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Sun, 09 Apr, 2017

(Online)

‘Today, our country has world-class missile systems’

Ahmedabad: The journey through her life is intertwined with that of India's missile programmes - Tessy Thomas, director of Advanced Systems Laboratory (ASL) of Defence Research and Development Organization (DRDO), started her career at DRDO the day the first Prithvi missile was test-fired. From that day on, in past two and a half decades, India has joined the club of a handful of countries having missile systems capable of striking in the range of 500 to 5,000 km even with nuclear warhead and has experimented with different propulsion systems.

Thomas was in Ahmedabad on Saturday at Ahmedabad Management Association (AMA) to deliver 10th Dr Lalita Iyer Memorial Lecture on the topic 'Women in Scientific Achievements.' She talked at length about her formative years, her initiation in defence science and the road ahead.

"It was my mother's dream to see us all educated and working in jobs. In those days, there was nobody to provide career guidance, but I was very much interested in mathematics and dreamt to be an engineer even before I could understand its meaning," said Thomas. "However, I got into electronic engineering at Thrissur and after completion of BTech got an opportunity to do MTech in guided missiles," she said.

Among the few women scientists at the defence technology at that time, she got an opportunity to work at DRDO with Dr A P J Abdul Kalam.

"Right from the word 'go', he was a constant inspiration. I started with the work on gyro-less inertial navigation system," said Thomas. "After Prithvi, Agni programme was envisioned as the technology demonstrator, and we made a lot of improvisations, overcoming all odds, like making navigation more effective, missile casings heat-resistant and the body lighter," she added.



Sat, 08 Apr, 2017

Stuck in snow, soldiers' boots to send distress signal

By Vijay Mohan

Temperature variation

- Areas earlier termed safe are now prone to avalanches
- Shorter winters have led to temp variations, which don't allow snow to harden. Data shows there's been 20% rise in avalanches over past 5 years
- Temperature variations have been as high as 13°C

Charge it by tapping feet

- The DRDO is developing a boot containing a miniature electronic signal emitter that can be charged with current generated by moving or tapping the feet
- Scientists said in extreme cold climate, conventional batteries go dead quickly, leaving vital equipment without a power source

As soldiers battle the danger posed by increasing number of avalanches along the Himalayan frontier because of changing climatic pattern, a novel device integrated into their boots would enable them to send out distress signals at times when battery-powered gadgets become non-functional due to intense cold.

The Defence Research and Development Organisation (DRDO) is developing a boot containing a miniature electronic signal emitter that can be charged from an electric current generated by moving or tapping the feet.

“The technology to generate electric current capable to charge small devices like a transmitter or a mobile phone from the pressure applied on soles of shoes while walking has already been developed by DRDO. This would now be adapted to develop rescue devices,” a scientist said.

The project would be taken up by the Defence Bio-engineering and Electro-medical Laboratory, which is associated with protective and life support equipment, biomedical devices and systems specific to service combatants.

DRDO scientists said in extreme cold climate, conventional batteries go dead very quickly, leaving vital equipment without a power source. “By simply tapping his foot or using his hands, a trapped soldier can continue sending out distress signals to pinpoint his location in situations where battery would otherwise have discharged. The presence or absence of a signal can also provide a clue about the physical state of the individual,” the scientist said.

Climatic changes and variation in precipitation and temperatures have also led the Army to take a relook at its static locations and operating procedures in snowbound areas. Many areas earlier considered safe are now prone to avalanches because late setting and shorter winters have led to temperature variations that do not allow snow to harden and stabilise.



Fri, 07 Apr, 2017

(Online)

Anti-tank weapon test from MBT Arjun successful

Bhubaneswar: The Defence Research and Development Organisation (DRDO) on Wednesday successfully test-fired an anti-tank weapon having a strike range of 5 km from a next-gen tank at a defence test facility off Odisha coast.

Defence sources said the ammunition, fired from main battle tank (MBT) Arjun Mk-II at the firing point-II of the Proof and Experimental Establishment (PXE) at Chandipur during noon, hit the target as expected.

