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Interlocutor won't impact Army operations in J&K: Bipin Rawat

By Sanjib Kr Baruah

At the same time, Gen. Rawat also sounded out a note of caution on the security of military installations across the country.

New Delhi: Implying that the tough posture adopted by the Army against militants in the last eight-nine months in insurgency-hit Kashmir is paying off, Army Chief General Bipin Rawat on Wednesday said that the government is now talking from a “position of strength” on the Kashmir issue.

Pointing out that the Kashmir situation has improved and infiltration is down, General Rawat said: “The appointment (of a new interlocutor, former IB chief Dineshwar Sharma) will not affect Army operations. The government’s strategy on Kashmir has worked. The government is talking from a position of strength.”

Gen. Rawat’s statement, on the sidelines of an event organised by the Army Design Bureau, along with industry body Ficci, is the first reaction of the Army after announcement of Mr Sharma’s appointment.

The Army, in a major shift in the counter-insurgency tactics about nine months ago, had decided to operate in a “seek and engage” mode against the militancy which has resulted in the gunning down of about 160 hardcore militants, offering a decisive edge to the counter-insurgency operations. The tactical change was brought in as militants were believed to be hiding among the civilian populace and using them as human shields.

At the same time, Gen. Rawat also sounded out a note of caution on the security of military installations across the country. “Security of military installations in the hinterland is becoming a cause for concern because we keep getting reports about likelihood of some attacks on the lines of Uri and Pathankot in some of our bases,” he said, underscoring the importance of integrating security systems with intelligence, surveillance and reconnaissance with suitable and adequate technology.

On January 2, 2016, militants had breached the security perimeter of the vital Pathankot IAF airbase before being neutralised by commandos after a prolonged fight. It was followed by a brazen attack at the Uri army base on September 18, 2016 which claimed the lives of 19 soldiers. While the Indian Army responded with a successful surgical strike across the Line of Control with Pakistan on the intervening night of September 28 and 29, the Pathankot and Uri attacks had exposed chinks in the security of military installations.

Making a strong pitch for a strong indigenous domestic defence industry and underscoring the importance of the private sector joining hands with the government in addressing the country’s military and security needs, the Army chief said: “We must win the next war with home-made solutions”.

According to the latest report by the Stockholm International Peace Research Institute (SIPRI), India remains the world’s biggest arms importer over the past five years, increasing its share of global arms imports from 9.7% in 2007–11 to 12.8% in 2012–16.

The chief reason behind India’s growing military spend is the lack of a domestic arms industry that can cater to the military needs.

15 warships to check China in Indian Ocean

By Ajay Banerjee

Vital points

- *Indian warships will prowl close to the Lakshadweep and Minicoy and Male Islands to keep an eye on Chinese ships. Warships are to be positioned off Madagascar Islands. Navy's surveillance aircraft, P8I and Dornier will scan the seas along Seychelles and Mauritius*
- *Anti-piracy patrol will continue at the Bab-el-Mandab and the Gulf of Aden which is the entrance to Red-Sea and onwards to the Suez Canal and Europe*

Adding a new dimension to the India-China race to dominate the seas, the Indian Navy's deployment pattern has been changed to ensure permanent patrolling in the Indian Ocean, securing shipping lanes and watch straits of Malacca and Bab-el Mandab, besides key locations like Seychelles, Mauritius and East Africa.

More than 15 ships will be stationed in the Indian Ocean, monitoring shipping and picking up activities of China, which now has a full time off-shore base at Djibouti (north-eastern Africa) and has stationed its warships on permanent patrol and submarines in the Indian Ocean.

New Delhi's security architecture has set a target of 2020 to be impregnable to ward off any threat in the Indian Ocean. Chinese threat and the Navy's own changes were discussed in detail at the ongoing Navy Commanders' conference that commenced here today.

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Anti-piracy patrol will continue at the Bab-el-Mandab and the Gulf of Aden which is the entrance to Red-Sea and onwards to the Suez Canal and Europe.

The deployment will be crucial to watch the traffic coming from China towards the Indian Ocean. In July, India launched a patrol off sea-shipping routes at the important 'choke-point' of Malacca, south-east of the Andaman and Nicobar Islands in the Bay of Bengal. The islands sit on the western edge of Malacca straits.



