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How we almost lost Tejas

By B. R. Srikanth

On May 17, a group of Indian Air Force's finest were gathered around in a room buzzing with radio transmissions and lined with consoles. There was nervousness in the air and frowns on faces. Their day in Bengaluru had started according to plan. India would witness the performance of the Tejas fighter jet, their boss, Air Chief Marshal Arup Raha, would be flying in it for the first time, he would take over controls halfway into the 30-minute flight and the jet itself would be flown by ace pilot Group Captain Madhav Rangachari.

But as Group Captain Rangachari fired up the engines of the twin-seat trainer version, Air Chief Marshal Raha, from the rear seat threw up a surprise. He told the pilot he would take over completely — take off, check the jet's agility, throw it into dives, pick a 'target' and then return to Bengaluru's HAL airport. And as the group of stunned IAF officers in command & control stared into monitors, their boss shot off in the direction of Krishnagiri in Tamil Nadu, 90 kilometres away, picked a dam as the 'ground target', simulated a strike, tossed the jet around with one of the moves generating a body-crushing 5Gs and then headed back to Bengaluru for a smooth landing.

The Air Chief Marshal was flying after 17 years and in command & control many were looking around for chairs to sit. Because besides the relief, there was much joy For those who had worked on the plane, this day was once a waking dream.

Tejas, and its May 17 flight, is the result of over 30 years of work and through those three decades, the plane's engineers endured unending taunts and even threats of imprisonment. Dr V.S. Arunachalam, a former scientific adviser to the defence minister and chief of DRDO remembers the day they almost lost the plane.

“At one meeting in 1991, chaired by then Defence Minister Sharad Pawar, MP Suresh Kalmadi, said we should be sent behind bars because he had found large-scale misappropriation of funds. But Ratan Tata, who was invited to the meeting along with other industrialists had a contrary opinion. Tata told the minister that we had chosen the best technology and if for some reason the government wished to scrap the project, the Tata Group would take over and make the aircraft themselves. Pawar then decided to support us as many others had agreed with Tata,” he says.

India's Light Combat Aircraft (LCA) programme (christened 'Tejas' by former Prime Minister A.B. Vajpayee later) began when Indira Gandhi was furious with the Soviets for playing truant while supplying spares for fighter aircraft. Soon, the challenge to make a jet for ourselves, fell on the shoulders of Dr Arunachalam and just about 300 others. They would face much of the bureaucratic hell Indian innovation was during its earliest years.

His successor, the late Dr A.P.J Abdul Kalam too, faced problems while steering the project. A major blow came in 1998 — after India's nuclear tests in Pokhran. Two companies —Lockheed Martin and General Electric — who had agreed to provide expertise to the LCA project pulled their engineers out after a US technology embargo. Their ejection turned the clock back by four years for the project.

The plane first flew on January 4, 2001. “One of the early jokes was that LCA stood for 'Last chance for Arunachalam'. And when I took over (as Chief of DRDO), they said it was Last Chance for Aatre. Today, critics are all quiet,” says Dr Vasudev Aatre, who headed DRDO when 'Tejas' made that first flight 15 years ago. Also, for Air Marshal Philip Rajkumar (Retd), who served as a formidable bridge between IAF and DRDO, and later as project director, the fact that Tejas clocked close to 3,000 hours without a single snag is a formidable achievement. He now wants more of

these planes inducted as soon as possible. He joins Air Chief Marshal Raha and many others who believe the Tejas has become, an asset. And to think we almost lost the plane to mountains of paperwork and Suresh Kalmadi's accounting.

The Indian Express
24 May, 2016

Manohar Parrikar interview: 'I believe in performance, not dressing up'

Union Defence Minister discusses improved procurement, AgustaWestland, and his view of honesty with Indian Express.

In November 2014, when you came to Delhi as defence minister and saw things from the inside, what surprised you the most about arms dealers?

First of all, I didn't come to Delhi, I was invited to Delhi from Goa. What I knew about the defence and what you call bicholiya.

Middlemen?

No. The word 'middleman' may be misunderstood. I would say commission agent, people who make deals for money. These people, through money or through other methods, try to influence decisions. I had heard a lot about them before coming here. Defence was new to me... It took months to gather information on how things are done here. Due to infamous arms deals and scams, the ministry had withdrawn into a cocoon. There was no openness, there were always fears and suspicion. I told everyone clearly, and through directions, to open up the ministry so that decisions could be clean, transparent and fast.

