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Fund crunch delays IAF's purchase plan

This fiscal, the IAF is facing a shortage of Rs 7,748 crore in its capital budget and of Rs 2,769 crore in revenue budget.

While contracts for two additional airborne warning and control systems (AWACS) and a replacement of the C-130 that crashed are expected to be signed this fiscal, some key IAF procurements such as fighter aircraft, aerial refuellers, and helicopters, and upgrade projects are likely to roll over to the next year due to paucity of funds.

Parliament's Standing Committee of Defence, in its latest report, has listed out 10 contracts worth over Rs 6,728 crore that are unlikely to be signed this year. This includes procurement of 56 new aircraft to replace the ageing Avro transporter, 48 medium-lift helicopters, six mid-air refuelling tankers, 20 Hawk advance jet trainers and 38 Pilatus basic trainers.

The Indian Air Force's wait for the much-needed KA-226 reconnaissance and surveillance helicopters, long-range surface-to-air missiles, engines for the Jaguar fighter, electronic warfare suite for the MiG 29 and avionics upgrade for IL-76/78 has also lengthened.

For the Rafale fighter jets, the procurement of which has been hanging for about a decade, a separate proposal will be moved for additional funds in 2016-17 to procure the 36 aircraft after details regarding cost and delivery timelines are finalised, the committee observed.

Among the eight contracts, valued at Rs 2,039 crore, that would hopefully be signed this year are AWACS, a C-130 special missions aircraft, 14 Akash anti-aircraft missile units, upgrade for medium helicopters, precision-guided munitions, recce pods for Su-30, armament suite for Dhruvs and radio sets.

This fiscal, the IAF is facing a shortfall of Rs 7,748 crore in its capital budget and of Rs 2,769 crore in revenue budget. The shortfall in capital allocations will slow down modernisation, delay induction of important capabilities, erode IAF's superiority and result in asymmetry in capability with respect to envisaged threat perception and flight safety

The lower revenue allocation will impact procurement of spares and fuel, affect serviceability, and lead to shortfall in training, resulting in compromise of operational preparedness and expenditure for disaster relief operations.

Rs 6,728-cr contracts won't be signed this yr

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- This includes procurement of 56 new aircraft to replace the ageing Avro transporter, 48 medium-lift helicopters, six mid-air refuelling tankers, 20 Hawk advance jet trainers and 38 Pilatus basic trainers
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HC notice on Army recruitment

Acting on a public interest litigation seeking directions for recruitment of married women law graduates into the Judge Advocate General (JAG) Department of the Indian Army, the Delhi High Court on Monday issued notices to the Defence Ministry and the Army's Directorate General of Recruiting.

A Division Bench said the issue required consideration as the PIL had raised the issue of married women law graduates being deprived of their right to serve in the Department.

Petitioner Kush Kalra has contended that discrimination on the ground of gender violates the fundamental right to equality before law and equality of opportunity in the matters of public employment. He said that it amounted to "institutionalised discrimination" against married women.

The Bench, comprising Chief Justice G. Rohini and Justice Jayant Nath, asked the respondents to submit their replies in the matter by August 10. The petitioner has also sought declaration of the eligibility criterion prohibiting the entry of married women candidates in the JAG Department as unconstitutional.

The Asian Age
10 May, 2016

Arms and the middlemen

By Bhopinder Singh

Corruption in Indian defence deals date back to the 1948 jeep scandal when the pesky and brazen V.K. Krishna Menon, India's high commissioner to the UK, ignored the protocols and signed a deal for 200 jeeps with a foreign firm and India only received 155. Since then, Bofors, HDW submarines, "Coffingate", Tatra trucks and many such deals are symptomatic of the continuing taints that have afflicted the various defence deals.

In almost all these deals, murmurs about the nexus between shady arms dealers and politicians of the ruling dispensations (of all political persuasions) did the rounds.

However, the conviction rate of any Indian politician or bureaucrat of any significance in the defence deals has been virtually zero and the "blacklisting" of tainted firms has resulted in unprecedented difficulties for the Indian defence forces.

Bofors, the Swedish manufacturer was blacklisted in 1987 and the ban was lifted only in June 1999 when Bofors proved its mettle in the Kargil war, albeit, badly crippled for want of spare parts.

A similar experience was faced by the Indian Navy when the German submarine manufacturer, HDW, was suddenly blacklisted on disclosures of kickbacks after having supplied four submarines. The HDW blacklisting forced the authorities to deal with dodgy companies to secure spare parts and keep the fleet operational at exorbitant prices.

Even in the current melee about the AgustaWestland helicopter scam, questions on the maintenance and spare parts of the three helicopters already inducted and the Naval Sea King helicopters abound, with no clarity on managing the eventuality, and its repercussions.

