stake learning activities. Confusion interventions are best for higher level learners who want to be challenged with difficult tasks, and who are willing to risk failure and manage negative emotions when they occur.

"It is also important that the students are productively instead of hopelessly confused. By productive confusion, we mean that the source of the confusion is closely linked to the content of the learning session, the student attempts to resolve their confusion, and the learning environment provides help when the student struggles. Furthermore, any misleading information in the form of confusioninduction techniques should be corrected over the course of the learning session, as was done in the present experiments," he noted.

The study, funded by the U.S. National Science Foundation, is to be published in the journal Learning and Instruction.





Australian scientists announced in June 2012 that they discovered the biggest graveyard of Diprotodons, or ancient rhinosize mega-wombats that weighed up to 2.8 tons. They believe the remote fossil deposit in Australia's outback Queensland state contains up to 50 Diprotodon skeletons, including a specimen named Kenny with a jawbone that is 70 centimeters long. The site could shed light on how the species lived and why it went extinct. Agence France-Presse

A Diprotodon replica is on exhibit at Sydney's Australian Museum.

a SPOTTY Escape

The Sukna Forest rescue team saved a wild adult leopard after it fell into a water tank at a tea estate in Hashkhowa, India, 45 kilometers from Siliguri, in June 2012. The team from the Mahananda Wildlife Sanctuary threw the big cat a net to help it climb out.

Agence France-Presse





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