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Thu, 12 March 2020

Safeguarding Space Assets: Dr G Satheesh Reddy, DRDO

Dr. G. Satheesh Reddy, Chairman of the Defence Research and Development Organisation, Secretary of the Department of Defence Research and Development and Scientific Adviser to the Defence Minister, opens up about his priorities – launch of DRDO's Next Gen flagship programs, platforms specific to reduce major imports in defence. Excerpts from an interview with Aeromag:

As the chief architect of India's path-breaking anti-satellite missile test Mission Shakti which is completing one year, how do you analyse the programme and could you explain the follow-up measures taken?

The importance of Mission Shakti lies in demonstrating deterrence in space and proving the country's technological capability to provide protection for our space assets. It is intended only for technology demonstration.

As the Chief of DRDO, what are your priorities?

Launch of Next Gen flagship programs, platforms specific to reduce the major imports in defence is the priority. DRDO is taking major steps in the direction of 'Make in India' with defence corridors being planned by the Government of India. We have laid emphasis on NG MBT, TEJAS Mk-II, AMCA, new generation missile systems and HEAUV. The thrust would be to incorporate advanced technologies in design and development of flagship programs so that we are ready for meeting the futuristic requirements.

Artificial Intelligence would be a key factor in the modern battlefield. Please update us about DRDO's programs in this regard.

DRDO has been working in the field of Artificial Intelligence and the work is being majorly carried out at one of our laboratory, CAIR. Other laboratories like R&DE and VRDE are also working on autonomous technologies.

<https://www.defenceaviationpost.com/2020/03/safeguarding-space-assets-dr-g-satheesh-reddy-drdo/>

TIMESNOWNEWS.COM

Thu, 12 March 2020

Induction of Astra missile into IAF fleet will tilt the scales in India's favour against Pak

Along with the Meteor missile, India's indigenously made Astra missile, will allow the IAF to regain the air strike superiority it surrendered to Pakistan post the Kargil War

The Indian Air Force (IAF) has begun the process to procure and induct the indigenously developed Beyond Visual Range (BVR) Astra missile into its fleet. Along with induction of the Astra, it is also currently integrating the Israeli I-Derby Extended Range missile on its Su 30 MKI. Speaking to the media, IAF representatives explained that, along with the medium-range BVR MICA, and the long-range Meteor missile, India's air strike capabilities would be significantly enhanced with the Astra's induction.

The move comes over a year after the Balakot strike that saw Indian aircraft cross the Line of Control, enter into Pakistani airspace, and conduct a series of strikes in retaliation to a Jaish-e-Mohammad suicide bombing in the Pulwama district of Kashmir. What followed was a dogfight between Pakistani F16s, equipped with the American-made BVR missile, AMRAAM, and India's Su 30 MKI and Mirage aircraft. It was noted at the time that Pakistan's AMRAAM missile had higher capabilities than the R-77 and MICA, used by India's fleet.

Pakistan's AIM-120 C-5 AMRAAM missile, reportedly, has a maximum range of approximately 105 km. The MICA has a maximum range of just 50km, and the R-77, supposedly Russia's answer to the American missile, has a range of 80 km.

Reclaiming the skies

In a frank discussion, following the Balakot strike, IAF Chief RKS Bhadauria stated that India's air strike capabilities were superior to Pakistan's during the Kargil War, but India had since let that advantage slip. He stressed the need to improve the IAF's weapons capabilities stating, "In air engagement, especially in a deeply contested area, it is important to have a weapon's edge. Once we retain this edge, it is important that we don't allow to slip back this edge."

The IAF Chief was alluding to the procurement of the European-made Meteor missile that, reportedly, has a range of 150 km. These missiles, when integrated with the newly purchased Rafale jets, the first batch of which are expected to arrive in May, would allow India to recapture the advantage in the skies.

