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Rijiju to get a taste of flying jet

Minister of State for Home Kiran Rijiju will get a taste of fighter flying on Wednesday when he gets a ride in Indian Air Force's combat jet Su-30MKI. The defence ministry has cleared Rijiju's sortie from Halwara air base in Punjab. The IAF has earlier given fighter jet experience to top government functionaries like former Presidents Pratibha Patil and APJ Abdul Kalam.

Business Standard
18 May, 2016

Hawk trainer to enhance defence ties with UAE, Oman

By Ajai Shukla

The proposed official trip of Defence Minister Manohar Parrikar to UAE has been delayed due to certain scheduling issues and he will now travel to Oman on May 20 and then to the Emirates

Until recently, the Indian Air Force (IAF) planned for the possibility of United Arab Emirates (UAE) supplying up to a squadron of F-16 fighters to boost the Pakistan Air Force (PAF) in an Indo-Pakistan conflict. Now, dramatically signalling the transformed relationship between New Delhi and Abu Dhabi, an IAF contingent returning to India next month from the on-going Red Flag exercise in the US will train with the UAE air force. Its pilots fly the world's most potent F-16s, the Block 60 version, superior even to US Air Force F-16s and to the Block 50/52 version that Washington supplies Pakistan.

The UAE is unlikely to choose defence equipment manufactured in India, the oil-rich country preferring state-of-the-art western weaponry, like the Block 60 F-16. Even so, New Delhi hopes to overhaul and upgrade the Hawk trainer jets that both the UAE and Royal Omani Air Force fly.

The IAF has the world's largest Hawk fleet, and Hindustan Aeronautics (HAL) continues to manufacture the advanced jet trainer at Bengaluru. In May 2015, HAL and BAE Systems, the Hawk's original manufacturer, agreed "to collaborate towards developing a comprehensive fleet support service for India's Hawk and Jaguar aircraft". HAL hopes to take this forward, becoming the hub that supports several Hawk fleets in the region.

Of the 161 Hawks flying in West Asia, the UAE operates 46 and Oman flies 25. Saudi Arabia operates 72; Kuwait 12 and Bahrain six. Another 190 Hawks fly with other Asian and African air forces, including 33 with Australia; 60 with Indonesia; 28 with Malaysia; 20 with South Korea; 24 with South Africa; 12 with Kenya; and 13 with Zimbabwe.

Besides the Hawk trainer, the UAE and Indian air forces enjoy several other commonalities. UAE operates 63 Mirage-2000-9 fighters, the most potent version of the IAF's Mirage 2000. The UAE also flies the Apache AH-64D (28 attack helicopters) and the Chinook CH-47D (eight heavy lift choppers) that the IAF has contracted to buy from Boeing. Both air forces operate variants of the C-17 Globemaster III and the C-130 Hercules transport aircraft.

Growing defence and counter-terrorism cooperation between India and UAE has been catalysed by Abu Dhabi's sharp U-turn from the time PAF pilots trained its air force and retired PAF technicians maintained its Mirage III and F-16 fighters. This has been catalysed by the radical threat posed by the Islamic State of Iraq and Syria (ISIS).

During Prime Minister Narendra Modi's visit to UAE last August, the two countries forged a "comprehensive strategic partnership". On its heels came the February visit to New Delhi of the Crown Prince of Abu Dhabi, Mohammed bin Zayed al Nahyan, when "the two renewed their commitment to strengthening the existing cooperation in training, joint exercises, and participation in defence exhibitions, as well as in identifying opportunities to cooperate on the production of defence equipment in India".

The UAE has detected and deported terrorist sympathisers from the two million Indians working in that country, handing them over to Indian authorities. al Nahyan, visiting soon after the terrorist attack on the Pathankot Air Base this year, condemned cross-border terrorism. If the UAE is a new friend, Oman has long been India's most steadfast partner in West Asia. Muscat and New Delhi signed a military protocol in 1972, and the two air forces together conducted Exercise Eastern Bridge in 2009 in Oman, and in 2011 in India.

This incorporated the common Jaguar fighter, which both operated until Oman retired its Jaguars in 2014 and bought the Eurofighter. Until then, Jaguar spares built by HAL were sold to Oman. With the IAF looking to extend the service life of its six Jaguar squadrons by fitting in new engines and avionics, Oman's 24 retired Jaguars could be of interest to the IAF.

Oman sent a naval vessel to participate in the International Fleet Review that the navy hosted in Visakhapatnam in February. When the Tejas flew the long journey to Bahrain for its first international outing in the Bahrain International Air Show, it staged through Muscat, Oman.

The Pioneer
18 May, 2016

‘Nuclear competition among China, India, and Pak could escalate’

Small increments of stockpile growth and multiple warhead missiles will ratchet up a triangular nuclear competition among China, India and Pakistan, a new book has said while warning that there are no realistic prospects for banning such arsenal.

With China beginning its long-awaited deployment of the DF-5B intercontinental ballistic missile, India and Pakistan are likely to respond by placing multiple warheads atop some of their missiles, the book titled ‘The Lure and Pitfalls of MIRVS: From the First to the Second Nuclear Age’ said.

The book, co-edited by Michael Krepon, Co-founder of the Stimson Center, and Shane Mason, says that in the second nuclear age, no less than the first, there are no realistic prospects for banning multiple-warhead missiles. China has started to deploy such missiles, and India and Pakistan are likely to cross this threshold as well.

Obama objects to blocking of Pakistan aid

White House says conditioning assistance will “unnecessarily complicate progress” in ties.