Strangely, efforts to tighten the screws on corruption have only made the process more complex as it gets mired in intrigues that further require “insiders”.

Individual arms deals often run into billions of dollars with long-term maintenance and technology support contracts. The process is bureaucratic, highly competitive and long-winding. Hence, it is susceptible to influencers who can circumvent, accelerate and grease palms with “speed money” to keep the deal moving in a particular direction, till fructification.

Two systemic changes introduced have been the formation of a Technical Oversight Committee, and the almost naïve, honour-based Integrity Pact (since 2006), which has an undertaking by the bidders that they have not paid/will not pay bribes, etc. with appropriate penalties (this was made compulsory for all procurement deals above Rs 100 crore).

Politically, indecision, procrastination or blacklisting could be kosher, but militarily it is disastrous as it perpetuates the risks to the soldiers and the nation. Against an authorised strength of 42 fighter squadrons, the Indian Air Force has only 33 — the tender for 126 medium multi-role combat aircraft (MMRCA) was done in 2007, yet despite Rafale’s selection in 2012, we are still haggling with Dassault Aviation over the base price fixation for the first 36 fighter aircraft in 2016.

There is an urgent need to simplify, shorten and insulate the workings of the core selection team from the competing vendors. This team needs enhanced participation of soldiers rather than tenure-based bureaucrats (the director-general of acquisition, defence ministry, is an IAS officer), and, critically, the answerability of decisions to Parliament rather than the government. This will go a long way in curbing the enthusiasm of ruling politicians, fixers and lobbyists in the ultimate preference of a weaponry, which ought to be decided only on the service requirements.

A fast-track court (perhaps, even military) to convict any individual seen to be meddling in a deal, in a time-bound manner, will ensure adequate deterrence and distance.

Last but not the least is the acceleration of private participation in defence industry to harness the technological, entrepreneurial and cost advantages afforded domestically.

Currently, the much-banded “Make in India” private industry thrust accounts for less than one per cent of the defence budget, signalling India’s tentative steps towards the new defence procurement procedure. Globally, private sector for defence industry fuels the domestic economy. Even a pacifist country like Sweden regularly supplies armament to countries with questionable human rights track record like Saudi Arabia, Bahrain or Egypt.

At the end of the day, scale of defence deals are reflective of our political abilities (or failures) in managing foreign affairs with our neighbouring countries, as indeed our domestic affairs.

Unsettled international border disputes, multiple insurgencies and secessionist movements within the country and frequent requisitioning of the armed forces for managing natural and man-made disasters is squeezing the capability and capacity of the defence forces to its limits.

Given the current status, India's reliance on international defence deals for critical sustenance and efficacy of the over-stretched and under-equipped defence forces is complete and necessary for at least the next two to three decades (India is the top arms importer, accounting for 14 per cent of the global arms trade).

So with the financial stakes expected to continue running high in the near future (Rs 78,586 crore has been allocated for capital expenditure in the current year's defence budget), coupled with existing systemic inefficiencies will ensure the curse of "influencers". Unfortunately, the AgustaWestland narrative is more focused on political blame-game rather than the critical task of simplifying the procurement process with adequate transparency, build-in. The lure for defence deals thrives on the inherent red-tapism and lack of conviction of "influencers" in the multiple scams so far. Meanwhile, the soldiers' remains exposed, under-involved and inadequately equipped to handle the conventional and unconventional demands that are enforced upon them to guard the borders and within. *The writer is former lieutenant-governor of Andaman & Nicobar Islands and Puducherry.*

The Statesman
10 May, 2016

Time India tightened screws on Pakistan

By Harsha Kakar

The recent action by the US Congress to deny F-16 aircraft to Pakistan as part of the military aid it provides raised alarm bells and angry counter-comments. To add insult to injury, were comments by Presidential hopeful Donald Trump, who stated that he would have Pakistan release Doctor Afridi, the man who gave the inputs on Bin Laden's presence, 'in a jiffy', as Pakistan is dependent on US aid.

Pakistan retorted angrily claiming US aid was peanuts and that it would never accept such diktats. Simultaneously, Pakistan was also targeted by Hillary Clinton, another Presidential hopeful, who stated that the Pakistan leadership had been aware of Bin Laden's location, though she did not have any proof. However, the saving grace were remarks by the state department spokesperson, John Kirby, who stated that the US has no intention of losing focus on the relationship between the two countries.

For a long time, Pakistan was considered a major link in the battle against terror. It received equipment and funding from the US government in the hope that it would rein in terrorist groups located within the country, mainly the Haqqani network and the Taliban, and bring them to the negotiating table. Sartaj Aziz, the Pakistan Foreign Affairs advisor even stated in Washington that since the Taliban leadership was based in their country and obtained medical and other support from them, they do possess some influence over them.