However, the foreign Meteor missiles are expensive, and as such, there has been a growing need to develop an indigenous missile on par with those of Pakistan's. As such, the Astra, with a reported range of 100km, will prove to be a fine addition to the spine of the IAF's fleet. Future versions of the missile currently being developed, are also likely to have a comparable range to the Meteor, according to some reports.

<https://www.timesnownews.com/india/article/induction-of-astra-missile-into-iaf-fleet-will-tilt-the-scales-in-indias-favour-against-pak/563588>



Thu, 12 March 2020

Contribution of women to research applauded at TBRL

Chandigarh: A workshop on 'Women in Research and Development – WIRED 2020' was organised by the Terminal Ballistics Research Laboratory (TBRL) to mark International Women's Day here today.

Dr Chandrika Kaushik, head of DRDO's Directorate of Interaction with Services for Business, was the chief guest for the occasion. She highlighted the achievements of women in various scientific disciplines and motivated the scientists to work with dedication.

Director TBRL, Dr Manjit Singh, highlighted and appreciated the role of women at different positions across the world. He also applauded the contribution of women employees of the TBRL in scientific research.

Expert talks on social, professional and health issues faced by women were organised on the occasion. Lt Col (Dr) Vikas Agarwal apprised the delegates of Covid-19 and precautionary measures.

Dr Anurag Sharma, head of the Cardiology Department at Ojas Hospital, Panchkula, guided the delegates towards maintaining their health.

TBRL scientist Vikrant Satya touched the area of gender sensitisation while scientist Meenakshi Bhatt Kala talked about the challenges faced by women at workplace.

More than 300 TBRL women employees, teachers of the Ballistics Vidyalaya, Ramgarh, and members of the Ballistics Officers' Wives Welfare Association participated in the workshop.

A medical camp was also conducted on the occasion and a cultural programme was presented to celebrate the participation of women in all walks of life.

<https://www.tribuneindia.com/news/contribution-of-women-to-research-applauded-at-tbri-53446>



Thu, 12 March 2020

Pie in the sky: Modi faces tough challenge to attract FDI in defence sector

India's efforts to attract foreign direct investment in the defence manufacturing sector has not succeeded so far despite several policy changes made by Prime Minister Narendra Modi's government in the last five years.

According to the latest official data given by the government in Parliament this month, the country has only received foreign direct investment of Rs 1,834 crore (\$248 million) between 2014 to December 2019.

The bulk of this amount came into the country last year as defence sector received \$2.18 million FDI in FY 2018-19.

However, it is nothing in comparison with the total amount of the Foreign Direct Investment received by the country during the same period which has been pegged at \$62 billion. And FDI in defence sector accounts for less than half percent (0.35%) of the total FDI inflows the country in FY 2018-19.

Early this month, India's junior defence minister Shripad Naik told the Lok Sabha, the lower house of Indian Parliament, that this figure of \$2.18 million FDI investment coming to the country was based on the information given by 79 companies operating in defence and aerospace sector.

In a separate reply, India's commerce and industries minister Piyush Goyal last year gave year-wise break-up of the FDI received in defence sector in the last five years.

<https://www.defenceaviationpost.com/2020/03/pie-in-the-sky-modi-faces-tough-challenge-to-attract-fdi-in-defence-sector/>

Indian Navy to enhance submarine patrol in Indian Ocean Region with deep submergence rescue vessels

Denial of access to unauthorised vessels inside India's Offshore Development Area is a major challenge, with warships and submarine involved in the robust surveillance arrangement

By Huma Siddiqui

The submarines deployed in forward areas to showcase India's interest in the Indian Ocean Region (IOR) is critical but the underwater operations carry many risks. However, seawater profile for detection of underwater routes by the submarine's navigational sonars etc., are a matter of concern. Denial of access to unauthorised vessels inside India's Offshore Development Area is a major challenge, with warships and submarine involved in the robust surveillance arrangement.