The Obama administration has opposed the Republican-controlled Congress’s move to block \$450 million in aid to Pakistan for failing to “demonstrate its commitment” and taking action against the Haqqani network.

A White House statement in this regard came as the bill made its way to the House of Representatives from House Armed Services Committee.

The White House asserted that it shares the view of the lawmakers with regard to the Haqqani network, but such a move would “unnecessarily complicate progress” in bilateral ties. The House is likely to vote on the bill later this week.

Action against Haqqanis

According to the National Defense Authorization Act 2017, of the total amount of reimbursement and support authorised for Pakistan during the period beginning on October 1 this year, and ending on December 31, 2017, \$450 million would not be eligible for a national security waiver unless the Secretary of Defence certifies that Pakistan continues to conduct operations against Haqqanis.

The Administration objects to the particular section of the bill, “which would make \$450 million of CSF (Coalition Support Fund) to Pakistan ineligible for the Secretary of Defense’s waiver authority unless the Secretary provides a certification to the Congressional defense committees,” the White House said.

“We share the Committee’s concerns regarding the threat posed to our forces and interests in Afghanistan by the Haqqani Network, and we continue to engage with Pakistan at the highest levels regarding the need for concerted action specifically against the group,” it said. It added: “However, the restriction would unnecessarily complicate progress in our bilateral relationship on this issue and would limit the Secretary of Defense’s ability to act in the U.S. national security interest.”

Under this new proposed provision, the Defense Secretary also needs to certify that Pakistan is demonstrating commitment to prevent the Haqqani Network from using North Waziristan as a safe haven and is actively coordinating with Afghanistan to restrict the movement of terrorists, including the Haqqani Network, along the Pakistan-Afghanistan border.

Certification requirement

There is similar certification requirement in the year ending on September 31, 2016, but the amount is \$300 million. The Defence Secretary has not been able to give necessary certification for the release of the fund to Pakistan so far. The House Armed Services Committee says that it will continue to review the reimbursements made to Pakistan and how it aligns with the future of U.S. policy, including key counter-terrorism objectives, in the region. The Obama Administration has opposed any move to either restrict or condition U.S. military aid to Pakistan, arguing that its ties with Islamabad are very important.

‘Ties with both India and Pak. are vital’

The United States views its relationships with India and Pakistan individually and not as a “zero-sum game”, the Pentagon has said.

The issue was clarified by U.S. Defence Secretary Ashton Carter during his trip to India last month, Pentagon Press Secretary Peter Cook said.

“We have an interest and Pakistan has an interest in going after terrorist groups in that country... At the same time, we have security interests with India that stand alone and stand apart,” he said, adding that Mr. Carter feels very strongly that the relationship can be enhanced further.

“We have made significant strides in the last few years with regard to that, last few months, even. And he sees that continuing to build, and he does not see those two issues, if you will, not getting in the way of each other,” he said in his statement to reporters.

The Hindu
18 May, 2016

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The Times of India
18 May, 2016

Pak being Pak, goes to UN with satnav bill, faces India ridicule

Islamabad Has No Locus Standi: Delhi

Pakistan has approached the UNSC against India's proposed Geospatial Information Regulation Bill alleging that India was acting in violation of council resolutions on Jammu and Kashmir, prompting a strong Indian response that Islamabad has no locus standi on the issue.

The Indian government has reiterated that entire Jammu & Kashmir is an integral part of India, including the portion under Pakistani occupation. “The proposed bill is an entirely internal legislative matter of India, since the whole of the state of J&K is an integral part of India. Pakistan or any other party has no locus standi in the matter,” said MEA spokesperson Vikas Swarup.

“The government firmly rejects Pakistan's repeated and increasing attempts to impose on the international community matters that India has always been open to address bilaterally with Pakistan,” he added.

Pakistan announced earlier that it had expressed serious concern to the UN secretary general and the president of the UN security council, through letters by its Permanent Representative in New York, with regard to the Indian government's efforts to introduce a “controversial” Geospatial bill in the Indian Parliament.

In violation of UNSC resolutions, Pakistan claimed, the official map of India had been depicting the disputed territory of J&K as part of India “which is factually incorrect and legally untenable”.

“Through the passage of this bill, the Indian government would penalise the individuals and organisations who depict Jammu and Kashmir as a disputed territory as per the United Nations Security Council (UNSC) resolutions,” it said.

According to Pakistan, the letter called upon the United Nations to uphold the UNSC resolutions and urge India to stop such acts which are in violation of international law.

According to the draft bill, wrong depiction of the map of India could land the violators in jail with a maximum term of seven years and impose a fine up to Rs. 100 crore.

Deccan Herald
18 May, 2016

Pak's F-16 predicament

By Harsh V Pant

The US Congress objected to the use of its funds to subsidise the sale of F-16s based on the Pakistan govt's support of militant groups.

Much to Islamabad's chagrin, the message coming out from Washington is loud and clear. Pakistan is now being asked to pay for F-16 jets out of its own pocket. The message that the US Congress is sending to Pakistan after it threatened to yank financing for F-16 jets ordered by the country cannot be more categorical.

Pakistan can still purchase the fighter jets, but Senate Foreign Relations Committee Chairman Bob Corker has promised to block any US funding for the deal in a reflection of Congressional anger at the Pakistani government for, what many say, are its close relationships with anti-American Islamist militants. The jets, along with other military equipment, approved for sale to Pakistan, will cost around \$700 million to the US exchequer.