“The high explosive anti-tank weapon was fired from the indigenously developed Arjun tank in salvo mode against a decommissioned tank. In this complicated exercise, the ammunition successfully hit the tank,” said a defence official from New Delhi.

The aim and objective of the test was to capture data generated during the trial and analyse it whether the weapon had that required effect on the target. Besides gauging the efficiency of the advanced Arjun tank which is a pride of DRDO, the test also confirmed the firepower of the ammunition.

“Similar trials also have been planned in coming days. Though open firing from Arjun tank has been conducted in the Pokhran range of Rajasthan several times, this time an instrumented tank was targeted during the trial,” the official said.

The Arjun is a third generation main battle tank developed by DRDO. It features a 120 mm main rifled gun with indigenously developed armour-piercing fin-stabilised discarding-sabot ammunition, one PKT 7.62 mm coaxial machine gun and an NSVT 12.7 mm machine gun.

The tank is powered by a single MTU multi-fuel diesel engine rated at 1,400 hp and can achieve a maximum speed of 67 km/h and a cross-country speed of 40 km/h.

The tank has proved its worth under various circumstances. In 2015, it had received global accolades with the Chinese military officials praising the tank which suits Indian conditions. Arjun was commissioned in the Army in 2004 while its Mk-II version has undergone design changes for better firepower.



*Fri, 07 Apr, 2017
(Online)*

DRDO's innovation to see supply of high-nitrogen steel for defence use

With its potential use in armour applications, India premier R&D institution-the Defence Research and Development Organisation (DRDO) has developed a Technology of processing Nickel Free High-Nitrogen Steel (HNS)

Union Defence Minister Arun Jaitley in Lok Sabha on Friday said that Non-exclusive Transfer of Technology (ToT) has been given to M/s Jindal Stainless Hisar Limited, a private industry, on 1st March, 2017.

This being a non-exclusive ToT, the technology can also be transferred to any other private or public industry, interested in absorbing this technology. However, the ToT does not involve a supply agreement.

The development of HNS was initiated as a basic Research & Development (R&D) and the technology fits to the policy of 'Make in India' initiative.

HNS has potential for use in all armour applications. However, for material to be qualified and used in a specific combat vehicle application, it has to undergo many types of tests by the designers of the vehicle, including ballistic testing against specific ammunitions.

The qualification of any material for its introduction into any armoured application is a long process and HNS has not yet been qualified for use in these applications.



Sat, 08 Apr, 2017

Sajjan on India visit this month

By KV Prasad

Taking forward the bilateral relations on to the next stage, Punjab-born Canadian Defence Minister Harjit Sajjan will be travelling to New Delhi and Punjab later this month.

Sajjan is scheduled to arrive on April 17 for an interaction with Defence Minister Arun Jaitley as both countries look to increase engagement in the sector.

India and Canada at present have agreed to explore cooperation in cold climate warfare, peacekeeping, participation in Defence Staff College training, naval linkages and staff exchanges, as also in Defence Research and Development, specially security science and technology.

“This visit is about what can we do more... how can we expand... it is an exploratory visit to provide stimulus for defence sector cooperation,” Canadian High Commissioner Nadir Patel told the Indian Association of Foreign Affairs Correspondents here.

On the concerns over radical groups, especially from Punjab remaining active in Canada, he said while the issue does come up during official interactions, a vast majority of Sikhs are making meaningful contribution to

the Canadian society and were peace-loving. However, when any laws are broken, the authorities will act immediately and security agencies in Canada take these [violations] seriously, he said.

India and Canada have two separate dialogues, a Joint Working Group on Counter Terrorism and a meeting between Deputy National Security Advisors. Among the 12 lakh Canadian-Indians, some five lakh are emigrants from Punjab while the Gujaratis at three lakh are the second largest.

The High Commissioner said investment in India is now hovering around Canadian \$14-15 billion, in pension funds and large-scale infrastructure operations. There are some 1,000 Canadian companies doing business with India.

Some 40 per cent of the pulses India consumes are imported from Canada with the two-way trade recording \$8 billion. "Most Indians may not be aware that the potato finger chips they have are produced by Canadian company McCain while Bombardier supplies coaches for Metro."