However, with no action on ground and a powerful summer offensive in progress by the Taliban, a frustrated Afghan government threatened to take the matter to the UN Security Council. In addition, domestic pressures made the US realize the futility of its flawed Pakistan policy. The present front-runners for the White House have openly criticized Pakistan for its support to international terrorism. Meanwhile in Europe, UK and the US, Pakistani nationals are being arrested for terrorist activities. This led to the slow slide in relations.

In spite of increasing Indo-US cooperation, Washington tended to turn a blind eye to Pakistan-sponsored attacks within India, only admonishing them lightly. The Americans needed Pakistan's support for their operations in Afghanistan, without adding to their woes. Further, with US improving ties with Iran, Pakistan's usefulness reduced. This change is now becoming evident, especially as the battle for the White House gathers heat. There is a realization that India is becoming strategically important in the region, especially to deal with growing Chinese assertiveness and a nuclear Pakistan.

However, America's fear of Pakistan's nuclear status and security of its arsenal would compel continued support to Islamabad. It is evident, that whenever US-Pak relations tend to move away from the normal, there is always a statement by Pakistan stating that it would seek to maintain a credible nuclear deterrent. This vague statement conveys a lot. In summary it appears that somewhere down the line Pakistan is losing its way and its advantage of it being a front line nation in the battle against terror.

In the recent past, China has been supporting Pakistan to the hilt, by even blocking the Indian proposal to declare the JeM leader as an international terrorist. India raising the issue at every level with China made no impact. Subsequent Chinese statements showed no change in their approach. As per latest reports, work on the China Pakistan Economic Corridor (CPEC) is in progress, along with development of the Gwadar port. Pakistan has deployed over 4,000 troops to ensure security to Chinese personnel employed in their country.

China needs the CPEC and the Gwadar port to bypass any threats to its maritime trade and oil imports in the Malacca Straits, in case of any deterioration in relations. Further, it would cut down costs, distance and time, as also lead to development in the Xinjiang province. In addition, it has always considered Pakistan as an alternative to balance India's rising influence and military power. By enhancing Pakistan's military power, it would compel India to also increase its defence spending as India would always be wary of a two front offensive. Therefore, it has invested heavily in the CPEC and in arming Pakistan.

Pakistan is looking for its own gains from the corridor. Whether it would actually gain, only time will tell. However, for obtaining benefits, Pakistan has to ensure security of the corridor and of the Chinese personnel employed. Other than employing additional troops and raising more forces, specifically for the corridor, Pakistan has begun ethnic cleansing in the Baluch region, to curtail their anger against this project. This has only worsened the situation which in time would increase threats to the CPEC and Gwadar.

While China would support Pakistan in its quest to counter India, it is equally wary of Pakistan's terror export policy. Chinese Muslims from Xinjiang province are also part of the Taliban and the

IS. Their return to the region would escalate the existing levels of violence. As the situation worsens in Afghanistan, the same would manifest itself in Xinjiang. While China supports Pakistan, it would be with riders, which Pakistan may not be able to ensure. While the two nations consider themselves as ‘all weather friends’ at present, the future may be different. Core amongst the issues is security of the CPEC, Gwadar development and denying Taliban support to insurgents from Xinjiang. Pakistan’s selective terrorism policy, which ensured its importance to the West, is today its bane. The same policy has backfired both in the international arena and also domestically. It is amongst the countries worst affected by internal terrorism, a monster created within. The world has started to move away, leaving it isolated, with only China being its pillar of support, which is also incumbent on core issues. The time is now ripe for India to push hard for international pressure to compel Pakistan to dismantle its terrorist networks in return for international support, Chinese backing notwithstanding. *(The writer is a retired Major-General of the Indian Army)*

*The Pioneer
10 May, 2016*

Iran test-fires ballistic missile, latest after N deal

Iran test-fired another ballistic missile, the latest in a spate of tests following the implementation of the nuclear deal with world powers earlier this year, according to a report on Monday by the country’s semi-official Tasnim news agency.

The test-firing of the missile was carried out two weeks ago, the agency quoted General Ali Abdollahi, deputy chief of the armed forces’ headquarters, as saying. Tasnim is close to the country’s powerful Revolutionary Guard, which is in charge of Iranian ballistic missiles programme.

The agency said the missile has a range of 2,000 kilometres, or 1,250 miles, enough to reach much of the Middle East. Iranian military commanders have described them as a strategic asset and a strong deterrent, capable of hitting US bases or Israel in the event of a strike on Iran.

*The Asian Age
10 May, 2016*

Minister denies Iran missile test

Iran’s minister of defence denied on Monday that the Revolutionary Guards had recently tested a medium-range ballistic missile, but reiterated that Tehran had not stopped bolstering what it insists is a purely defensive arsenal. Earlier, the Tasnim news agency quoted Brigadier General Ali Abdollahi as saying Iran had successfully tested a precision-guided missile two weeks ago with a range of 2,000 km.