These submarine operations can provide high-quality ISR (Intelligence, Surveillance and Reconnaissance) information during peace times and this capability comes from the submarine's ability to enter an area to watch, listen and to collect the information because it can operate stealthily close to the action they can capture many elusive signals.

In recent times, Chinese military and commercial facilities have emerged along its sea line of communication through strategic investments in several Indian Ocean ports (like Gwadar, Hambantota, and Colombo etc.). This potential Chinese intention in the IOR is geopolitically known as String of Pearl's theory. The protection and safeguard of all present or evolving economic assets fall within the ambit of Indian Navy's Flag Officer Defence Advisory Group (FODAG). The FODAG's role is to advise various ministries — Defence, Petroleum & Natural Gas and Shipping on all planning and policy aspects of offshore security and defence covering EEZ, territorial waters and other Maritime Zones of India.



Diving Support Vessels

Indian Navy regularly conducts deep sea diving operations, including in the IOR, with an aim to undertake submarine rescue exercise, actual undersea inspection or salvage operations. The Saturation divers are specialized deep-sea divers who carry out such highly complex diving operations, usually with the assistance from a Diving Support Vessel (DSV). "This unique vessel has Deck Decompression Chambers where divers are compressed to the required depth and then transferred under pressure to a Diving Bell, which is further lowered into the sea. Underwater, these divers are provided a heated gas mixture of oxygen and helium for breathing and hot water for maintaining body temperatures. With every 10 meters depth, the water pressure on the Saturation diver increases by a kilogram per centimetre square, causing physiological problems like gas bubbles throughout the human body while surfacing. Once at the surface, these divers undergo a 'decompression' routine inside specialized chambers installed onboard the DSV," explains Milind Kulshreshtha, C4I expert.

Deep Submergence Rescue Vessels

Keeping an active watch over an 'area of interest' closer to hostile coastline requires an enhanced shallow water submarine operation. Though submarine provides a significant strategic advantage here, it is also vulnerable to action damage and requires critical follow-up diving operations for the Search and Rescue mission. C4I expert, says, "This role is amply supported by a Deep Submergence Rescue

Vessel (DSRV), and is the much-required re-assurance to the crew onboard the submarine undertaking risky manoeuvres. Earlier unfortunate incidents like Russian Kursk submarine sinking and fire accident onboard INS Sidhuratna, had also highlighted the need for a submarine rescue vessel. India's first DSRV procured from the UK completed Navy's Sea Acceptance Trials successfully in June'2019. The trials involved an underwater 'mating' of the DSRV with a hatch of a submerged submarine to carry out a personal transfer. The hatch of the submarine was duly strengthened earlier as per directives of Submarine Design Directorate at Naval Headquarter, so as not to buckle with the additional load of DSRV."

What are they equipped with?

"These DSRVs are equipped with sophisticated sonar systems and an ROV (Remotely Operated Vehicle) to clear debris and various other obstructions underwater. It has a Side Scan Sonar for locating the position of the submarine in distress at sea, and can use its ROV (Remotely Operated Vehicle) to assist the rescue operations. And can be transported rapidly to the mission area via air, sea or land," he explains.

According to the Indian Navy the DSRV can recover submarine crew from depths up to 650m and Navy intends to position one each on West and East Coast, respectively.

Centre of Regional Excellence for Submarine Rescue

As has been reported by Financial Express Online earlier, India is part of a select league of nations which possess the capability to rescue submarines, including that of friendly nations in the IOR. India has the ambition to emerge as the Centre of Regional Excellence for Submarine Rescue missions and accordingly, apart from procuring the additional DSRVs is undertaking indigenous construction of two 7,650 ton Diving Support Vessels (DSVs) at Hindustan Shipyard Ltd. (HSL) to further augment the submarine support operations. It is planned to fit a DSRV onboard each of these new induction DSVs. Overall, the induction of DSVs and DSRVs by Navy shall go a long way in enhancing India's regional role of being the nodal agency in IOR for submarine rescue.