Patel said there has been a 70 per cent rise in the number of students who preferred to pursue quality education at a lesser cost in Canada, while tourism grew at 16 per cent.



Mon, 10 Apr, 2017

Indian team in U.S. for defence technology talks

By Dinakar Peri

The Navies of the two countries signed terms of reference on March 1

A Defence Ministry delegation is in the U.S. to discuss the entire range of cooperation under the Defence Technology and Trade Initiative (DTTI).

Nine working groups have been established under the initiative, which aims to promote co-development and co-production of military technologies for use by both countries. The latest group set up recently is on new naval systems, such as sonars and sonobuoys, which are of interest to India.

A six-member team headed by a Vice-Admiral from the Tri-Services Integrated Defence Staff (IDS), along with Service and Ministry members, has embarked on the three-day visit, a senior defence official said.

"This is a task force meeting and they will comprehensively discuss all issues under the DTTI," he said.

However, India is still waiting for some clarity on appointments in the Pentagon. While the Indian side of the DTTI is co-chaired by A.K. Gupta, Secretary, Defence Production, the U.S. side is co-chaired by Frank Kendall, Under-Secretary for Acquisition, Technology and Logistics.

However, with the change in the administration, there is no clarity on appointments as yet.

The two Navies had signed the terms of reference at the first meeting of the new Naval Systems Joint Working Group in Washington DC on March 1.

Underwater surveillance

Underwater surveillance systems such as sonars and sonobuoys are of particular interest to India as it is augmenting its capabilities to keep track of the increasing Chinese naval presence in the Indian Ocean.

A senior official observed that some niche technologies with the U.S. can be accessed through the mechanism and various possibilities are being explored.

The naval cooperation is also in U.S. interests and the Chief of the U.S. Pacific Command (PACOM), Admiral Harry Harris, said early this year that "there is sharing of information regarding Chinese maritime movement in the Indian Ocean".

Mon, 10 Apr, 2017

Staff shortage at ordnance factories hurts def projects

By Chethan Kumar

An acute shortage of staff at ordnance factories, the mainstay of defence production, is affecting manufacturing schedules, research and development of new products and quality control, all impacting India's ambitious plans for enhanced indigenisation in this sector.

As of January 2017, ordnance factories collectively have 70,810 technical staff, 41% less than the 1.2 lakh sanctioned posts, according to information accessed from the ministry of defence. There's also a 44% shortage of non-technical staff-15,083 against the sanctioned strength of 22,524. Factories have a shortage of 40% in Grade A officers. While their sanctioned strength is of 2,981, the actual number is 1,808.

The number of technical staff responsible for the bulk of the workload including maintenance of machinery and equipment, handling of ammunition and armaments has been steadily decreasing. In 2015, this number was 74,634, as compared to 76,273 in 2014. Compared to 2014 and 2015, the ministry has reduced the number of sanctioned posts from 1.25 lakh to 1.2 lakh.

Employee union representatives allege that the existing staff and machinery are being overworked to keep up with the demand, resulting in human errors. A senior office-bearer of the All-India Defence Employees' Federation (AIDEF) said they are often unable to maintain the quality standards, as a result of which, the commitment to the client is also affected.

The issue was taken up by the parliamentary standing committee on defence, which in its latest submission to the government, said, "The Committee is concerned to note that this huge shortage of manpower in ordnance factories, particularly in the technical category, will have a negative impact on manufacturing and ensuring improvement in the products." It recommended immediate steps be taken to bridge the gap.

In one case, an order to produce over 3 lakh pieces of Coats for Extreme Cold Conditions (Coats-ECC) was taken away from the Ordnance Clothing Factory (OCF), Avadi, and given to Bengaluru-based Gokaldas Exports last year due to manpower shortage.

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Mon, 10 Apr, 2017

Army to replace animals with all terrain vehicles

New Delhi: The Indian Army's mules could soon be retired with the force working on a proposal to deploy all-terrain vehicles (ATVs) in mountainous areas to ferry weapons and ammunition. It is also exploring the possibility of using drones to support its high-altitude deployments.