Earlier this year, the Obama administration had approved the sale of up to eight F-16 fighter jets to Pakistan. But Bob Corker announced last week that Pakistan will have to pay full price for its purchase of fighter jets from the United States. Corker commented, "Given Congressional objections, we have told the Pakistanis that they should put forward national funds for that purpose."

Some members of the Congress, led by Corker, had objected to the use of US funds to subsidise the sale of the F-16s to Pakistan based on what they see as the Pakistani government's support of militant groups that have targeted Americans and Afghans and their inadequate support of the Afghan peace process.

Pakistan is now reportedly exploring alternative options such as the Russian SU35 and the Chinese J10 and J20 stealth fighters. Sartaj Aziz, the Pakistani prime minister's adviser on foreign affairs, said that Pakistan will "opt for jets from some other place" if US funding is not arranged.

It is clear that even if this immediate matter of F-16 sale is resolved, the US-Pakistan relations are in for troubles times. And this has been clear for quite some time now. In many ways, this was bound to happen. Pakistan could not have expected to play China and the US against each other for this long. Moreover, the country's dubious role in Afghanistan is creating a strong backlash in the US.

In his address to a joint session of Afghanistan's two houses of parliament last month, Afghan President Ashraf Ghani threatened to lodge a formal complaint against Pakistan at the United Nations. In a departure from his earlier stand, Ghani called on Pakistan to forego attempts to bring the Taliban to negotiations and take military action against the militant group.

The Afghan president threatened, "If we do not see a change, despite our hopes and efforts for regional cooperation, we will be forced to turn to the UN Security Council and launch serious

diplomatic efforts." Despite Pakistan's repeated assertions that it would go after Taliban leaders who refused to engage in the peace process involving Afghanistan, Pakistan, the US, and China, negotiations have stalled and deadly attacks in Afghanistan have increased as the militant group carries out its spring offensive.

On April 19, the Afghan Taliban claimed attack against a security agency responsible for protecting senior government officials and VIPs, which killed 64 people and injured 347 others. Afghanistan has alleged that this deadly attack in Kabul was planned by the Haqqani network in Pakistan. Rather than engaging Pakistan, Kabul is now talking of isolating it in response.

Dawa Khan Meenpal, deputy spokesperson for President Ashraf Ghani recently suggested, "Pakistan is in the state of isolation. We want to use diplomatic initiative to isolate Pakistan at regional and international levels and to tell the world community where terrorists are and which country and intelligence (agency) support them." Washington's anger is reflective of this growing divide in Afghanistan-Pakistan relations.

India's displeasure

When the Obama administration had decided to go ahead with the sale of F-16s to Pakistan, India's reaction was strong. It had openly disagreed with the US stand that this sale would help in the fight against terrorism and, instead, had argued that it would be used against India. The US Ambassador to India was summoned to underscore the country's displeasure. New Delhi is seriously concerned about the changing balance of air power in the region as Islamabad today has four squadrons of F-16 fighters, all built with the US assistance.

But Indo-US ties today are at a completely different level. As Prime Minister Narendra Modi gets ready to address the US Congress next month, Washington and Delhi need to find a better way of managing Pakistan so as not to impact the positive trajectory of their bilateral ties. There is a larger strategic reality that confronts India and the US beyond Pakistan. This is clear from recent attempts by the two states to swap anti-submarine warfare technology in order to counter the threat from Chinese submarines.

It is likely that a joint US-India exercise on anti-submarine warfare will take place in the Philippine Sea and include Japan as the two navies gear up to hedge against patrols by Chinese nuclear-armed submarines. Pakistan is being sent a message from the US polity that it cannot forever blackmail the US. India should remain alive to such changes in the US and leverage them accordingly. (The writer is Professor of International Relations, King's College London)

Deccan Herald
18 May, 2016

'US to blame for tension in South China Sea'

New Delhi: A delegation of scholars from China on Tuesday blamed the US for escalation of tension over the disputed South China Sea.

A day after the first ever India-US maritime security dialogue focussed primarily on Beijing's move to militarise the islands in the disputed South China Sea, a delegation of scholars from academic institutions of the communist country, currently visiting New Delhi, sought to lay the blame on Washington.

Hailin Ye, who heads the Institute of International Strategy Studies at Yunnan in China, said that Beijing initially had no intention to build military infrastructure and deploy military assets and personnel in the islands of the disputed South China Sea.

Security risks from delay

Manifest risks to national security should spur quick decisions

There has been no official word so far on the news flowing from China and pronouncements from the Pentagon in Washington. Taken together, the two suggest that China is gearing for possible military action on the Tibetan plateau through a change of command structure and the mobilisation of forces. That the government – like all its predecessors – prefers to play such issues close to its chest is something that has come to be expected, but that is no reason for accepting official silence on a matter of national security. In its annual report for 2015-16, the defence ministry notes that there has been an “increase in assertiveness” during routine patrolling by the Chinese army, but it is otherwise full of the usual anodyne statements. Given the news reports of the past few days, the ministry must give the country its assessment of the security situation on the disputed land border with China, and whether the short-term threat perception has changed for any reason.