Bravado that Constricted India

By Pravin Sawhney

In 2004, when Gen NC Vij acknowledged publicly that India had a Cold Start doctrine, he narrowed Indian mobile forces' options in war

The Indian media loves referring to Pakistan's Tactical Nuclear Weapons (TNW) just as their Pakistani counterpart relish citing Indian Army's Cold Start doctrine. These terms make sensational front-page stories.

One such incident happened with the Indian Air Force chief, Air Chief Marshal BS Dhanoa at his media interaction on October 5. Asked how India would tackle Pakistan's TNW, the air chief said, "We have a draft

nuclear doctrine which will take care of nuclear weapons." After a pause, he added, "The Indian Air Force has the capability to locate, fix and strike targets across the border."

Except for one newspaper, all others reported the next day that ACM Dhanoa had confirmed the ability to locate, fix and target Pakistan's TNW. Well, he did not really say that but he allowed the media leeway to quote him out of context. Much on expected lines, Pakistan's Foreign Minister Khawaja Asif, who was in Washington, felt obliged to warn India of "dire consequences" adding that "nobody should expect restraint from Pakistan either."

Cold Start and TNW are globally recognised terms, but they have different connotation in the context of India and Pakistan. Cold Start was first mentioned in 2004 to the media by the then Indian Army chief, General NC Vij. He did this without consulting the Government and the Air Force, because, within months, once the import of what he had said sunk in, Cold Start was re-named 'pro-active strategy', which is what it was. But the damage had been done, which we will discuss later.

Cold Start meant instant crossing over into enemy territory once the decision to wage war was taken. Cold Start implied surprise, suggesting that war preparedness existed to maintain the swift tempo of operations. Given Pakistan's elongated geography and high-profile assets close to the border, it was bound to ring alarm bells in Pakistan.

The proactive strategy, on the other hand, is meant to reduce the Indian Army's war mobilisation time, and retain the element of surprise with phases of offensive actions crafted to unhinge the enemy so that it makes wrong operational assessments and commits its reserve forces (strike or offensive formations) early in war which could then be decimated by air and land firepower.

Unlike Pakistan, India has a problem in mobilisation of its strike formations - a consequence of geography. Since Pakistan operates on interior lines, it can mobilise its holding or defensive formations to move into battle locations in 72 to 96 hours. Its strike formations can be mobilised for crossing the border simultaneously. This is not the case with India.

Given India's sub-continental size, the Indian Army operates on exterior lines of communication with its strike formations spread across the hinterland. While it can mobilise its holding formations in 72 to 96 hours, the strike formations would take between 10 to 15 days. Historically, this provided a tremendous advantage to Pakistan in the initial stages of war. However, the problems will be accentuated as any war is expected to be intense and short (lasting no more than two weeks) since international pressure for a ceasefire on account of nuclear weapons would be enormous.

Give this, according to the 'pro-active strategy', the mobilisation time for offensive formations was sought to be reduced by two methods: the appropriate forward location of certain portions of strike reserves called integrated battle groups, and a review of the Operational Rail Move Plan (ORMP) to move the remaining elements of the strike corps faster. Incidentally, the ORMP was tested for the first time after the 1971 war during the 2001-2002 Operation Parakram, and it was not much of a success.

While the Pakistan Army knows all this, it was not willing to lose the opportunity provided by General Vij. It announced the presence of TNW in its inventory, which it said was meant to provide strategic deterrence at tactical level to halt the Cold Start manoeuvre.

By definition, TNW are very low-yield - ranging from sub-zero to a few kilotons - weapons, which are held at field-formations level for use in battlefield. Given this, there was global furore since (a) Pakistan had lowered its nuclear threshold, thereby, increasing the risk of a nuclear war, and (b) as TNW were to be held by field commanders, there was danger of them falling in the hands of non-state actors.

Pakistan's TNW came to called 'loose nukes' which they are not for three reasons. One, the Pakistan Army chiefs draw strength by holding nukes capability tightly under their command, control and supervision (director general, Strategic Plans Division, always an army officer, responsible for nukes, reports to the army chief). Nukes' issues are neither shared with the government, nor with the other two defence services. Given this, why would the army chief give away his source of power to his field commanders?