The mules of the army's animal transport units are currently assigned responsibility of supporting some of the most remote outposts.

The animals played a crucial role during the 1999 Kargil war, ferrying stores to posts as high as 19,000 feet.

The suggestion to retire them and use vehicles was made by the Army Design Bureau (ADB).

"A mule can carry only 40kg load. The army has to find smarter solutions to transport stores in high altitude," said Lieutenant General Subrata Saha, who retired as the army's deputy chief on March 31. The ADB reports to the deputy chief.

In two back-to-back reports, the ADB listed 78 problem areas that need to be addressed for the best protection to soldiers on frontlines and to develop new systems for battlefield superiority.

“At present, the troops operating in rugged areas are required to traverse vast distances on foot, which imposes time penalty and exposes troops to undue fatigue,” said the 119-page report on Future Core Technologies and Problem Statements.

The army has made some improvisations for transport in remote areas, having locally built ropeways and modified load carriers. But the methods have only been partially successful.

On the need to solve the problem on priority, the report said: “During active operations there is a need for small teams to deploy rapidly... Need for air-portable, light-weight, ATVs is felt to speed up the movement of these troops with their stores and equipment.”



Mon, 10 Apr, 2017

Chinese, Indian navies foil piracy bid in rare joint op

Despite a long history of military rivalry and strained ties, India and China joined hands in the Gulf of Aden to rescue a merchant vessel from pirates on Sunday. The Tuvalu-flagged container ship had 19 Filipino crew, all of whom are now safe. The attack on MV OS 35 came just over a week after an Indian dhow sailing from Dubai to Yemen was hijacked by Somali pirates.

A Navy official said that INS Mumbai, a guided missile destroyer built at Mazagon Dock, and INS Tarkash, a Russian-made guided missile frigate, were the first to respond to an alert sounded by the UK Maritime Trade Operations, which was monitoring the movement of the 21,000-ton vessel, MV OS 35.

“Assistance operation was carried out jointly by four Indian Navy ships and a Chinese military ship Yulin. We provided air cover while the PLA (People's Liberation Army, the combined name for China's military) sent a team of 18 personnel to sanitise the merchant vessel. It has been rendered safe. The operation lasted about five hours,” Indian Navy spokesperson Captain D K Sharma told TOI.

ALL CREWMEN SAFE

- 4 Indian Navy ships provide air cover, while Chinese ship sends 18 men to sanitise merchant vessel
- Op in Gulf of Aden lasts 5 hours. Pirates flee; all 19 Filipino crew members of the Tavalu-flagged ship safe
- Incident comes a week after Indian dhow sailing from Dubai to Yemen was hijacked by Somali pirates

Four naval warships, INS Mumbai, Tarkash, Trishul and Aditya were passing through the Gulf of Aden for a mission in the Mediterranean Sea when the alert was sounded late night on Saturday. INS Mumbai and Tarkash were diverted and by the early hours of Sunday closed in on the distressed vessel.

“The Indian warships established contact with its captain, who, along with the crew, had locked himself in the cargo ship's strong room as per the standard operating procedure in case of a pirate attack,” said the Navy official. A Navy chopper undertook aerial reconnaissance of the vessel to sanitize its upper deck and ascertain the location of the pirates. Neither pirates nor any skiff were detected, indicating that the attackers had fled in all likelihood on sighting military ships.

“Emboldened by the Indian Navy's helicopter cover, and on receiving an all-clear signal that no pirates were visible on the upper decks, some crew members gradually emerged from the strong room in the morning and carried out a search of the vessel. They ascertained that the pirates had fled,” said the Navy official. “Subsequently, in a show of international maritime cooperation against piracy, a boarding party from a nearby Chinese military ship went on board the merchant ship, while the Indian helicopter provided air cover. It has been established that all 19 Filipino crew of the vessel are safe.

India-Israel defence deal irks Pakistan

SHAFQAT ALI
ISLAMABAD, APRIL 9

Islamabad, April 9: The defence deal between India and Israel has irked Pakistan, as Islamabad complained to the United States against the 'nexus,' officials said.