Short-term capabilities are born out of medium-term decisions. It is an unhappy fact that the expenditure on defence, seen in relation to GDP, remains too low. Virtually all equipment procurement programmes – whether being built domestically or negotiated with overseas suppliers – are running many years behind schedule. Four years after the Rafale was picked as the appropriate choice of fighter aircraft, and a year after Prime Minister Narendra Modi announced a reduced order size, no contract has been concluded. Meanwhile, the first of six new Scorpene submarines has ventured out for sea trials and will be inducted into the navy later this year, four years behind schedule — yet without torpedoes, its most important armoury for anti-ship warfare. It is already known that new destroyers are being commissioned without either key ship-to-air missiles or enough anti-submarine helicopters, and with only sub-optimal sonar systems. Even basic equipment like a new assault rifle for the infantry is caught in a bureaucratic logjam. War reserves are being used up for routine operations, there isn't enough ammunition to last a short war...the list goes on.

These problems did not materialise in a day, and there are no overnight solutions. The question is whether enough is being done to make the country's defences progressively more secure, at a fast enough pace. Admittedly, the Modi government has taken a variety of initiatives — for instance, to indigenise the manufacture of defence equipment, improve fighter aircraft maintenance for improved operational availability, and speed up procedural clearances for various acquisitions. However, the actual signing of contracts has been relatively rare. As for warship production, a navy that talks of having more than 60 additional warships in a decade, over and above replacements, is commissioning perhaps three vessels annually, most of them as replacement. If manifest risks to national security do not act as a spur for quick decisions and adequate budgets, what will?

The Financial Express
17 May, 2016

ISRO, DRDO, Aadhaar show public sector capable of path-breaking innovations & solutions; even better than private sector

ISRO has been at the forefront of technological innovation, having developed software in a much cheaper and cost-effective manner.

Indian Space Research Organisation (ISRO) is all set to breach another barrier as it gets ready to launch its first space shuttle this month. While India would become the fifth nation after US, Russia, France and Japan to have built a space shuttle, if successful, the technology will allow for an even more cost-effective mechanism for launching satellites. The RLV-TD (Reusable Launch Vehicle-Technology Development) developed by Isro in five years, at a cost of just R95 crore, is

expected to navigate its way back into Bay of Bengal. Though it will take another 10-15 years to develop the technology for commercial use, according to Isro scientists, once perfected, it would bring the cost down by as much as 10 times, to \$2,000 per kg. The Indian space agency is also expected to conduct landing and further return-flight experiments. Research on space shuttles has been in process for a long time now, but one of the major obstacles for scientists has been the ability to maintain the temperature inside the shuttle once it enters the Earth's atmosphere. The friction leads to temperatures rising to 5,000-7,000 degree Celsius. But the shuttle would incorporate very lightweight, heat-resistant silica tiles and carbon coating to counteract the heat.

Isro has been at the forefront of technological innovation, having developed software in a much cheaper and cost-effective manner. It launched the Mars Orbiter Mission in 2013, for instance, at a cost of \$78 million, one-tenth of what the US space agency NASA spent to develop its Mars Mission. Isro recently also completed the launch of its navigation satellites to aid the development of navigation system, IRNSS. The IRNSS, once fully operational, would make India the fifth country with an indigenously-developed navigation system. More than its own achievements, the Indian space agency's success also demonstrates the ability of government-run enterprises to showcase their effectiveness, if left to manage on their own. DRDO is another example of India's technological prowess—the defence research organisation has been able to successfully test many missiles, and recently tested a supersonic interceptor missile capable of destroying enemy projectiles. The work done by Aadhaar, the National Payments Corporation of India, the National Stock Exchange or the National Securities Depository Limited—or even the National Dairy Organisation in Karnal, which was the first to create an IVF buffalo and clone a buffalo—similarly, has been accepted as world-class examples of frugal innovation. Though government-run organisations are typically seen as slothful and slow in implementing and adopting technology, when freed from bureaucratic control, many have shown themselves to be not only as capable as the private sector, but even better in providing path-breaking innovation and solutions.

Deccan Herald
18 May, 2016

NASA funding sleep-inducing, growable habitats

Washington: Nasa has selected eight technology proposals for investment, including interplanetary habitats that can induce deep sleep for astronauts on long-duration missions, and growable habitats that can be robotically assembled in space.

The selected proposals have the potential to transform future aerospace missions, introduce new capabilities and significantly improve current approaches to building and operating aerospace systems, Nasa said.

The selected concepts include an interplanetary habitat proposed by Space Works Inc in US, configured to induce deep sleep for astronauts on long-duration missions.

A novel coating called "Solar White" developed by Kennedy Space Centre is predicted to reflect more than 99.9 per cent of the Sun's energy.

According to the researchers a sphere covered with a 10 mm thick coating of Solar White and located far from the earth can achieve temperature below minus 223 degrees Celsius, the freezing point of oxygen.

This method can cool fuel tanks in space down to minus 184 degrees Celsius, with no energy input needed.

Another concept proposed by Embry-Riddle Aeronautical University in US demonstrates low-cost atmospheric satellite which is powered by a combination of wind and solar energy and may be able to stay aloft for weeks or even months at a time.

Magnetoshell Aerocapture for manned missions and planetary deep space orbiters, being developed by MSNW Inc in US will use aerodynamic drag forces to slow a spacecraft while it lands on a planetary body.

Aerocapture would enable long term studies of the outer planets and their moons that would not be possible with existing braking technologies, researchers said.

Another proposal by the Texas Engineering Experiment Station seeks to design a rotating habitat with a robotic system that constructs the structure and provides a habitat growth capability.

The Asian Age
18 May, 2016

Cubesat deployed from ISS to study sun's soft x-rays

A NASA-funded CubeSat, of the size of a bread loaf, has been deployed into space from the International Space Station (ISS) to study soft X-ray emissions from the Sun that can affect communications systems on Earth.