<https://www.financialexpress.com/defence/indian-navy-to-enhance-submarine-patrol-in-indian-ocean-region-with-deep-submergence-rescue-vessels/1894946/>



Thu, 12 March 2020

Attack on military estimates

Lahore: As might have been expected, the majority of the non-official members who took part in the general discussion of the Financial Statement in the Indian Legislative Council on Monday last entered a strong and energetic protest against the rapid and phenomenal growth of military expenditure during the last few years. Of the ten Indian members who appear to have referred to this matter, as many as seven attacked the budget provision under this head, while the three who were claimed by the Finance member to have supported it were at best lukewarm in their sympathies. Mir Asad Ali, who was the first speaker, said that he was for a reasonable reduction in the growing military expenditure. Maharaja Sir Manindra Chandra Naudi followed in the same vein, and, while saying that he could not reconcile himself to the military estimates, urged that the Indian army should consist of Indian soldiers. Sir Fazulbhoy Currimbhoy reminded Government that what patriotic Indians expected was that in time of peace they would get some savings from military estimates, with the result that a programme of Education, Sanitation and Industrial Development would be vigorously pushed through. This hope was shattered to pieces, as one thought of a gigantic sum of £40 million being budgeted as the minimum military expenditure in a year of peace.

Mr. Banerjea thought that it was not impossible to reconcile an effective military defence with the resources of a poor country like India, and as a means to that end suggested the Indianisation of the Indian Army. Why not have, he said, a territorial army of Indians as a second line of defence? That would reduce military expenditure, infuse discipline in Indians, stimulate loyalty and bind the country to the Empire more strongly. The Government, Mr. Banerjea added, was responsible for the loss of martial spirit in Indians.

<https://www.tribuneindia.com/news/attack-on-military-estimates-53990>

Outlook
THE NEWS SCROLL

Thu, 12 March 2020

Will fully follow SC order on permanent commission to women in Army: Govt

New Delhi: The government will fully follow the Supreme Court's order on granting permanent commission to women in the Army, Minister of State for Defence Shripad Naik informed Lok Sabha on Wednesday.

Responding to a question by TMC MP Saugata Roy on permanent commission for women, he said, "We don't do any discrimination. We will fully follow the Supreme Court's order."

The Supreme Court had last month ruled that women officers shall be considered for permanent commission and will also be eligible for command posting on par with male officers.

Roy said the Army has only 65 permanent commission officers, the Navy has nine and Air Force has 382.

The Army also has 3,202 women permanent commission officers in the medical branch -- the Army Medical Corps (AMC), Army Dental Corps (ADC) and Military Nursing Service (MNS). The Navy has 80 women permanent commission officers in its medical branch and the Air Force 108.

In such a scenario, how will there be gender parity, Roy asked.

Naik said eligible women officers will be get permanent commission.

In a written response, Naik said, "The government is committed to comply to the judgement regarding granting Permanent Commission to SSC (short service commission) women officers in Indian Army as per their qualification, professional experience, specialisation, if any and organisational requirement."

He added that the impact of the judgement on operational efficiency of Indian Army after grant of permanent commission to SSC women officers and their employment in similar conditions and operational environment as their male counterparts, can only be analysed in the future and cannot be commented upon at this stage.

"However, the details regarding granting permanent Commission to SSC women officers are being prepared for implementation," he said.

(Disclaimer: This story has not been edited by Outlook staff and is auto-generated from news agency feeds. Source: PTI)

<https://www.outlookindia.com/newscroll/will-fully-follow-sc-order-on-permanent-commission-to-women-in-army-govt/1758409>

Meet Captain Ruchi Sharma, India's first female operational paratrooper

She was commissioned into the Army Ordnance Corps in 1996 to become the country's first female operational paratrooper

Prime Minister Narendra Modi's social media appeal for Women's Day 2020 brought to fore inspiring stories from across India.

Among the stories shared was one of Captain Ruchi Sharma — Indian Army's first operational paratrooper.