Two, since halting of India's Cold Start would be on Pakistani soil, Pakistan Army would damage itself more than the enemy. Given the high density of its own population close to the border - even the once wasteland opposite India's Thar desert is now a populated green belt - thermal radiation from even low-yield TNWs would blight human DNA and disable civilians in the vicinity for generations. Depending on the wind direction, the damage within Pakistan could be colossal.

And three, if the Pakistan Army was serious about use of TNWs, why would it seek parity with the Indian military at the warfighting level (called the operational level of war), where outcomes are decided? The Pakistan Army believes that given its geographical location, total nukes control, and viable conventional force, Pakistan's foreign policy can never be geo-politically marginalised.

Moreover, senior Pakistani officers have made it clear that they believe all nukes, whether strategic or tactical, should be held at the highest level without dilution of authority. For example, Lt Gen Khalid Kidwai, the longest serving head of Pakistan's Strategic Plans Division, made numerous presentations after retirement to convey this message in western capitals.

While all this is fine, India's war dilemma is this: since Pakistan has conceded having TNW, this factor now has to be dovetailed in India's conventional warfighting plans. Thus, whatever Indian Army's capabilities be, any meaningful thrust inside Pakistan along the entire border is ruled out. It is one thing for analysts to say in peacetime that the Indian Army's mobile columns would bash on regardless of TNWs. It is quite another if TNWs get actually used; the war would come to a stand-still.

If Gen Vij had not mentioned Cold Start, Pakistan, even while having the capability, would not have brought TNWs in the war narrative for fear of global opprobrium. This would have given freedom and options to Indian fields commanders for manoeuvre in semi-mountainous and open terrain. Pakistan, instead of India, would have faced the dilemma of actual use of TNWs in case of an Indian armour breakthrough. This is no longer the case. Gen Vij's bravado has constricted Indian mobile forces' options in war, an area where it scored over Pakistan.

(The writer is editor, FORCE newsmagazine)



Thu, 26 Oct, 2017

Dassault-Rel Aerospace Park a Reality Now; Foundation Stone to be Laid On Fri

By Madhusudan Sahoo

In a move to promote the Make-in-India initiative of the Government in order to bring in more foreign direct investment (FDI) into the country, the Dhirubhai Ambani Aerospace Park at Multimodal International Hub Airport at Nagpur (MIHAN) has become a reality now as French aircraft manufacturer Dassault Aviation and Anil Ambani-led Reliance Aerospace Ltd will lay the foundation stone of the aerospace park on Friday, a top official of Reliance Aerospace said.

According to sources, Dassault Aviation and Reliance Defence have teamed up in a 49:51 stake joint venture. "The park is being set up as part of Dassault's offset obligations for the Rs 58,000 crore deal to supply 36 Rafale fighter jets to India. The deal was signed in September last year," sources said, adding that the park will also be home to the largest defence sector FDI in the country.

"It is expected that production at the facility will be started in the first quarter of 2018 and phase one of this defence project will be fully operational by the third quarter of 2018," it said.

The bhoomipujan of the aerospace park at MIHAN is expected to be performed by Union Minister for Road Transport and Shipping Nitin Gadkari, Maharashtra Chief Minister Devendra Fadnavis and Reliance Group Chairman Anil Ambani on October 27. The Commerce Ministry has already given the approval for the project that has the capacity to change the economic scenario of Vidarbha.

However, it is also learnt that the Maharashtra Airport Development Company (MADC) is the nodal agency for developing the aerospace park. “The Phase-I of the project is expected to generate more than 700 highly-skilled direct jobs and 3,000 indirect jobs. The aerospace park will eventually generate more than 10,000 jobs, promoting the ‘Make in India’ and ‘Skill India’ initiatives of the Government. Reliance has decided to start construction on 104 acres of land,” sources said.

The Dhirubhai Ambani Aerospace Park (DAAP) is being set up in the city's Mihaan Special Economic Zone. Spread over 289 acres, DAAP is touted to be the largest greenfield aerospace project in India.

The joint venture will be the leading entity to execute the Rafale offset programme. “The aerospace park will have assembly lines and manufacturing facilities for fixed wing aircraft and will produce aircraft components for global markets,” said an official of Reliance Aerospace Ltd.