The Miniature X-Ray Solar Spectrometer (MinXSS) CubeSat began its journey into space on 16 May and will operate for up to 12 months, NASA said.

The CubeSat will observe soft X-rays from the Sun, which can disrupt Earth's upper atmosphere and hamper radio and global positioning system (GPS) signals travelling through the region.

The intensity of the soft X-ray emissions emitted from the Sun is continuously changing over a large range—with peak emission levels occurring during large eruptions on the Sun called solar flares.

MinXSS data will also help understand the physics behind solar flares.

The soft X-rays carry information about the temperature, density and chemical composition of material in the Sun's atmosphere, allowing scientists to trace how events like flares and other processes heat the surrounding material in the Sun's atmosphere—which are still being debated among solar scientists.

CubeSats are a new, low-cost tool for space science missions. Instead of the traditional space science missions that carry a significant number of custom-built, state-of-the-art instruments, CubeSats are designed to take narrowly targeted scientific observations, with only a few instruments.

The Asian Age
18 May, 2016

Robotic hand maps surroundings in 3D

Scientists, including one of Indian-origin, have developed a robotic hand attached with a camera that can rapidly create a 3D model of its environment and track its own position in real time, enabling it to pick up delicate objects in unknown surroundings.

Researchers from Carnegie Mellon University (CMU) in US found they could improve the accuracy of the map by incorporating the arm itself as a sensor, using the angle of its joints to better determine the pose of the camera.

This would be important for a number of applications, including inspection tasks, said Matthew Klingensmith, a Ph.D. student at CMU.

Placing a camera or other sensor in the hand of a robot has become feasible as sensors have grown smaller and more power-efficient, said Siddhartha Srinivasa, associate professor at CMU.

That is important because robots usually have heads that consist of a stick with a camera on it, Srinivasa said. They cannot bend over like a person could to get a better view of a work space.

However, an eye in the hand is not much good if the robot cannot see its hand and does not know where its hand is relative to objects in its environment.

It is a problem shared with mobile robots that must operate in an unknown environment.

A popular solution for mobile robots is called simultaneous localisation and mapping (SLAM) in which the robot pieces together input from sensors such as cameras, laser radars and wheel odometry to create a 3D map of the new environment and to figure out where the robot is within that 3D world.

“There are several algorithms available to build these detailed worlds, but they require accurate sensors and a ridiculous amount of computation,” Srinivasa said.

Those algorithms often assume that little is known about the pose of the sensors, as might be the case if the camera was handheld, Klingensmith said.

However, if the camera is mounted on a robot arm the geometry of the arm will constrain how it can move, he said.

“Automatically tracking the joint angles enables the system to produce a high-quality map even if the camera is moving very fast or if some of the sensor data is missing or misleading,” Klingensmith said.

The researchers demonstrated their Articulated Robot Motion for SLAM (ARM-SLAM) using a small depth camera attached to a lightweight manipulator arm, the Kinova Mico.

In using it to build a 3D model of a bookshelf, they found that it produced reconstructions equivalent or better to other mapping techniques.

“We still have much to do to improve this approach, but we believe it has huge potential for robot manipulation,” Srinivasa said.

Deccan Herald
18 May, 2016

Astrosat solves decade-old astronomical puzzle

By Kalyan Ray

Ultra-violet telescope helped researchers tackle riddle

New Delhi: India's first space observatory, Astrosat, has solved a cosmic puzzle involving a 7 billion-year-old star cluster located in a far corner of the universe.

An on-board instrument known as UVIT (ultra-violet imaging telescope), with an extraordinary ability to look at the stars and galaxies, helped researchers solve the riddle which baffled the scientific community for a decade.

A star in the cluster NGC 188 has been a puzzle as it is red in visible light, implying that it is a cool star, but it is dazzling in UV, which implies that it is very hot at the same time.

"Now, with Indian UVIT data, scientists have nailed the problem - it turns out that this star is actually a binary system, of a hot and a cool star," Biman Nath, an astrophysicist at the Raman Research Institute, Bengaluru, told DH.

The first set of scientific results from the Astrosat mission were presented before the Indian scientific community last week at a meeting of the Astronomical Society of India at Srinagar in Jammu and Kashmir.

Nath is the chairman of the scientific organising committee, which reviewed these results before they were presented.

Detected first in 1995, the cosmic riddle involves stars that belong to the class of "sub-dwarf". It remained a mystery from the beginning.

Astrosat data showed that these 2 stars were not individual stars, but binaries. This means each one is found to be consisting a very hot star and a cooler star. The properties of the hot component were also derived using the Indian data, for the first time.

"The evolutionary process of these 2 systems is being studied based on the data collected by the UVIT and ground-based telescopes. The Astrosat would aid in solving many such mysteries in future," said Annapurni Subramanian, professor, Indian Institute of Astrophysics, Bengaluru, who was part of the team that analysed the UVIT data.

Launched on September 28, 2015, the Indian space observatory spent just about 7 months in space and has begun to show its ability to the scientific community.

"The spatial resolution with which UVIT can take images is expected to be far better than the previous UV imaging mission by NASA - GALEX (Galaxy Evolution Explorer)," said Subramanian.

Other instruments on-board Astrosat too are throwing up exciting observations. For instance, the hard X-ray instrument CZTI witnessed a gigantic gamma ray burst soon after the window of the telescope was opened.

Apart from the expected results, Astrosat found out additional surprising information for the astronomers. "For the next 10 years, it would be the best X-ray instrument in space," Nath said.