According to an SSB Crack Exams report, she was commissioned into the Army Ordnance Corps in 1996 to become the country's first female operational paratrooper. Her first jump was in 1997, but she had to quit in 2003 for personal reasons. Captain Sharma, who is married to an Army officer, has been felicitated by President Ram Nath Kovind too.



Notably, paratroopers are elite officers who leap off aircraft from high altitudes and are usually deployed in some of the country's top covert operations.

Speaking about her profession, the officer, who belongs to a league of 350 women who literally changed the face of the Indian Defence Forces, said: "Paratroopers have an aura of their own. I always dreamed of breaking into this league of extraordinary gentlemen."

The retired para officer further said: "I was ready for combat and as an individual, I think women should be given a chance to take up combat arms. I am not even saying men and women have equal physical strength. Having women will result in a good, healthy institution."

Sharma is the daughter of an Indian Army officer and both of them are the alumni of the Officers' Training Academy, Chennai.

Her inspiring story was also shared by the official Twitter account of the Defence Ministry's spokesperson.

<https://www.moneycontrol.com/news/trends/meet-captain-ruchi-sharma-indias-first-female-operational-paratrooper-5011481.html>

India-US Af-Pak initiative pushed back due to Covid-19

Esper's proposed visit, close on the heels on the US President's India trip, was aimed at dialogue on Af-Pak situation and expansion of defence partnership based on the Prime Minister Narendra Modi-President Donald Trump summit.

WASHINGTON: US Defence Secretary Mark Esper has put off a trip to India, Pakistan and Uzbekistan, scheduled for next week to help contain the spread of Covid-19 in America. Esper was due to visit the three countries from March 16-20 but he decided "to remain in the US to help manage the Department of Defence (DoD) response", said Pentagon spokeswoman Alyssa Farah. She said Esper's trip would now occur at a later date.

Esper's proposed visit, close on the heels on the US President's India trip, was aimed at dialogue on Af-Pak situation and expansion of defence partnership based on the Prime Minister Narendra Modi-President Donald Trump summit.

Afghanistan would have dominated Esper's discussions in both Delhi and Islamabad as the process entered a crucial phase following the signing of the US-Taliban deal, said people aware of the matter. The deal envisaged a host of measures, including release of thousands of prisoners by both sides of the conflict, intra-Afghan dialogue and firm guarantees by the Taliban not to allow the Afghan soil to be used by terrorist groups.

Esper's visit would have also helped take forward Indo-US defence partnership. Modi and Trump pledged at their February 25 summit to deepen defence and security cooperation, especially through greater maritime and space domain awareness and information sharing; joint cooperation; exchange of military liaison personnel and advanced training.

<https://economictimes.indiatimes.com/news/defence/us-defense-chief-delays-india-pakistan-trip-to-guide-virus-response/articleshow/74565928.cms>



Thu, 12 March 2020

India faces big budget cut for new human spaceflight program

As India prepares to launch its first astronauts into space, the program will proceed under tighter funding than hoped, at least for the time being.

The human spaceflight program of the Indian Space Research Organisation (ISRO), called Gaganyaan, received only about 30% of the funds sought by the according to the Times of India. ISRO said it will find a way around the low budget, but details were not provided in the news report.

Gaganyaan is designed to send three crew members into space for five to seven days in a small spacecraft, roughly 10 feet by 11 feet (3 meters by 3.4 m) in diameter. Should India achieve its goal of flying its own astronauts, it will be only the fourth country to do so after the United States, the Soviet Union (now Russia) and China.

The 2020-21 budgetary estimate for Gaganyaan is 4,257 crore (about \$639 million), with this figure representing about a third of ISRO's overall budget. The actual amount the agency is allocated so far for human spaceflight, however, is 1,200 crore (\$180.3 million).