The Islamic Republic has worked to improve the range and accuracy of its missiles over the past year, which it says will make them a more potent deterrent with conventional warheads against its enemy Israel.

“We haven’t test-fired a missile with the range media reported,” Iranian defence minister Hossein Dehghan was quoted as saying by the state news agency IRNA.

The US and some European powers have said other recent tests violate a United Nations resolution that prohibits Iran from firing any missile capable of carrying a nuclear warhead. Iran says the missiles are not designed to carry nuclear warheads, which it does not possess.

In April, Gen. Amir Ali Hajizadeh, chief of the Revolutionary Guard's airspace division, said a new, upgraded version of the Sajjil — a solid fuel high-speed missile with a range of 1,200 miles that was first tested in 2008 — would soon be ready.

Washington has imposed new sanctions on Tehran over recent tests, even after it lifted nuclear-related sanctions in January as Tehran implemented the nuclear deal it reached with world powers in 2015.

Iran's Supreme Leader Ayatollah Ali Khamenei said in March that missile development was key to the Islamic Republic's future, in order to maintain its defensive power and resist threats from its enemies.

The Statesman
10 May, 2016

China hits out at 'chairman' Kim's N-intent

Beijing: Chinese state-run media today played down North Korean leader Kim Jong-Un's pledge not to use nuclear weapons unless his country's sovereignty is threatened, saying that his pursuit of atomic arms remained dangerous.

Beijing is Pyongyang's main diplomatic protector and source of trade and aid, but relations between them have become increasingly strained by the North's nuclear ambitions, and Kim has yet to visit his neighbour.

The North's first ruling party congress in nearly 40 years formally endorsed Kim's policy of expanding the country's nuclear arsenal, after he said it would not use the weapons unless attacked, and would work for global denuclearisation.

But the international community and the United Nations have long demanded an end to the North's nuclear and missile programmes.

Kim's declaration "was made from the perspective that North Korea is now a nuclear state", China's Global Times newspaper, which is close to the ruling Communist party, said in an editorial.

As such, it said, its "attitude has not changed, and neither has its biggest contradiction with the outside world been resolved".

"Major countries will not change their stance to recognise North Korea as a nuclear state," it added. "As long as Pyongyang resists giving up its nuclear weapons, normalising relations with the outside world will be highly unlikely."

China's foreign ministry said that Beijing's position on the nuclear question "remains unchanged" following the weekend's events.

"We maintain that all resolutions of the UN Security Council related to the issue should be applied by all the parties," spokesman Lu Kang told reporters at a regular briefing.

There were no Chinese representatives at the Workers' Party gathering, the Global Times reported last week, although a large delegation attended the previous congress in 1980 headed by Li Xiannian, later China's official head of state.

Beijing has been reluctant to take measures against the North, fearing that a crisis could send floods of refugees into its territory. It also views as anathema the prospect of US troops on its border in a reunified Korea.

The North's nuclear programme had been a factor in the US and South Korea "constantly upgrading their military preparation for strikes against Pyongyang", the newspaper said.

The Tribune
10 May, 2016

Russia marks World War-II victory anniversary

Kremlin uses parade to boost patriotism, unity | Putin watches event at Red Square



Russian President Vladimir Putin (3rd L) and Kazakhstan's President Nursultan Nazarbayev (2nd L) attend the Victory Day military parade at Red Square in Moscow on Monday. AFP

Moscow: Russia today staged a grandiose military parade through Moscow's Red Square as part of nationwide celebrations to mark 71 years since the Soviet Union's victory over Nazi Germany in World War II.

Some 10,000 troops, tanks and nuclear missile systems swept across Red Square's cobblestones in front of President Vladimir Putin, senior officials and a handful of war veterans.

Putin addressed the troops, congratulating them on a holiday that traditionally unites Russians across political divides. The Kremlin strongman also took the opportunity to call for the international community to unite in the fight against global terrorism.

"We must overcome this evil, and Russia is open to uniting forces with other states, it is ready to work on the creation of a modern, non-aligned international security system," Putin said.

The parade on Red Square also saw military aircraft, including Su-35 fighter jets Russia uses in its bombing campaign in war-torn Syria, swoop over Moscow in a resounding fly-by. A smaller-scale parade was held on Russia's Hmeimim airbase in Syria, where Moscow is conducting air strikes it says are aimed at extremist groups like the Islamic State. May 9 festivities also took place in some former Soviet republics. Kazakh President Nursultan Nazarbayev sat beside Putin at the Moscow parade, but other foreign leaders were not among the honoured guests. — AFP

Deccan Herald
10 May, 2016

Regulations on UAVs in the offing, concerns remain

Eighteen months after it banned the flying of Unmanned Aircraft Systems (UAS) by non-government entities, India's Directorate General of Civil Aviation (DGCA) has in the last week of April come up with draft rules on the civilian use of UAVs and drones.