“The Dassault-Reliance partnership will bring in not only high level transfer of technology but also help develop the eco-system of the domestic aerospace sector and feed into the global supply chain,” said the official, adding that a large number of Indian MSMEs are also expected to set up facilities at DAAP.

Business Standard

Thu, 26 Oct, 2017

Rex Tillerson bats for new wave of US defence sales to India

The 57-fighter MRCBF deal is estimated to be worth \$6-10 billion

By Ajai Shukla

US Secretary of State Rex Tillerson is visiting New Delhi at a delicate moment for American defence sales to India. Having rung up \$15-18 billion in defence sales to New Delhi in the last decade, Washington is backing the US defence industry’s drive for a second wave of contracts that could add up to another \$18-25 billion.

Addressing the media with Foreign Minister Sushma Swaraj in New Delhi on Wednesday, Tillerson stated: “[W]e are willing to provide India advanced technologies for its military modernisation efforts. This includes ambitious offers from American industry for F-16 and F/A-18 fighter planes.”

On October 18, speaking in Washington before his India visit, Tillerson specified additional platforms that could feature in India’s shopping basket. He said the US had put forward proposals for “[Sea] Guardian UAVs (unmanned aerial vehicles), aircraft carrier technologies, the Future Vertical Lift program, and F-18 and F-16 fighter aircraft, [which] are all potential game changers for our commercial and defense cooperation.”

US policy insiders tell *Business Standard* that the Washington bureaucracy believes that, given the tight strategic partnership, US industry should, by right, get at least one of the two fighter contracts.

“We understand the F-16 might be at a disadvantage, owing to Indian perception that US has long supplied it to Pakistan. But the F/A-18E/F is a fantastic aircraft and Boeing has the go-ahead from Washington to set up a plant to build the fighter in India”, a former top Pentagon official told *Business Standard*.

India, however, is proceeding with competitive procurement. On January 25, the Indian Navy issued a Request for Information (RFI) to global manufacturers for 57 “multi-role carrier-borne fighters” (MRCBF). Consequently, the F/A-18E/F will probably compete with Dassault’s Rafale-M, Saab’s Sea Gripen and Russia’s MiG-29K/KUB that already flies with the Indian Navy.

The 57-fighter MRCBF deal is estimated to be worth \$6-10 billion.

Meanwhile, Lockheed Martin, which has offered India the new F-16 Block 70, finds itself in hot competition with Saab's new Gripen E fighter in the "single-engine fighter" category. With India likely to buy 100-200 of these fighters, the contract would be worth \$7-14 billion.

A more sensitive matter for Washington, one that could seriously test US-India relations, is India's request for 22 Sea Guardian UAVs for maritime surveillance of Indian Ocean waters.

Senior US defence industry executives say New Delhi initiated the request for the Sea Guardian in 2016, following it up with multiple high level requests in US-India meetings. The US administration, recognising a commercial as well as strategic opportunity, pulled out the stops to get it cleared in time for Prime Minister Narendra Modi's visit to the US in June.

US officials say obtaining export clearances involved intensive lobbying by the Indian ambassador in Washington, and by pro-Indian Senators on Capitol Hill. This also involved dealing with strong counter-lobbying by Pakistan-friendly groups in Washington.

Now, based on the commitment made during Modi's meeting with President Donald Trump in June, Washington responded to an Indian Letter of Request (LoR) for price and availability (P&A) of the Sea Guardian just days before Defence Secretary James Mattis' visit to Delhi on 25-26 September. The cost would be in the region of \$2-3 billion, say industry experts.

Inexplicably, since then, Indian interest in the Sea Guardian seems to have cooled, say US officials.

The Sea Guardian is a tightly controlled weapons platform, being in Category I under the Missile Technology Control Regime. This entails a strong "presumption of denial" to any export requests.

Contrary to media reports, the Sea Guardian is not strictly an unarmed platform. While it does not come with weapons, its wings are fitted with hard points for weapons carriage. If, at a later stage, India wants to weaponise the UAV, it would be possible to approach Washington for sanctions and weaponry.

Indian Navy officers say buying the Sea Guardian would undercut the rationale for buying more Boeing P-8I multi-mission maritime aircraft. The navy has already signed up for 12 P-8Is, but would like to at least double that figure. However, the defence ministry would question the procurement of additional P-8Is, as well as Sea Guardians.