Earlier, Israel Aerospace Industries struck a \$ 2 billion deal with India to supply the missile defence systems to the Indian navy. This was described by IAI as the largest-ever defence deal.

Under the deal, the IAI would supply an

advanced air defence system, including medium-range surface-to-air missiles, launchers and communications and control technology, to the Indian army for around \$ 1.6 billion.

An additional naval defence system, including long-range surface-to-air missiles, would be deployed on India's first aircraft carrier, which is still being built, said an IAI statement.

The value of the second deal was not made public but the IAI said the total package amounted to nearly \$ 2

billion.

For years, Israel has been one of the top three arms suppliers to India. The United States congress between 2008-2015 said that India was the second largest arms purchaser among the developing countries after Saudi Arabia.

THE  HINDU

Mon, 10 Apr, 2017

Stirring up the nuclear pot

By T.P. Sreenivasan

The nuclear genie may take a new form in view of changing threat perceptions and global uncertainties

A picture of the globe under the hood of a cobra was a familiar symbol of the precarious state of international security till recently. Accidental or deliberate pressing of the nuclear button was the nightmare that haunted humanity. At the same time, using the nuclear genie and harnessing it for prosperity was the best dream. Today, both the nightmare and the dream have become jaded. Nuclear weapons have ceased to be viable as instruments of war because of the unpredictability of the consequences of a nuclear war. No one can trust even the use of tactical nuclear weapons without collateral damage for the user. Today, nations can be destroyed with mobile phones and laptops without killing a single human being, making the "humaneness" of cyberwarfare the biggest danger.

The theories of deterrence of nuclear stockpiles have also been discredited after 9/11 brought the most formidable nuclear power to its knees. Non-proliferation today, if any, is not on account of the Non-Proliferation Treaty (NPT), but on account of the futility of building nuclear arsenals. The threat of terrorism looms larger than the threat of nuclear weapons. After Fukushima, nuclear power too is receding as a sensible component of the energy mix. One clean-up operation after an accident can demolish many years of technological advancement and hopes of having cheap power. The sun shines as a source of energy, not the glittering nuclear reactors which seem to emit mushroom clouds.

Still a flourishing industry

Old habits die hard, however, and there is constant activity on the weapons and the power fronts. The nuclear and disarmament industry still flourish. Former U.S. President Barack Obama's Prague speech had ignited cautious optimism that nuclear weapons would cease to be the anchor of security, though not during his presidency, not even in his lifetime. Rajiv Gandhi's United Nations Plan of Action for total elimination of nuclear weapons came out of the dusty archives. The 'Global Zero' movement gained momentum, even as nuclear weapon powers continued investment in developing delivery systems and weapons.

U.S. President Donald Trump had once said that proliferation was good for American allies, but more recently, he said: "It would be wonderful, a dream would be that no country would have nukes, but if countries are going to have nukes, we're going to be at the top of the pack." He even hinted at the use of nuclear weapons in extreme circumstances. The hope raised by four old cold warriors, George P. Shultz, William J. Perry, Henry A. Kissinger and Sam Nunn, by setting the goal of a world free of nuclear weapons and working on the actions required to achieve that goal finally receded, and in desperation, the world turned to the good old UN machinery to create illusions of progress.

Emphasising non-proliferation

NPT enthusiasts have been disappointed of late that out of the three pillars of the treaty — non-proliferation, disarmament and nuclear energy for peaceful purposes — the first, non-proliferation, has got watered down and disarmament has become the priority. They also worry that dangerous technologies like enrichment are within the reach of the non-weapon states. In the context of Japan and South Korea debating acquisition of nuclear weapons, they feel that non-proliferation should be brought back to be the first priority of the NPT. The promotional function of the International Atomic Energy Agency (IAEA) is also a concern for them. The IAEA has already shifted its focus from nuclear power to nuclear security, as a result. In 1995, the NPT was made a perpetual treaty with no possibility of amendment, but its votaries now advocate that non-proliferation should be emphasised to the exclusion of disarmament and nuclear energy promotion.