The Pioneer
18 May, 2016

Connecting the Dots in a Connected World

The Internet has become part of millions of people worldwide. It has found many applications, with the smartphones now leading the way. But with increased access has come issues of confidentiality

The Internet was developed as a medium for sharing data. Its basic architectural principles (to break data into a numbered set of small packets and transmit the packets as efficiently as possible), reflects that underlying premise. Each packet is transmitted using the Internet protocol. Packets typically have three parts. The header says where the packet is from (the sender's IP address), where the packet is going (the receiver's IP address), the type of communications protocol (email, Web page, video, voice, and so on), and its position (packet number) in that particular transmission. The payload — the actual content follows. Finally a trailer marks the end of a packet. Applications are broken into packets and then reassembled at the receiver's end.

Mobility of devices means that the user's IP address at the café at 10 am is different from that in the seminar room at 11 am. Each time the user connects back to the network, his IP address is transmitted to his service provider. That is how Facebook communications and your email reach the person even when that person has moved locations and IP address has changed.

IP location provides partial identification. While an IP address delimits a location from which and to which packets are transmitted, that address is, for a number of reasons, not necessarily useful in identification. The IP address may be one used temporarily, and without strong identification, such as at an Internet café or an airport. Without ancillary information, such an IP address may provide minimal identifying information. Another reason that an IP address may not provide definitive

identification is that few routers along the transmission check a sender's address; so spoofing an IP address is easy.

Even if the IP address is correct, it may not provide an investigator with information to determine who is responsible for a particular action. That is because in such instances, the connecting machine may be just a way station. Consider, for example, DDoS attacks (Distributed Denial of Service attacks), in which hundreds of thousands of computers simultaneously send messages to an online service, overwhelming it and taking it offline. The machines sending these messages are simply intermediaries that have been compromised themselves. DDOS is an example of a multistage attack, in which a perpetrator infiltrates a series of machines to launch an attack. Cyberexploits — theft of information from networked systems — are also typically multi-stage attacks. The first machine to receive the exfiltrated data is often itself compromised, and the stolen data will be quickly moved from that machine to another and another — a lengthy chain of compromised machines — before the data ends up in the attacker's hands. An investigation may lead to the initial machine that was used in the scam, but is unlikely to lead all the way to the real attacker.

The fact that IP addresses do not provide precise identity matters very little in certain cases. Spoofing does not concern the Recording Industry Association of America, which uses an IP address as a jumping off point for copyright infringement suits. IP addresses have also served law enforcement as a starting point for investigations. They can also be useful in investigations in which the participants' addresses are related or common.

Investigators often seek identity, though not necessarily at the level of an IP address. Following users across the Internet became important with the arrival of free services such as Facebook, Google search, and Yik-Yak. Such services are supported through advertising.

There are times when identity on the Internet at the level of a person matters. A bank does not particularly care what a user's IP address is, but if there's a transaction occurring, the bank seeks assurance that the person is who he or she claims to be and wants him or her to authenticate the identity at the bank's site.

By making the network indispensable to daily life, the Internet drove the development of smartphones. Most Internet accesses now occur through mobile devices, a fact with profound implications for privacy and surveillance. While a laptop can be 'on' but not connected to the network, if a smartphone is on (and not in 'airplane mode'), it will be connected to the telephone network whenever the provider's system is within range. Thus, a phone's location, is a relatively public piece of information.

Governments are not the only ones following users' locations; in fact, they may be collecting far less information than many private companies. To provide the Internet with services for which smartphones are valued, the phone must provide location information to the app. This is done through GPS, which typically operates on a resolution within ten metres. So, the network provider knows where the phone is and which service the user is communicating from, while the app provider learns phone location and what information is delivered through the app. This is an interesting design choice in location data tracking: Apple's ios8 does not allow apps to collect location information when the app is not in use, but there is no such restriction for Android phones

While the use of encryption for confidentiality had been controlled, its use for authentication — assurance that a person or site is who they say they are — had not. Https, the secure version of the http linking protocol, is used to authenticate a website and encrypt communications between a user and the site. This protocol was essential for electronic commerce, and was already deployed by the mid to late 1990s. Given that https was widely deployed quite early for e-commerce, it is surprising that Web mail, the service that provides email through a browser, was not similarly protected.

An example of alternative privacy protection is Off-the-Record chat. Google's OTR chat does not store chat histories in users' accounts, or in the accounts of the people with whom they are chatting. But Google policy does not preclude storing the communications elsewhere. A more protective version would be not to store the communications whatsoever. Even more protective would be not storing and providing encryption for the chat. Most protective would be to encrypt using a technique called 'forward secrecy', so that even if the encryption key is compromised at some point, no previously intercepted messages can be decrypted.

As the Snowden disclosures confirmed, national security agencies may exploit vulnerabilities in communications devices to exfiltrate data from targets. Such capabilities are used not only by intelligence agencies, but by law enforcement as well. As encryption becomes increasingly common, such 'lawful hacking' will increasingly be used when communications content cannot be retrieved in other ways. It is no silver bullet; a vulnerabilities approach is more complex legally and technically, and more expensive than if unencrypted communications can be made available.

The Times of India
18 May, 2016

Found: Way to make cells burn fat, curb obesity

Scientists have found a new way for stimulating the body to burn fat instead of storing it, a breakthrough that may help fight obesity, diabetes and cardiovascular disease.

In the study, researchers from the McGill University in Canada focus on a protein known as folliculin and its role in regulating the activity of fat cells. By knocking out the gene that produces folliculin in fat cells in mice, researchers triggered biomolecular signals that switched the cells from storing fat to burning it. This process is known as the 'browning' of fat cells.