What was shocking or new for you?

Everything was new.

Give an example of what surprised you.

The system surprises me, even now. I have never seen such a complicated system of procurement. If you ask me, procurement in defence is a different kind of issue in itself. Ultimately you want to buy a weapon that may not exist or may not be available in the market. At the same time, you go through all tests and trials. It's a strange type of procurement. It's not like open-market procurement where any product can be determined easily. Here each system has a different function. No two companies manufacture similar types of products, and you have to be careful in ensuring that more than one manufacturer comes into the picture. But AgustaWestland was the only one in the picture that wanted to supply what you wanted. The challenge is how you ascertain that there is an alternative available.

When you were assigned this job, did the PM give you any framework?

Yes, general discussions did take place. Definitely, one was that defence deals mein kafi garbadi hoti hai [a lot of corruption takes place in defence deals], so work out a team and develop preparedness, and other issues.

Your predecessor A K Antony had a reputation, as you do, that he was honest. Why didn't this work to the advantage of the ministry in 10 years? His honesty is part of your ministry's legacy, is it not?

I will put it like this. Honesty without output is of no use... It's not that if you are honest then you can't deliver. A simple way of living honestly is not to take any decision. When you take a decision

you have to pass through a path with thorns and nails. You have to avoid all those and take a clear, conscious decision in the interest of the nation.

For 10 years we saw a frustratingly complex and slow-moving weapons buying system. We haven't seen much of a difference in the last two years. How can you say that Antony was honest but an output was absent?

You are talking like this because you don't know figures of acquisition. For example, the CAG 2013 report says most of the ammunition stock in India has gone down below critical level. Now, out of 170 only 38 items are insufficient, but in the coming months only 21 items will be below critical level... The output of the ordnance factory has improved for the first time by 17 per cent. It was stagnant for four to five years and hovering around Rs 10,000 to Rs 11,000 crore... Ammunition expenses were around Rs 4,500 crore in 2013-14 but have now reached Rs 6,800 crore, increased by 50 per cent. What I am trying to point out is that if you go case by case, things are moving up. Two, all PSUs and ordnance factories have shown an increase in turnover from around Rs 43,000 crore to Rs 51,000 crore, around a 20-per-cent growth. Three, in aviation Tejas has been inducted, a second Tejas delivered, the third will be delivered in June, and in July or August the first squadron will be formed. After 32 years, Indian-made light combat fighters have been inducted and a formation worked out. The Air Force chief (Arup Raha) himself flew the plane. From a situation where no plane was coming up to a situation that the first squadron will be formed now is a great achievement.

But, then, ADA and HAL [Aeronautical Development Agency and Hindustan Aeronautics Limited] weren't delivering the final version of Tejas.

That is what leadership is all about. I ensured that ADA delivers what the Air Force wanted. I had 18 meetings with them, we sorted it out. Finally, the Air Force says it will buy 120 Tejas aircraft... We are offering to friendly countries and we may start exporting also. Tejas aircraft were made and dumped, I made it operational. Basically, what I want to say is that there was a mess created over a period of 10 years due to no decisions. Now decisions are being made and its impact will be felt as the days pass. Whether it's intelligence or counter-insurgency, whether decisions are about equipment supplies to armed forces, we are taking decisions. In the last two years we have finalised contracts for almost Rs 1.15 lakh crore. But, what is more important is that contracts for another Rs 1.15 lakh crore are in the pipeline. We have brought it near a conclusion. In another one or two years, we will sign those contracts. What is needed is to look at the total impact of ten years of the UPA government. They could mainly procure government-to-government sales from the US. For 36 years there was no gun prepared for India. I am pleased to tell you that the Dhanush trial has been successfully done in the desert. There will be one more final desert trial and even a cold weather trial. By the year-end we will start manufacturing the gun, which will be better than Bofors. The original technology was transferred from Bofors but we have indigenously developed it and the Ordnance Factory Board, Kanpur and Jabalpur, will manufacture it. By August or September we will finalise an order for Vajra (self-propelled Howitzer gun) to the private sector. First time in 36 years, decisions on guns, tanks and aircrafts are being taken in the ministry.