The ban was imposed on October 7, 2014, saying there is a need for a Civil Aviation Regulation (CAR) regarding UAS. It had cited concerns on aviation safety if UAS were allowed without any regulation.

With "high density" of manned aircraft traffic in cities, the DGCA felt that UAS pose threat of air collisions and accidents due to lack of regulation, operating procedures and uncertainty of technology. After a series of deliberations with the Ministries of Home Affairs and Defence, the regulator asked stakeholders to submit their response by May 21. Once it is cleared, India will become the sixth country to have regulations to deal with the civilian use of UAS.

However, concerns have been raised over the use of UAS from various quarters, including International Air Transport Association (IATA).

The draft regulation deals with a variety of issues and tries to address concerns. According to it, UAS pose problems to the regulator in terms of ensuring safety of other users of airspace and people on the ground. Regulations are also needed in view of technological advancements in UAS and their increased civil applications.

The draft makes it clear that no foreign person or company can operate a UAS in India. One needs to obtain a Unique Identification Number and Unmanned Aircraft Operator Permit (UAOP) for doing so. It also prohibits international operations of civil UAS and over water territory.

"The unmanned aircraft shall not be flown over the entire air space over the territory of Delhi (30km radius from the Rashtrapati Bhavan) and areas falling within 50 km from the international borders besides sensitive locations." It also talks about not allowing dropping of articles "unless

specially cleared and mentioned in the UAOP,” which could help e-commerce companies like Amazon to launch drone delivery.

One may not be able to do away with use of UAS in the coming days, but it gives a lot of room for concerns – from security to privacy. The IATA has already raised its concerns over drone safety. It was the first to flag caution soon after the DGCA released the draft, saying drones were a threat in every airspace and they were not aware of any particular issue that distinguishes India from other countries.

In every possible international fora, the IATA raised the concern in the past, even as it acknowledged the growing industry and its benefits. The most important concern raised is how the use of the Unmanned Aerial Vehicle (UAVs) could affect the airspace. Some sections fear that it creates potential threat to manned aircrafts. They say monitoring may not be an easy way. It could become a drag on the efficiency of airways and a safety threat to commercial aviation, they fear.

Security threat

The aviation regulators highlighted that miscreants could hack into UAVs with the intent of causing harm to the nation. With terrorists looking for new avenues, concerns are raised that they would use cyber experts to target these drones or UAVs. While espionage by private parties and intrusive surveillance are their other concerns. Besides, accidents due to battery discharge of the UAS also cannot be ruled out.

Any new regulation could not avoid citizen’s right to privacy. An argument against civilian use of UAS is that it could be used for collecting personal information. It is a question how authorities can ensure that there is no unauthorised data collection. Drone photography could be another problematic issue.

Though unrelated to the publication of draft regulation, Congress MP Rajeev Satav tabled a Private Members’ Bill in Lok Sabha on April 29 seeking to make certain that there is no violation of privacy due to photography using new technology, including using drones. The bill aims to prevent “adverse photography with a view to ensure that advancement in photography and drone technology does not lead to violation of privacy of individuals or servicemen on the line of duty or pose threat to the places of national or strategic importance.”

However, if this technology is controlled, it could bear many benefits. It can be used in damage assessment of property and life in areas affected by natural calamities, monitoring of critical infrastructure including power facilities, ports and pipelines, while commercial photography and aerial mapping are other avenues. The draft also mentions that its use is increasingly expanding in the recreational field.

But before the draft is translated into law and then enforced, the Home Ministry and the Defence Ministry have to reach a consensus on who will take action against the intruding unmanned aerial vehicles. There needs to be clarity on the rules and people need to know about it. For instance, the Federal Aviation Administration (FAA) of the United States, which last year came up with UAS regulations, has launched a campaign ‘Know Before You Fly’ along with the aviation industry to educate people about the use of drones.

Only in the past one year, several incidents of unauthorised use of drones were reported. Two youths working for an online real estate firm flew drones to photograph certain localities for their business but landed in police net in one of the incidents in the US. To ensure that no such incident takes place, India needs to tighten its regulations before opening up the skies to unmanned aerial vehicles.

The Hindu
10 May, 2016

Gorakhpur scientist bags SGD 3mn grant from Singapore's NRF

Dr. Manvendra K Singh, an Indian scientist from Uttar Pradesh's Gorakhpur city, has been awarded a grant of SGD 3mn (about Rs. 14.7 crore) by the National Research Foundation, Singapore, to research in congenital and adult cardiovascular diseases. The NRF, a department within the Prime Minister's Office, Singapore, is responsible for developing strategies, policies and plans for research, innovation and enterprise. Dr. Singh, who works as an assistant professor in the cardiovascular and metabolic disorders programme at Duke-NUS Medical School, Singapore, said he is among the seven young scientists from across the world to be endowed with the Singapore NRF fellowship to carry out cutting-edge research this year.