While the impact to Gaganyaan is unknown, ISRO has said it will cost about 10,000 crore (\$1.5 billion) to launch Gaganyaan before Aug. 15, 2022, which is Independence Day in India. In general, human spaceflight programs often deal with reduced budgets in one of two ways: by delaying launches or by making cutbacks within the program to allocate the lesser funding received.

India's Parliamentary Committee on Science and Technology, Environment, Forests and Climate Change tabled a report Friday (March 9) asking for more funds bringing ISRO up to its original request, the Times added. But whether that will be implemented is unclear.

<https://www.defenceaviationpost.com/2020/03/india-faces-big-budget-cut-for-new-spaceflight-program/>



Thu, 12 March 2020

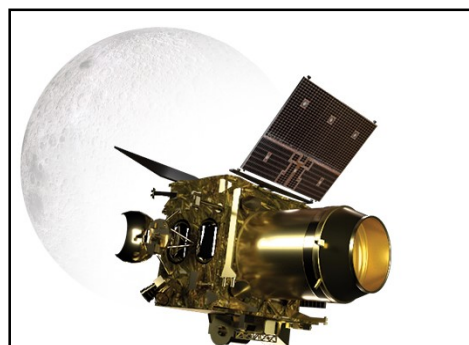
India's Chandrayaan 2 is creating the highest resolution map we have of the Moon

By Jatan Mehta

India's space organization, ISRO, launched Chandrayaan 2 to the Moon last year in July. While its lander Vikram crashed on the lunar surface on September 7, the Chandrayaan 2 orbiter continues to orbit the Moon.

The Chandrayaan 2 orbiter hosts an extensive set of instruments to map the Moon and now we get a peek at the data it has sent.

ISRO scientists have submitted a raft of initial results from the orbiter's mapping instruments to present at the flagship 51st Lunar and Planetary Science Conference in March. This is an annual conference hosted in the United States where more than 2000 planetary scientists and students from across the world attend and present their latest work.



Seeing a crater in the dark

Chandrayaan 2 orbiter has an optical camera called the Orbiter High-Resolution Camera (OHRC) which captures detailed images of the Moon. OHRC can image at a best resolution of 0.25 meters/pixel, beating NASA Lunar Reconnaissance Orbiter's (LRO) best of 0.5 meters/pixel.

Back in October, we already saw OHRC ex its muscles by sending images where boulders less than 1 meter in size were clearly visible. And now OHRC has demonstrated imaging an area not directly illuminated by sunlight! It captured an image of a crater oor in shadow by seeing the dim light falling on it that has been reected from the crater rim!

Moving ahead, this capability will be used to image insides of craters on the lunar poles, where sunlight never reaches. Mapping the terrain of polar craters is important because future lunar habitats are believed to be stationed near them, transporting water and other resources from inside them.

Highest resolution 3D maps

The Terrain Mapping Camera (TMC 2) onboard Chandrayaan 2 is a stereo imager, meaning it can capture 3D images. It does that by imaging the same site from three different angles, akin to NASA's LRO, from a 3D image is constructed.

TMC 2 has beamed back images taken from 100 km above the lunar surface and the 3D views generated from them look great. Here is one of a crater and a wrinkled ridge, the latter being a tectonic feature

Such images are very useful for understanding how lunar features form and get their shape. For example, a 3D image can help construct an accurate picture of the geometry of the impact that formed a crater.

Over time, Chandrayaan 2 will provide the highest resolution 3D images of the entire Moon, the best case resolution being 5 meters/pixel.

Enhanced eyes in the infrared

The Imaging Infrared Spectrometer (IIRS) on Chandrayaan 2 is the successor to the famous Moon Mineralogical Mapper (M3) instrument onboard Chandrayaan 1.

The M3 instrument, which was contributed by NASA, has been publicly acknowledged for its excellent mineral mapping capabilities and detection of water on the Moon. Noah Petro, Project Scientist for LRO, recently noted on Twitter:

“10 years ago today Chandrayaan-1 ended. I was so lucky to be a small part of that mission. The M3 instrument allowed us to take a huge step forward in learning about the composition of our 8th continent!”