When George Fernandes was defence minister, he had said that immediately after the attack on Parliament the chiefs of the armed forces were not prepared to move to the border in eight days. How's the position now? Are they better prepared?

You gave me a hint in your question. They are much better prepared than in 2001. I will put it like this. If I am satisfied with the improvement, then I will not be able to introduce more and more swiftness, more decision-making and improvement and more capacity in defence. We are improving. It will be in a much shorter time that we will be moving our troops. We are battle-ready, always. We will improve on the current level, too.

A Defence Procurement Procedure was released but it's incomplete. Some chapters are not yet released.

Those who deal with the defence sector do see a difference now. One chapter of DPP will be released later, it was about "strategic partnership". It's a totally new concept. This requires much more consultation because it's a completely out-of-the-box issue. If we do it in a wrong fashion and if someone starts complaining of favouritism, then? Here is a concept where you select a private partner on the basis of his capacity and pay him according to cost, not as per profit-loss. It has never been tried earlier in Indian industry... The rest of the chapters have been loaded, except the attachments. The new acquisition policy has come into force from April 1. It will take at least six months for anything to come to the defence acquisition council under the new policy. We will complete legal vetting in a week. I have participated in the drafting of the DPP to remove bottlenecks. People now know that fresh acquisition cases will start with Indigenously Designed and Developed and Manufacture. The rule is very clear. Only new cases will come under IDDM. Old cases will come under the old procedure. To come under the new procedure they will have to start again.

Remember the way the PM presented Rafale as an off-the-shelf deal in Paris. Now, there is such a long delay. How do you explain it?

You have to get the right deal for yourself. The UPA spent about nine years in coming to the contract negotiation committee level with Rafale. They didn't buy it. Antony said you complete your negotiation and come back and tell me how are they above all. This was never done. This was a safety network for himself. There was so much confusion in the deal that it would have never gone through because the procedures were not properly followed. From there we have gone for 36 Rafale aircraft to fill in the minimum gap after discussing the requirement... Probably we are close to a final position, which may happen anytime soon.

Do you regret inviting Finmeccanica to Make in India?

Finmeccanica is banned from participating in defence procurement. I cannot ban it from doing something else if it wants to. In defence we don't buy equipment from some countries for security reasons but I don't stop that country from selling smart-phones in India.

Maybe it's difficult to ban it because, some argue, India has Scorpene submarines that need torpedoes, which come from WASS, a subsidiary of Finmeccanica.

We have refused it [WASS].

How then will you make Scorpene's functional?

I will make it functional, don't worry about it.

Indian make?

There are other companies who can supply it... Can't tell you for security reasons where we will get it from.

You must have read the authenticated copy of the Italian judgment [on the Agusta Westland deal].

Why should I read the Italian judgment?

Has the government found any evidence to link Sonia Gandhi, Pranab Mukherjee, Manmohan Singh or other Congress leaders named in [alleged middleman] James Christian Michel's letter?

Why should I go by him? I can tell you one thing. It is for sure that the procedure was tilted, was modified wherever required, in such a way that AgustaWestland was selected. How did only one

company remain in the picture? I explained it in Parliament also. Second, my own judgement and my information, as well as information in Air Force files based on assessment, indicates that the cost should have been Rs 160 to 170 crore whereas we were paying Rs 300 crore for it. My assessment may be Rs 10 to 20 crore plus/minus. The Air Force knew the market price and quoted Rs 100 crore for AgustaWestland and Rs 60 crore for Sikorsky and Rs 35 crore for Russian choppers... The total expenses came to Rs 793 crore. When a single-vendor situation comes, benchmarking is very important. How come benchmarking wasn't taken into consideration when the Air Force took the basic cost at 15 million euros, which is around Rs 100 crore, while the benchmarking cost stood at Rs 380 to 400 crore? When you know that you are benchmarking at almost six times the original cost, then a question mark comes. I would have understood if it was double the original cost, even 2½ times is understandable. There is a definite angle of paying a much higher cost than it deserves. The rest is for the investigator to investigate. I am not the investigator.

Political personalities have been drawn into the debate, Sonia Gandhi and Manmohan Singh.

That is what the Italian court says.

But their names are not in the main judgment.

You can read the judgment. Why should I speak on it?

You yourself said...