He has been awarded the fellowship to pursue research in the field of congenital and adult cardiovascular diseases.

Singh said his research interest is to study congenital and adult heart diseases, which are the leading causes of mortality worldwide. In Singapore, cardiovascular disease accounted for 30 per cent of the total deaths in 2014.

"Our laboratory studies the molecular mechanisms that regulate cardiovascular development, homeostasis and disease.

Our goal is to understand how signaling pathways and transcriptional networks regulate cardiovascular cell lineages differentiation and their interaction during heart morphogenesis.

"Our work aims for better understanding of congenital human diseases of the heart by establishing mouse models for these disorders and delineating the molecular changes associated with them," he said. Singh, also an adjunct assistant professor at National Heart Research Institute Singapore and Department of Cell and Developmental Biology, University of Pennsylvania, USA.

He did MSc Biotechnology from Madurai Kamaraj University before joining MD/Ph.D program in Molecular Medicine at Hannover Medical School, Germany.

Singh further said he has also been awarded PhD prize from Hannover Biomedical Research School, Germany for his PhD thesis, excellent performance as an international student and for his social and cultural engagement.

"Our long-term goal is to apply lessons learned from our developmental studies to better understand and treat cardiovascular diseases," he added. - PTI

Mercury's Sun moment thrills sky gazers

Professional and amateur astronomers turn their telescopes towards the planet for a closer look

Mercury's rare transit across the Sun on Monday was cheered by enthusiasts across the country, with professional and amateur astronomers positioning their telescopes towards the planet in the evening sky for a closer look.

The Jawaharlal Nehru Planetarium in Bengaluru had arranged for different modes to view the rare event and the skies remained clear, enabling a good view. Apart from the Newtonian telescopes set up on the planetarium campus, a Coude telescope was set up on the terrace. Sun-spotters were also kept alongside, with volunteers helping the viewers spot Mercury against the fiery backdrop of the Sun. Live telecasts from different centres in India and abroad were arranged.

"I was born in 2003, so I missed it the last time," said enthusiast Supratim Jash, a class seven student, who had made his father, Soumitra Jash, a scientist, take off early from work to accompany him.

In Chennai, at 4 p.m. several people queued up at the Periyar Science and Technology Centre, which also houses the planetarium, to watch the celestial event. The Birla Planetarium set up three telescopes for the enthusiastic visitors, while two other scopes projected the image on to a small screen. Some people who had come to the planetarium used welding gear to try and look at the sun.

Rare occurrence

In Vijayawada, children and youngsters of Krishna Lanka spotted Mercury moving slowly as a tiny dot in front of the Sun.

Mercury's transit occurred from 4.40 p.m. to 6.28 p.m., lasting 1.48 hours. A five-inch Newtonian reflector telescope was used to spot the rare occurrence, said a participant.

Cloudy weather in Hyderabad left sky gazers disappointed. The persistent few, however, managed to join rest of the world to get a glimpse of the celestial event when clouds parted for a brief two minutes before sunset in the city.

Gene that gives carrots their colour identified

Scientists decode the vegetable's complete genome

Scientists unveiled on Monday the gene in carrots that gives rise to carotenoids, a critical source of Vitamin A and the pigment that turns some fruits and vegetables bright orange or red.

Un-poetically dubbed 'DCAR_032551', the star gene emerged from the first complete decoding of the carrot genome, published in the scientific journal *Nature Genetics*.

“Vitamin A deficiency is a global health challenge,” the study pointed out.

“Its plentiful carotenoids make carrot an important source of provitamin A in the human diet.”

Carotenoids were first discovered in carrots (hence the name), but which among the vegetable’s newly tallied 32,115 genes was most responsible for their formation remained a mystery. The researchers sequenced the genome of a bright orange variety of the vegetable called the Nantes carrot, named for the French city.

Daucus carota now joins a select club of about a dozen veggies — including the potato, cucumber, tomato and pepper — whose complete genomes have been sequenced.

Laying bare the humble carrot’s genetic secrets will make it easier to enhance disease resistance and nutritive value in other species, the researchers said.

Having identified the mechanism controlling the accumulation of carotenoid, it may be possible — through gene-editing, for example — to import it to other staple root vegetables such as the cassava, native to South American and widely grown in Africa. “These results will facilitate biological discovery and crop improvement in carrots and other crops,” said Philipp Simon, senior author and a professor at the University of Wisconsin-Madison.

Among vegetables spinach and peas are widely associated with growing up strong, but it’s hard to beat the carrot when it comes to health boosters.