Deccan Herald
18 May, 2016

Germs may cause type 1 diabetes

Germs may play a role in the development of type 1 diabetes by triggering the body's immune system to destroy the cells that produce insulin, new research suggests.

Scientists have previously shown that killer T-cells, a type of white blood cell that normally protects us from germs, play a major part in type 1 diabetes by destroying insulin producing cells, known as beta cells.

Now, using Diamond Light Source, a team from Cardiff University found the same killer T-cells that cause type 1 diabetes are strongly activated by some bacteria. "Killer T-cells are extremely effective at killing off germs, but when they attack our own tissues, the effects can be devastating," said Prof Andy Sewell, lead author of the study.

"Killer T-cells sense their environment using cell surface receptors that act like highly sensitive fingertips, scanning for germs," said Dr David Cole from Cardiff University. "Sometimes these sensors recognise the wrong target, and the killer T-cells attacks our own tissue. We, and others, have shown this is what happens during type 1 diabetes when killer T-cells target and destroy beta cells. We identified part of a bug that turns on killer T-cells so they latch onto beta cells. This finding sheds new light on how these killer T-cells are turned into rogues, leading to the development of type 1 diabetes," said Cole.

First Zika virus clone developed

Scientists have genetically engineered a clone of the Zika virus strain for the first time, an advance that may aid the development of vaccine and therapies against the infection, linked to birth defects, such as microcephaly and Guillain-Barre syndrome. Cloning the virus unlocks scientists' ability to more quickly develop countermeasures and explore the evolution of the virus.

The researchers from the University of Texas Medical Branch (UTMB) constructed the Zika virus clone. Five fragments spanning the complete viral genome were cloned and assembled into the full-length clone of the Zika virus.

The infectious complementary DNA (cDNA) clone allows researchers to make Zika virus from test tube and cells on petri dishes. The researchers then used the UTMB-developed Zika mouse model to demonstrate that the cloned virus infected the mice and gave them neurological disease.

The team fed *Aedes aegypti* mosquitoes, one of the types known to transmit Zika, with human blood infected with either the parental Zika virus or the "human-made" virus and found the number of infected mosquitoes was similar.

These findings confirm that the cloned virus is highly infectious for *Aedes aegypti* mosquitoes. In addition, the results demonstrated that *Aedes aegypti* might be a good mosquito vector for Zika virus transmission. Furthermore, the team engineered a luciferase reporter Zika virus. Luciferase is the chemical in fireflies that gives them their signature glow.

The Statesman
18 May, 2016

Efficiency under scanner

Scientists to Be Retired If Inefficiency Is Established, Hints Vardhan

Scientists would have to face the consequences of compulsory retirement from their services if their inefficiency is established, hinted science & technology minister Dr Harsh Vardhan here today. He had been on a two-day visit to the Central Mechanical Engineering Research Institute (CMERI) – a Council for Scientific & Industrial Research (CSIR) organisation here.

The Narendra Modi government already has decided to compulsorily retire the senior officials 10 years in advance if they are found to be inefficient or have bad reputation or possess questionable integrity at their workplace. The Department of Personnel & Training (DoPT), headed by Mr Modi, had sent guidelines to all the respective ministries in September 2015 to identify such officers. The DoPT had stated that the services of those officials who are no longer useful must be compulsorily retired from services.

The efficiency of Steel Authority of India (SAIL) executives and the Revenue Department executives have already been brought under scanner. Asked whether the decision is pertinent to the scientists and technocrats under the CSIR organisations, Dr Harsh Vardhan said: "The matter is under active consideration these days."

Dr Harsh Vardhan, accompanied by DG, CSIR, Dr Girish Sahni and Director, CMERI, Dr Harish Hirani inspected the Micro System Technology Laboratory, Underwater Robotics Lab, Near Net-Shape manufacturing Technology Lab and inaugurating a non-conventional power tree developed by CMERI scientist Dr S N Maity, addressed the scientists for nearly 30 minutes. Responding to Dr Hirani's cry that CMERI was not having adequate building infrastructure, the minister said: "CMERI was established in 1958 and the building was erected in 1964. It's become old." But, he added: "Our young scientists need to have a new mindset and explore new ideas with setting their

targets high. They are given good laboratories where microscopes worth Rs 6-10 crore are visible on the tables of the laboratories.”

He referred the difficulties faced by the laurels in the field of science like C V Raman, Meghnad Saha, J C Bose and said: “They had several constraints but marked their presence with their significant contributions meant for the poor and the working class.”

The minister also said that the CSIR has been told to publish a book comprising biographies of 55 Indian scientists, which according to him: “Would inspire both – the young scientists and the students.”

The Asian Age
18 May, 2016

UK water experts develop device to save lives in India

Experts at the University of Birmingham on Tuesday announced that they have developed a unique device that could save lives in countries like India by quickly and simply testing whether water supplies are safe to drink.

A team from the university’s Department of Civil Engineering has developed prototype optical equipment called “Duo Fluor” which uses water’s natural fluorescence to “scan” the water and highlight pollutants that are present in the sample — almost instantly revealing whether supplies are safe to drink.

Professor John Bridgeman, who led the team of researchers, said: “It is vital to ensure that people have access to safe water supplies. The ‘Duo Fluor’ device is a huge step forward in managing water and wastewater systems and has the potential to save lives — not just in India, but around the globe. Microbiological waterborne disease remains a significant concern for the global water community. Pathogens in drinking water sources cause ill health and the ‘Duo Fluor’ allows rapid drinking water quality checks to prevent the spread of disease and death.”