The UN General Assembly, with its unlimited agenda, readily jumped into the first UN conference in more than 20 years on a global nuclear weapons ban, though the nuclear weapon powers did not join. More than 120 nations in October 2016 voted on a UN General Assembly resolution to convene the conference to negotiate a legally binding treaty to prohibit nuclear weapons, leading to their total elimination. Britain, France, Russia and the U.S. voted no, while China, India and Pakistan abstained. Though India had recommended the convening of such a conference, it abstained on the resolution as it was not convinced that the conference could accomplish much at this time. India said that it supported the commencement of negotiations in the Conference on Disarmament on a comprehensive Nuclear Weapons Convention, which in addition to prohibition and elimination also includes verification. The U.S. and others wanted to accept the reality that such conferences would serve no purpose. The conference has failed even before it commenced.

In the midst of this ferment, a debate has begun in India about a review of its no-first use doctrine. Experts seem to think that India's doctrine is flexible enough to deal with any eventuality, but others feel that we should enter more caveats to safeguard our interests. Perhaps, it is best to let the sleeping dogs lie.

On nuclear power production

On the nuclear power front, the efforts to increase nuclear power production suffered a setback as a result of Fukushima. Many countries that had lined up before the IAEA for nuclear technology for peaceful purposes quietly switched to other sources of energy. The much-expected nuclear renaissance withered away. Except for China, India and Russia, most nations have shied away from building nuclear reactors or importing them. India's liability law deterred U.S. companies from exporting reactors to India. The financial problems of Westinghouse, which had agreed to build six reactors in Andhra Pradesh, postponed, if not cancelled, the venture. But India has not fundamentally changed its three-stage nuclear power development, though the thorium stage eludes it.

The need for reduction of greenhouse gases was an incentive to increase nuclear power production, but President Trump's challenge of the whole concept of climate change as a hoax and the consequent reduction of allocation of funds to protect the environment will further reduce the accent on nuclear power. The

Kudankulam project is set to move along with Russian collaboration, but its progress has been slow. The nuclear liability law, the Westinghouse bankruptcy and the protests by local people have combined to delay the expansion of nuclear power in India.

Like everything else in international affairs, the nuclear pot is also being stirred on account of the uncertainties of the U.S. government and changing threat perceptions. Nobody thinks any more that peace and amity will break out between the U.S. and Russia, making nuclear weapons redundant. But no one is certain that the nuclear genie will not take new incarnations as a result of the ferment.

T.P. Sreenivasan, a former Ambassador, was the Governor for India of the IAEA and Executive Director of the IAEA 2020 Programme



Mon, 10 Apr, 2017

Trump seeks options to end N Korea N-threat

Deploys Strike Group to Korean Peninsula

As a US strike group led by an aircraft carrier steamed toward the Korean peninsula on Sunday, a senior official said President Donald Trump has asked to be provided with a range of options for eliminating the North Korean nuclear threat.

“US Pacific Command ordered the Carl Vinson Strike Group north as a prudent measure to maintain readiness and presence in the Western Pacific,” said Commander Dave Benham, spokesman at US Pacific Command. “The number one threat in the region continues to be North Korea, due to its reckless, irresponsible and destabilising programme of missile tests and pursuit of a nuclear weapons capability,” he said.

The US naval move will certainly raise tensions in the region and comes hard on the heels of a US cruise missile strike on Syria that was widely interpreted as putting Pyongyang on warning over its refusal to abandon its nuclear ambitions. North Korea denounced Thursday's attack as an act of “intolerable aggression” and one that justified “a million times over” the North's push toward a credible nuclear deterrent.

Secretary of state Rex Tillerson insisted in an interviewed broadcast on Sunday that the United States does not intend to try to remove the regime of Kim Jong-Un.

“That is not our objective and so the whole reasons underlying the development of a nuclear programme in North Korea are simply not credible,” Tillerson told the ABC programme “This Week.” He said the US expects China, the main ally of North Korea, to do more to rein in the regime in Pyongyang. “They have indicated that they will and I think we need to allow them time to take actions,” Tillerson said.