Carrots are loaded with beta-carotene, a natural chemical that the body can transform into Vitamin A. The deeper the orange colour, the more beta-carotene.

Carotenoids are also antioxidants, which are thought to protect against heart disease and some forms of cancer by neutralising so-called “free radicals”, single oxygen atoms that can damage cells.

“Some of these compounds can prevent disease,” Mr. Simon said.

“Carrots are an interesting crop to work on because of their wide range of diversity. They are familiar to everyone, and generally well-regarded by consumers, but like most familiar things, people don’t necessarily know the background stories,” said Mr. Simon, led the study published in the journal *Nature Genetics* .

Interestingly, carrots — along with many other plants — have about 20 per cent more genes than humans.

Looking back at the plant’s family tree, scientists have been able to determine that it split with the grape about 113 million years ago and from the kiwi about 10 million years after that, when dinosaurs still lorded over the planet.

Originally white, the wild ancestors of the carrot likely came from central Asia. The earliest record of carrots as a root crop dates from 1,100 years ago in Afghanistan, but those were yellow carrots and purple ones, not orange ones. Paintings from 16th century Spain and Germany provide the first unmistakable evidence for orange carrots. Global crop production of the root has quadrupled in the last 40 years and is today eaten everywhere in the world. — AFP/Reuters

Regrowing body parts now closer to reality?

A future, in which humans regrow lost or diseased body parts, may feel like a mirage, but a team of scientists begs to differ. Researchers at the Translational Genomics Research Institute (TGen) and Arizona State University (ASU) have identified tiny RNA switches, known as microRNAs, which may hold the keys to regenerating muscles, cartilage and spinal columns.

The team, for the first time, identified three microRNAs, which turn genes on and off, that are associated with the regeneration of tails in the green anole lizard, *Anolis carolinensis*.

Using next-generation genomic and computer analysis, scientists hope their findings will help lead to discoveries of new therapeutic approaches to switch on regeneration genes in humans.

“Since microRNAs are able to control a large number of genes at the same time, like an orchestra conductor leading the musicians, we hypothesised that they had to play a role in regeneration,” said Kenro Kusumi, a professor at ASU.

“Our earlier work found that hundreds of genes are involved in regeneration, and we are very excited to study these three new microRNAs,” Kusumi said. Elizabeth Hutchins, a postdoctoral fellow at TGen hopes the findings will eventually enable such things as regenerating cartilage in knees, repairing spinal cords in accident victims, and reproducing the muscles of injured war veterans. “This work highlights the importance of tiny RNA molecules in the tissue regeneration process, and showed for the first time an asymmetric microRNA distribution in different portions of the regenerating lizard tails,” said Marco Mangone, assistant professor at ASU. “It seems like microRNAs may play an active role in this process, and are potentially able to shape the regenerating lizard tail like playdough,” Mangone said. The study was published in the journal *BMC Genomics*....ANI/PTI

World’s first holographic flexible smartphone developed

Scientists claim to have developed the world’s first holographic flexible smartphone that lets users interact with 3D videos and images without any headgear or glasses.

The device, dubbed HoloFlex, is capable of rendering 3D images with motion parallax and stereoscopy to multiple simultaneous users without head tracking or glasses.

“HoloFlex offers a completely new way of interacting with your smartphone. It allows for glasses-free interactions with 3D video and images in a way that does not encumber the user,” said Roel Vertegaal, from Queen’s University in Canada.

HoloFlex features a 1920x1080 full high-definition Flexible Organic Light Emitting Diode (FOLED) touchscreen display.

Images are rendered into 12-pixel wide circular blocks rendering the full view of the 3D object from a particular viewpoint.

These pixel blocks project through a 3D printed flexible microlens array consisting of over 16,000 fisheye lenses. The resulting 160x104 resolution image allows users to inspect a 3D object from any angle simply by rotating the phone.

HoloFlex is also equipped with a bend sensor, which allows for the user to bend the phone as a means of moving objects along the z-axis of the display.

Vertegaal envisions a number of applications for the new functionality of the HoloFlex technology.

A first application is the use of bend gestures for Z-Input to facilitate the editing of 3D models, for example, when 3D printing.

Using the touchscreen, a user can swipe to manipulate objects in the x and y axes, while squeezing the display to move objects along the z-axis.

Due to the wide view angle, multiple users can examine a 3D model simultaneously from different points of view.

“By employing a depth camera, users can also perform holographic video conferences with one another,” said Vertegaal.

“When bending the display users literally pop out of the screen and can even look around each other, with their faces rendered correctly from any angle to any onlooker,” he said.

HoloFlex also can be used for holographic gaming. In a game such as Angry Birds, for example, users would be able to bend the side of the display to pull the elastic rubber band that propels the bird.

When the bird flies across the screen, the holographic display makes the bird literally pop out of the screen in the third dimension.