Noah Petro, Project Scientist for LRO, on Twitter.

Both IIRS and M3 detect reflected sunlight from the Moon’s surface. Scientists identify minerals on the surface based on the patterns of these reflections. The IIRS boasts nearly twice the sensitivity of M3 in infrared light and the initial results demonstrate to that effect. Here are images of the Glauber crater as seen by IIRS and M3 respectively.

Thanks to M3, scientists now know that the lunar soil does hold trace amounts of water and hydroxyl molecules even in non-polar regions. IIRS onboard Chandrayaan 2 will map water concentrations in the lunar soil with improved sensitivity. Chandrayaan 2’s long-term observations aim to discern how the water content in the lunar soil changes in response to the lunar environment i.e. what the lunar water cycle looks like.

Note that all this is still less amount of water than the driest deserts on Earth. However, the lunar poles host appreciably more water. And that is where Chandrayaan 2’s radar comes into the picture.

Quantifying water on the Moon

The Dual Frequency Synthetic Aperture Radar (DFSAR) onboard the Chandrayaan 2 orbiter is the successor to the Miniature Synthetic Aperture Radar (Mini-SAR) on Chandrayaan 1. DFSAR penetrates the Moon’s surface twice as deeper than Mini-SAR. Not just that, DFSAR also boasts a higher resolution than the radar onboard LRO called Mini-RF. The initial results demonstrate as much, comparing a DFSAR radar image of region with Mini-RF.

With greater penetration depth and higher resolution than any prior instruments, Chandrayaan 2’s orbiter is in the process of adequately quantifying just how much water ice is trapped beneath the permanently dark craters on the Moon’s poles. Current estimates based on past observations suggest that the Moon’s poles host more than 600 billion kg of water ice, equivalent to at least 240,000 Olympic-sized swimming pools.

What’s next?

The lunar science and exploration communities agree that we can harness water ice on the Moon’s poles to power future lunar habitats. Using solar power generated by the habitats, we can also split the water ice into hydrogen and oxygen for use as rocket fuel.

But before we plan habitats at the Moon’s poles, we need to know more about the nature of water ice in these regions and how to access it given their terrain. The initial results from Chandrayaan 2 clearly show the promise of the highest resolution mapper ever sent to the Moon. ISRO has stated that

Chandrayaan 2 will orbit the Moon for seven years and that should be ample time to fully map and quantify water and their host regions on the Moon.

Surface missions that explore PSRs, like NASA's upcoming VIPER rover, are the next logical step towards sustainable habitats on the Moon. As we develop technologies that tap into water ice on the Moon, we can colonize not just our celestial neighbor but the Solar System. We should be glad our Moon has plenty of water; we can't keep dragging everything out of Earth's gravitational well forever.

<https://www.universetoday.com/145356/indias-chandrayaan-2-is-creating-the-highest-resolution-map-we-have-of-the-moon/>



Thu, 12 March 2020

Make physics more gender inclusive

Address bias in hiring; invest in social science training; and work-life balance policies for all

By Prajval Shashtri

It just takes a short walk around town to see that gender equality in our society is, as yet, a distant goal. Should we then worry at all about gender inequity in the microcosm of physics? Indeed, we should. Even as the Supreme Court has come down hard upon the Indian Army's patriarchal notions around women's competence, we, in a privileged and purportedly "objective" science, are still tying ourselves up in knots. Our policies to mitigate gender inequity are still driven by gender-stereotyped notions: That it is only the women who need special scientific and leadership training, or awareness building in gender inequity, or extra leave for child care, or even flexible work hours in order to cook and clean. There is still huge resistance to the idea of work-life balance as something for everybody. Worse, there is little reflection on what the evidence speaks about the whole story.

The gender gap in physics is big, globally and in India. The fraction of women with PhDs in physics who are employed in tertiary education nationally is 20%, far less than in, say, biology. Worse, that fraction plummets to single digits in elite research institutions, in leadership positions and in honours lists. How do we understand this trend?