The researchers are now working with experts from the charity Oxfam and funding from the Engineering and Physical Sciences Research Council and the Diageo Foundation to refine the instrument design and make it ideally suited to disaster relief and areas of poor sanitation.

And they plan to work with counterparts at Teri University on research based around the quality of drinking water in New Delhi. The city is located on the banks of the Yamuna and many inhabitants rely on the river for their daily water supply.

Many households in northern Delhi rely on shallow groundwaters, abstracted by hand-pump, for drinking water supply — providing potential for water contamination.

The “Duo Fluor” device uses portable and inexpensive, off-the-shelf equipment to reveal unsafe sources of drinking water in less than 30 seconds.

It should help reduce the risk of future widespread outbreaks of cholera and other water-related diseases in areas of poor sanitation.

Professor Bridgeman said despite the hard work of those responding to the UN Millennium Development Goals, there are still 768 million people who do not have access to safe drinking water supplies and 2.5 billion are without access to improved sanitation services.

Current methods of analysing the quality of drinking water take more than 12 hours and use expensive reagents. This is not fast enough to meet people’s needs in poor communities and disaster zones.

The NSG conundrum

Is appeasing China and others worth it?

The Nuclear Suppliers Group (NSG) is not as weighty as the UN Security Council (UNSC) but Prime Minister Modi has made its membership a foreign policy goal. The fly in the ointment is that its membership is open only to the signatories to the Nuclear Non-Proliferation Treaty (NPT). India has not signed the NPT because it means giving up its nuclear weapons arsenal, a privilege allowed only to the five UNSC members, including China. Given India's record of never exporting nuclear technology on the sly, membership should have been a breeze, especially after the NSG lifted the sanctions on India and New Delhi was permitted to trade in civil nuclear technology and fuel.

However, politics has intruded just when the NSG begins considering India's application next month. Beijing's motive for threatening to put a spanner in the wheel is two-fold. One, Pakistan is impressing upon China to back its membership into the NSG as well. However, world memory is still fresh about Pakistan running a veritable nuclear technology Walmart. The second reason is geo-political: India's growing strategic proximity with the US is reflected in Modi planning a fourth visit to Washington.

Modi is within his right to visit another country as many times as he wants. But China looks at the India-US relationship from the prism of a US move to curb its influence in the South China Sea in tandem with Japan and Australia. Its apprehension is stoked by a US Bill to facilitate transfer of top-end military technology and hardware to India. Sino-Indian ties too are in cold freeze. There is also opposition from a six-country grouping which feels an NSG membership to India will scuttle the goal of nuclear disarmament. India will have to mollify them as well. It will require Indian diplomats to raise their game. The Foreign Office does not inspire confidence that it can deal adroitly with China, the US and Russia simultaneously. The still larger question is whether it is worthwhile to spend considerable political capital for a seat at a table that is not as high or useful as the UNSC.

The Hindu
18 May, 2016

Now, a 'tatkal' system to expedite patent examination

Aim is to reduce the period from 5-7 years to 18 months by March 2018.

The government has amended rules and introduced several measures including a system similar to 'tatkal', to expedite examination of patent applications by start-ups as well as entities choosing India for the first filing of patent. This comes in the backdrop of 2.37 lakh patent applications pending in the country.

The government, incidentally, is aiming to bring down the time period for initial examination of patent applications from the present 5-7 years to 18 months by March 2018. It had also last week announced the National Intellectual Property Rights (IPR) Policy to push IPRs as a marketable financial asset and economic tool, promote innovation and entrepreneurship/start-ups, while protecting public interest.

Expedited examination

Under the 'tatkal'-like system applicants can opt for the 'expedited examination'- route on the grounds that they have chosen India as the competent International Searching Authority or International Preliminary Examining Authority in the corresponding international application, and file their applications first in India. The 'expedited examination'-route is also available to all entities

that qualify as a start-up as per the definition for start-up provided in the Patent Rules. The applications for this route have to be filed only electronically. "The move is to popularise India as a patent filing hub so that more companies file applications in India. Now many applications for the initial examination are filed abroad, in places like Europe, the US or Japan," said Rajiv Aggarwal, Joint Secretary, Department of Industrial Policy and Promotion – the nodal government body on most Intellectual Property Rights, including patents.

Cost Arbitrage

Under the 'expedited examination' route, the fees for individuals and start-ups have been fixed at Rs.8,000, while for small firms it is Rs.25,000 and for large companies, the fee is Rs.60,000.

The Hindustan Times
18 May, 2016

INDIAN-AMERICAN WINS YOUNG SCIENTIST AWARD

A 15-year-old Indian-American teenager has won the prestigious 'Intel Foundation Young Scientist Award' for developing a low-cost electronically-aided knee brace that allows a person with a weakened leg to walk more naturally

MEET THE WINNER

Syamantak Payra (in pic), a Texas resident, won the US\$ 50,000 award along with 17-year-old Kathy Liu. The award was given by Intel Corporation and the Society for

Science and the Public (SSP) at the 2016 'Intel International Science and Engineering Fair' in Arizona last week

INSTANT RESULTS

When Payra tested his prototype with two individuals partially disabled by polio, it almost immediately restored a more natural gait and increased mobility, according to a statement



"Our top winners — Syamantak and Kathy — demonstrate that age has no bearing on your ability to conduct research and come up with solutions to important problems."
MAYA AJMERA, SSP president and chief executive