The Asian Age
10 May, 2016

New algorithm will teach computers human languages

London: Scientists have developed a set of algorithms that will help teach computers to process and understand human languages.

While mastering natural language is easy for humans, it is something that computers have not yet been able to achieve.

Humans understand language through a variety of ways, for example by looking it up in a dictionary, or by associating it with words in the same sentence in a meaningful way.

The new algorithms developed by researchers at the University of Liverpool

The new algorithms will enable a computer to act in much the same way as a human would when encountered with an unknown word

in the UK will enable a computer to act in much the same way as a human would when encountered with an unknown word.

When the computer encounters a word it doesn't recognise or understand, the algorithms mean it will look up the word in a dictionary, and tries to guess what other words should appear with this unknown word in the text.

It gives the computer a semantic representation for a word that is both consistent with the dictionary as well as with the context in which it appears in the text.

In order to know whether the algorithm has provided the computer with an accurate representation of a word it compares similarity scores produced using the word representations learnt by the computer algorithm against human rated similarities. — PTI

The Times of India
10 May, 2016

Digital reading may change way you think

Washington: Tablet and laptop users, take note! Using digital platforms for reading may change the way you think, making you more inclined to focus on concrete details rather than interpreting information more abstractly, a new study by scientists from Dartmouth College in the US has found.

The findings serve as another wake-up call to how digital media may be affecting our likelihood of using abstract thought, researchers said. The research was comprised of four studies that evaluated how information processing is affected by each platform. More than 300 participants, aged 20 to 24, took part in the studies.

“Given that psychologists have shown that construal levels can vastly impact outcomes such as self-esteem and goal pursuit, it is crucial to recognise the role that digitisation of information might be having on this important aspect of cognition,” said Geoff Kaufman from Dartmouth College...PTI

Deccan Herald
10 May, 2016

Solar-powered light-emitting cement developed

Currently, the cement exists in blue or green colour, and the light intensity can be regulated to avoid dazzling drivers.

Washington: Scientists have created a new light-emitting cement that could last a hundred years and illuminate roads, highways or bicycle lanes at night by absorbing solar energy during the day. Currently, the cement exists in blue or green colour, and the light intensity can be regulated to avoid dazzling drivers.

"The main issue was that cement is an opaque body that doesn't allow the pass of light to its interior," said Jose Carlos Rubio, from Michoacan's University of San Nicolas Hidalgo (UMSNH) in Mexico. Rubio explained that common cement is a dust that when added to water dissolves like an effervescent pill. "In that moment it starts to become a gel, similar to the one used for hair styling, but much stronger and resistant; at the same time, some crystal flakes are formed, these are unwanted sub-products in hardened cement," Rubio said.

Due to this, researchers focused on modifying the micro-structure of the cement in order to eliminate crystals and make it completely gel, helping it to absorb solar energy and then return it to the environment as light. By the morning, the building, road, highway or structure that is made out of this new cement can absorb solar energy and emit it during the night for around 12 hours, researchers said.

Rubio said that most fluorescent materials are made out of plastic and have an average of three years of life span because they decay with UV rays. However, the new cement is sun-resistant and has an estimated lifespan of 100 years. The material is made out of sand, dust or clay that becomes the gel, and the only residue of its production is water vapour, researchers said.

The Economic Times
09 May, 2016

NASA makes 56 patents free for commercial use

Washington: NASA has released 56 formerly-patented agency technologies into the public domain, making them freely available for unrestricted commercial use.

In addition to the release of these technologies, a searchable database now is available that catalogues thousands of expired NASA patents already in the public domain, the US space agency said.

These technologies were developed to advance NASA missions but may have non-aerospace applications and be used by commercial space ventures and other companies free of charge, eliminating the time, expense and paperwork often associated with licensing intellectual property.

The technologies include advanced manufacturing processes, sensors, propulsion methods, rocket nozzles, thrusters, aircraft wing designs and improved rocket safety and performance concepts, NASA said.

"By releasing this collection into the public domain, we are encouraging entrepreneurs to explore new ways to commercialise NASA technologies," said Daniel Lockney, NASA's Technology Transfer programme executive.

This patents release is the latest in NASA's long tradition of extending the benefits of its research and development into the public sector, where it may enhance the economy and quality of life.

The innovations included in this transfer were selected by NASA officials using a rigorous review process, during which decision-makers looked for technologies that offer the potential for high unit values but are less likely to be licensed by outside companies because of low demand for resulting

products (eg spacecraft), or the technology still requires significant development before it is marketable.

A few examples include technologies designed to mitigate the dangerous gases created as humans live and work in space; inventions related to rocket nozzles, injection systems and propellants that might help launch a new generation of commercial spacecraft; and methods for controlling airflow around vehicles in hypersonic flight.