US National Security Adviser HR McMaster insisted, however, that in the meantime it is “prudent” to send the strike group to the Korean peninsula, criticising North Korea as a rogue, nuclear-armed nation engaged in provocative behaviour. “Presidents before and President Trump agreed that that is unacceptable, that what must happen is the denuclearisation of the peninsula,” McMaster told Fox News.

“The president has asked them to be prepared to give us a full range of options to remove that threat,” he added, apparently referring to Trump's advisers. Pyongyang is on a quest to develop a long-range missile capable of hitting the US mainland with a nuclear warhead, and has so far staged five nuclear tests, two of them last year.

Expert satellite imagery analysis suggests it could well be preparing for a sixth, with US intelligence officials warning that Pyongyang could be less than two years away from developing the means to deliver a nuclear warhead to the continental United States.

North Korea on Wednesday fired a medium-range ballistic missile into the Sea of Japan ahead of a US-China summit. The isolated North is barred under UN resolutions from any use of ballistic missile technology.

Russia wants US to reduce missile stocks

New York: The Soviet Union wants the United States to reduce its land and sea-based ICBMs to a point where the US will no longer have overwhelming nuclear superiority over the Soviet Union.

This is the Soviet price for stepping further development and deployment of anti-ballistic missiles.

The United States is now stated to have 1,446 ICBMs

compared to about 470 of the Soviet Union — or a three-to-one superiority.

As a result of President Johnson's appeal and letters to Prime Minister Kosygin, the Soviet Union has agreed to talk on arms but have made clear what they want: Reduction in this three-to-one superiority in nuclear strength and admission of the United States-Soviet parity in this most critical area of world power.

The Soviets have not spelled out how this is to be achieved — they have put the ball in the American court arguing that the Americans, as initiators, must come up with ideas.

The American position might not be ready for another month, but already the military, with help from its allies in the Congress and industry, have begun sending out alarm signals both against any reduction of ICBMs or non-development of ICBMs which mean flow of billions of dollars to selected industries.

The Statesman
PEOPLE'S PARLIAMENT, ALWAYS IN SESSION

Assam scientist heads breakthrough black hole research

The last meal that the supermassive black hole of the Milky Way had was six million years ago, when it consumed a large clump of infalling gas before burping out a colossal bubble of gas weighing the equivalent of millions of suns, a new research led by an Indian scientist from here has found. With the help of the NASA's Hubble Space telescope, Rongmon Bordoloi (picture) and his team of researchers from the Massachusetts Institute of Technology in Cambridge found that several distant quasars can be seen through the northern half of the Fermi Bubbles, an outflow of gas expelled by the Milky Way galaxy's hefty black hole.

The Hubble Space Telescope probed the quasars' light for information on the speed of the gas and whether the gas is moving toward or away from Earth. Based on the material's speed, the research team estimated that the bubbles formed from an energetic event between 6 million and 9 million years ago. "Six-nine million years might sound like a long time in human years. But in terms of cosmic timescale, it is like the blink of an eye. Just to give you the scale, the universe is approximately 13.7 billion years old, and the dinosaurs became extinct around 66 million years ago. So the last meal that the supermassive black hole of the Milky Way had was after the dinosaurs became extinct," says Bordoloi.

"For the first time, we have traced the motion of cool gas throughout one of the bubbles, which allowed us to map the velocity of the gas and calculate when the bubbles formed," he says. "It was a very strong and energetic event. It may have been a cloud of gas flowing into the black hole, which fired off jets of matter, forming the twin lobes of hot gas seen in X-ray and gamma-ray observations. Ever since then, the black hole has just been eating snacks," he says. A black hole is a dense, compact region of space with a gravitational field so intense that neither matter nor light can escape. The supermassive black hole at the centre of our galaxy has compressed the mass of 4.5 million sun-like stars into a very small region of space. Asked when the next meal would be, Bordoloi said, "Recently a binary star called G2 (with a mass of several earth masses) came very close to falling into the supermassive black hole at the centre of the Milky Way. Somehow it didnt fall through and survived.