Perhaps the highest-tech piece of equipment that New Delhi and Washington are negotiating is a billion dollar "electromagnetic aircraft launch system" (EMALS) for its second indigenous aircraft carrier, INS Vishal, which is still to begin construction. This uses an electromagnetic rail gun to accelerate carrier-borne aircraft to take-off speed, replacing the conventional steam catapult.

The great advantage of EMALS is its "dial-up-a-power-level" capability, which allows it to safely and quickly launch aircraft of completely different sizes – from light UAVs to 60-tonne maritime surveillance and anti-submarine aircraft.



Thu, 26 Oct, 2017

Bomb that could wipe out the US

Report says Trump underestimating electromagnetic pulse devastation

An Attack on the US electronics by North Korea could kill 90 per cent of the population by crippling the nation's infrastructure, an expert has claimed. A spine-chilling report said Washington is underestimating the threat of an electromagnetic pulse (EMP), a phenomenon that could be caused by detonating a nuclear bomb

high above the earth. Such an attack would see the release of a burst of energy that would interfere with and destroy all electronics – and North Korea has claimed it has built a warhead for this very purpose.

ONE MAN'S SPINE-CHILLING VIEW OF ARMAGEDDON

Satellite to scale with 6ft man

NUCLEAR MELTDOWN
Nuclear power plants would go into meltdown. The US has 99 reactors, across 30 states. It would take seven days for reactors' emergency power supplies to run out and power stations to go into meltdown, spreading deadly radioactivity across most of the US.

EXPLODING PIPELINES
The US has the world's biggest network of oil and gas pipelines, with more than two million miles of pipe. Most start in Texas - America's oil and gas capital - fanning out northwards from the Gulf of Mexico. Electro-mechanical systems regulating the flow of gas and oil would spark during an EMP attack, causing explosions that would create huge firestorms in both cities and forests.

2.4 million miles of gas and oil pipelines in the US.

STARVATION
Refrigerated and frozen food would perish within a month, while supermarket shelves would empty within days. America only imports 15 per cent of its food but much of the remaining 85 per cent will be destroyed by radiation. Within a year of an attack, many would have died from starvation.

AIRCRAFT FALLING OUT OF THE SKY
At any one time, there are about 5,000 commercial planes in the air above the US, carrying an estimated 500,000 people. An EMP would 'fry' not only aircraft electronics but also those in air traffic control towers and other aircraft navigation systems on the ground. Unable to navigate or use flight instruments, the planes would simply drop out of the sky.

An EMP weapon would be small enough to fit inside this North Korean satellite presently in orbit over the US.

A burst of electromagnetic radiation (EMP) created by a nuclear explosion 250 miles above the US would create rapidly fluctuating electrical and magnetic fields destroying all electronic systems.

Map labels: CALIFORNIA, WISCONSIN, KANSAS, TEXAS, Mexico, Gulf of Mexico

Despite deep scepticism from scientists and security experts, nuclear strategist Peter Pry, who previously worked for the CIA, outlined his theories in testimony to Congress.

And in an interview with Forbes magazine, he expanded on his vision of how America would fare in such an attack. He said: "The US can sustain a population of 320million people only because of modern technology. An EMP that blacks out the electric grid for a year would [destroy] the critical infrastructure necessary to support such a large population." Airliners — of which there are 5,000 flying over the US at any one time, carrying 500,000 passengers — would crash as their electrical systems were destroyed, killing most on board, he said.

Meanwhile, the systems that regulate gas flow through pipelines would spark, causing huge fires in cities and forests. To make matters worse, he said, nuclear power plants will melt down within a week, causing radioactive particles to spread across the nation. Food supplies in supermarkets would be consumed within days. Without power, the national food supply would start to spoil around a month later.

A single warhead delivered by a North Korean satellite could shut down the entire electric grid and other critical infrastructure for more than a year. In that time, Pry contends up to 90 per cent of the US population could perish from starvation, disease and societal collapse. Pyongyang has recently claimed to have developed an EMP weapon, though experts have suggested that North Korea's limited experience with missiles means it is unlikely to be able to carry out such an attack.