Investigations that have compared scientific competence and productivity of researchers across genders have found no systematic deficit among women scientists. Nor is there evidence of a lack of interest in physics among girls: 50% of government science fellowships for physics are won by girls. Discriminatory familial responsibilities, the much-touted cause of the gender gap in the work force, cannot be weighing down women physicists more than biologists, and, therefore, this cannot be the whole story. Clearly, there is a strong gender bias within the profession. Indeed, when a process of selection into, say, leadership positions or honours lists, reduces the gender fraction, that is a clear signature of bias in the process.

There are, of course, no overt strictures against women practising physics at any level, unlike, for example, in the Indian Army. However, patriarchy lurks under the surface. Micro-aggressions driven by misogyny and toxic masculinity frequently raise their head in scientific forums and in corridor conversation. Hidden norms, such as not hiring a scientist's meritorious spouse, still exist, especially among the older, elite public institutions. Sexual misconduct is still perceived as part of the "boys will be boys" syndrome rather than as scientific misconduct.

Clearly, the physics profession needs to reach beyond the confines of its discipline to understand and address its gender bias. A first-of-its-kind interdisciplinary conference was organised by the Gender in Physics Working Group of the Indian Physics Association at the University of Hyderabad in 2019. Around 240 physicists, social scientists, educationists and diversity practitioners deliberated on the social processes in physics practice.

Several key recommendations emerged from the conference. First, that work-life balance policies, including child-care leave, career-break support, and mobility schemes that facilitate geographic proximity of jobs for couples, should be available to all genders. While not at all disadvantaging women, such gender-neutral policies would instead encourage wider cultural change. Further, the possibility of stigmatising women as somehow “favoured” would be eliminated.

Second, policies of hiring and promotion should be based on transparent merit criteria alone, explicitly formulated beforehand, and free of hidden norms. The norm of not hiring spouses is anyway blatantly untenable, since institutions will never be able to fire a scientist for marrying a colleague. An upper-age bar is often imposed, discriminating against women who have taken career breaks. A woman’s spouse being employed in a different location is frequently held against her. Mandating diversity officers as observers in selection committees and editorial boards was strongly recommended.

Third, a mandatory course by sociologists on the impact of social processes in the practice of science was recommended for the graduate physics curriculum. This is expected to partially address the lack of rigorous exposure of Indian-educated physicists to any discipline that studies human behaviour.

Fourth, institutions need to invest in strong mentoring mechanisms for early-career academics, so that they do not have to rely on external socialising, beer evenings and the like or on the voluntary goodwill and time of senior academics. Typically, the men have access to the former while even privileged women have to take recourse to the latter. Diversity measures can trigger more hostile behaviours towards women. One way to mitigate hostility is by creating safe spaces for dialogue across gender and power divides, even using non-traditional immersive and experiential methodologies derived from theatre.

Other long-standing recommendations such as mandatory childcare facilities in institutions and conferences, gender-audit of staff at different levels on institutional webpages, mandatory self-declaration of previous indictments of sexual misconduct in all faculty applications and nominations to prestigious positions, as well as gender-balancing of text books and science communication materials were reiterated. . These recommendations have been gathered into the “Hyderabad Charter for Gender Equity in Physics” on the occasion of Women’s Day, and have received over a 100 endorsements from physicists, including senior researchers, leaders and early-career practitioners.

We physicists need to stop “fixing our women” because there is no evidence that they need fixing. We need to fix the flawed meritocracy instead, so that we build a more nurturing learning environment.

(Prajval Shastri is an astrophysicist from Bengaluru and chair of the Gender in Physics Working Group of the Indian Physics Association). The views expressed are personal.

<https://www.hindustantimes.com/analysis/make-physics-more-gender-inclusive/story-O6tvFAhglqMbnUZq6ypjnN.html>