And critics have said to cause such havoc, North Korea would have to detonate a very large bomb in a very specific position. They also say tests have shown EMP causes significantly less havoc than Pry claims. Pry is chief of staff of a congressional committee set up to assess the threat of EMP. However, the committee lost its funding last month. Scientists and security experts argue that the claims by Pry and others are far-fetched. Daily Mail



Thu, 26 Oct, 2017

US slams Russia for vetoing UN resolution on chemical weapons

The US has slammed Russia for vetoing a UN Security Council resolution extending the mandate of the only official mission probing the use of chemical weapons in Syria, saying Moscow has “once again” demonstrated it would do anything to protect its ally. Russia yesterday vetoed the US-sponsored UN resolution that would extend the work of inspectors seeking to determine who is responsible for chemical weapons attacks in Syria. Russia has blocked such a move by the UN Security Council a number of times, White House Press Secretary Sarah Sanders said in her daily news conference.

Russia has blocked the UN Security Council action to hold accountable those who use chemical weapons, including terrorists and the regime of Syrian President Bashar al Assad, she said. “By blocking the extension of the Joint Investigative Mechanism, Russia has once again demonstrated it does not care about stopping the barbaric use of chemical weapons in the world and will do whatever it takes to protect its ally, the Assad regime,” Sanders alleged. Blocking the extension of the investigating authority means nothing less than Russia's endorsement of the Assad regime's use of chemical weapons against innocent women and children.

“We will continue to push back against this,” Sanders said. At the UN headquarters in New York, the Security Council rejected the draft resolution following a vote of 11 in favour to 2 against (Bolivia, Russian Federation), with 2 abstaining (China, Kazakhstan). Had it been adopted, it would have extended the mechanism's mandate established by resolution 2235 (2015) and set to expire on November 17 for one more year. Vassily A Nebenzia, Russia's Permanent Representative to the UN, suggested that adjourning the meeting until November 7 and discussing an extension without undue pressure.

He said that the Russian Federation expected an honest, impartial, complete investigation, and would accept clear, incontrovertible evidence of guilt. The US had already determined who was guilty, and its actions were politicising the issue, he alleged. US Ambassador to the UN Nikki Haley said Russia has once again demonstrated it will do whatever it takes to ensure the “barbaric” Assad regime never faces consequences for its continued use of chemicals as weapons. “By rejecting the renewal of the work of the Joint Investigative Mechanism (JIM) an independent, purely technical body Russia has made it clear that it does not care about stopping the use of chemical weapons in the world,” she said.

Wed, 25 Oct, 2017

(Online)

ISRO begins flight integration activity for Chandrayaan-2, as scientists tests lander and rover

The ISRO has started flight integration activity for the Chandrayaan-2, and scientists are currently carrying out tests for the lander and the rover that will explore the moon.

The ISRO has started flight integration activity for its next lunar mission Chandrayaan-2 and scientists are currently carrying out tests for the lander and the rover that will explore the moon. Officials said the spacecraft launch, on board GSLV-Mk II, is planned for March and many new technologies have been developed indigenously to achieve the mission requirements.

Chandrayaan-2, India's second mission to the Moon, is an advanced version of the previous Chandrayaan-1 mission nine years ago. This spacecraft is a composite model consisting of orbiter, lander and rover. According to the Bengaluru-headquartered space agency, unlike Chandrayaan-1, wherein an impact probe crash-landed on the surface of the moon, Chandrayaan-2 will soft-land its lander with the rover on the lunar surface to conduct the next level of scientific studies.

“Things are going on. The orbiter is getting ready. Flight integration activity is going on, and a series of tests are planned for lander and rover. They are all in progress and we are working towards the first quarter (of 2018) launch of Chandrayaan-2,” ISRO Chairman A S Kiran Kumar told PTI. Officials said rover flight systems test include “soil mixing exercise” and mobility test to evaluate the rover's wheel-soil interaction.

According to them, the lander configuration has been finalised to meet soft and safe landing at the identified site, as also payload configuration and interfaces with the lander. Indian Space Research Organisation (ISRO) had also established a lunar terrain test facility for conducting lander leg drop tests. “It is a totally Indian mission; no other collaboration,” Kiran Kumar said.

“It (Chandrayaan-2) differs from the previous one (Chandrayaan-1) in the sense that in the last one, we had moon impact probe that descended on the moon in an uncontrolled manner, whereas this (Chandrayaan-2) will carry a lander, which will descend on the surface of the moon in a controlled manner,” he said. After the lander lands on the moon, the rover will come out and it will do some in-situ observations and we will be able to get these observations through radio contact, Kiran Kumar said.



Thu, 26 Oct, 2017

Come 2019, the kilogram will get a new measure

Global metrology experts decide to drop traditional system

In 2019, the kilogram will get more accurate. For 125 years, a salt-shaker-sized cylinder housed at the Bureau International des Poids et Mesures (BIPM), Paris and weighing exactly a kilogram served as the definition of the measure. India's National Physical Laboratory too has a replica of this, since 1957, and it has served as the reference for a variety of industries to keep their weights accurate.

However an international conference of heads of metrology institutes decided, on October 19 in Sevres, France, that the kilogram will no longer be pegged to this cylinder made of 90% platinum and 10% iridium.

In the last 60 years, several standard units — the second, metre, ampere, Kelvin, mole, candela and, the kilogram — have all ceased to be defined by physical objects.

One metre, for instance, was a platinum-iridium bar of that measure. In 1960, the metre was defined as the distance travelled by light in vacuum in $1/299,792,458$ seconds.

No more artefacts

In essence, the units were freed from being defined on the basis of artefacts, as these being objects, were subject to wear and tear and sources of eventual error. The new artefacts, according to the International Committee for Weights and Measures, ought to derive from the constants of nature that are all interdependent.

These include constants such as the Planck constant — the ratio of the electromagnetic radiation from a photon to its frequency — and the charge of an electron.

Until this month, the kilogram was the only one among the units still pegged to a real object and now — after a formal vote in 2018 — the world is set to redefine the kilogram in terms of the Planck constant, the second and the metre.

Kibble balance

The undoing of the cylinder has been the Kibble balance.

It is a set of scales, which uses the force produced by a current-carrying wire in a magnetic field to balance the weight of a mass.

Through this, accurate measures of the Planck constant — the fulcrum of several of the standard units — can be made.

“At the level of large objects nothing changes,” said Dinesh Aswal, Director, NPL and India’s representative at the conference, “But when measures at the level of micrograms need to be made such as in preparing drugs, these errors hugely matter.”



Thu, 26 Oct, 2017

‘Fish-lizard’ fossil from Kutch is a Jurassic first

By Jacob Koshy

The 5.5 metre ichthyosaur, believed to be at least 90 million years old, points to India’s evolutionary links

A near-complete Jurassic-era fossil of an intriguing animal that looks like a mashup of a dolphin and lizard, and lived during the twilight of the dinosaurs, has been unearthed in Kutch, Gujarat.

Ichthyosaurs, or ‘fish- lizards’ in Greek, were large reptiles that lived at the same time as dinosaurs. While many ichthyosaur fossils have been found in North America and Europe, the fossil record in the Southern Hemisphere has mostly been limited to South America and Australia. Until now.

Guntupalli Prasad, a geologist at the University of Delhi, said when a fossil bone from the animal’s skeleton was first found by an Indo-German research team in Kutch in 2016, they suspected it to be a dinosaur. “But the bone was too long and later the whole skeleton was unearthed. It’s the first Jurassic ichthyosaur found in India,” he told *The Hindu*.

The 5.5 metre-long skeleton is thought to belong to the Ophthalmosauridae family, which likely lived between 165 and 90 million years ago, when the arid Kutch was a sea. The remains were found among fossils

of ammonites and squid-like belemnites, and the way the creature's teeth were worn out suggest it ate animals with thick, bony coverings, the team of scientists report in the October 25 edition of *PLOS ONE*.

Dr. Prasad, one of the authors of the report, notes: "This also throws light on the evolution and diversity of ichthyosaurs in the Indo-Madagascan region of the former Gondwanaland and India's biological connectivity with other continents in the Jurassic."

Sparse evidence

Earlier too, researchers have discovered evidence of ichthyosaurs in prehistoric India. Remnants were reported from Ariyalur, Tamil Nadu in 2016 but these were only fossils of teeth and part of the vertebra. In Kutch, the team reported the finding of vertebral column, ribs, neural spines and a part of the snout.