I will not go into that. I refuse to indulge in name-taking. I didn't do it in Parliament. One minute! You take a conclusion from this — I am very clear on it. Number one, the process has been manipulated to ensure that AgustaWestland was selected. Second, my very clear conclusion is that the price is much higher than the genuine cost we should have paid.

On your table, what is more important: issues with China, or with Pakistan?

Both are important. You can't neglect either of them. We are handling each differently. My only contact with Pakistan is on the borders when our DG or his men talk to Pakistan and keep each other informed. When our sorties fly near the borders, we inform each other. With China we have improved our relations. Instead of three we now have five points with China to talk to each other... CBMs are in place and there is a general decrease in cross-border tension.

Is China the bigger security threat or Pakistan?

I won't say. For me, my nation's security is the most important. Based on my security requirement, I form my views.

Why do you never wear formal dress?

Why do you need it? If a man's work were dependent on shirts or dresses, then anybody who has money would put on smart dresses and show off performance. I believe in performance and not in dressing up. I can assure you they are not shabby.

Do you expect to retain this portfolio in the coming cabinet reshuffle?

That you will have to ask the Prime Minister.

How is Delhi treating you?

Reasonably well. Except the temperature, which I am not accustomed to. Otherwise, I have no problem here.

Why then did you say in a press conference in Goa that "I am coming back soon"?

Were you there?

No.

Then, don't ask me that question. What I said there was, "I refuse to tell you what my action plans are." Which I still refuse to tell you. Why should I tell everyone what my plans are?"

The Economic Times
24 May, 2016

Def Tieups: Parrikar Puts Biz Bodies in Driver's Seat

By Manu Pubby

Five subgroups, led by industry chambers, told to recommend changes in 10 days

To untangle the logjam over his strategic partnership (SP) model that is being showcased as the anchor of the Make In India initiative in the defence sector, Manohar Parrikar is roping in the industry with the setting up of five consultation groups that will make specific recommendations on manufacturing defence equipment.

Speeding Up The Change
Defence Ministry has ordered setting up of 5 industry-led subgroups for giving suggestion on executing the strategic partnership model

- Armoured Fighting Vehicles**
Chaired by FICCI; Lt Gen AV Subramanian (retd) to represent Aatre Task Force; Two star general from Armoured directorate
- Aircraft and Helicopters**
Chaired by CII; NR Mohanty (former HAL chairman) to represent Aatre taskforce; two star officer from Air HQ
- Submarines**
Chaired by FICCI; Rear Adm Pritam Lal (retd) to represent Aatre taskforce; two star officer from Navy HQ
- Ammunition**
Chaired by ASSOCHAM; Lt Gen Subramanian (retd) to represent Aatre taskforce; two star officer from Army HQ
- Macro Process Management**
To discuss technical competence, financial evaluation, regulatory issues, selection process
Chaired by CII; Kaushik Dutta and Asish Bhattacharyya to represent Aatre Task Force; two star officers from all services

The SP model -selecting key private industry players for specific large scale defence manufacturing projects -has been in the making for over a year but little progress has been made as it has encountered resistance both within the ministry as well as with other stakeholders.

The industry too has been up in arms on the details of the SP model that a defence ministry appointed panel has recommended, specifically on clauses that restrict a particular company from participating in more than one sector like warship building or aircraft manufacturing.

Now, in an effort to get the industry on board and to accelerate the SP model, the defence ministry has set up five new sub groups all headed by different industry bodies that will make specific recommendations for sector like armoured fighting vehicles, aircraft, submarines and ammunition.

In a sign that the SP model is being accelerated, the groups have been given just 10 days to come up with recommendations. "The chairman of each of the give sub groups will have to complete the discussions on the topic assigned to them and be ready with their presentation within ten days of the issuance of the convening order," a defence ministry directive dated May 20 states.

Each of the sub group will have industry representative from CII, FICCI, ASSOCHAM, PHDCCI and FISME. The chairman of the group from an industry association will then make a presentation to Parrikar on the discussions and recommendations.

As reported by ET, SP model has faced resistance with various departments and services raising concerns that process recommended may lead to monopolization and needs more consultation. The Atre Committee report has identified five priority areas for Make in India in the defence sector. While the concept of the SP model to identify and encourage private sector players for manufacturing in defence is agreed to, details like the suggestion that only one company be selected for a particular segment like warship production or submarine construction has not found full favour within the ministry and with the industry.

The Statesman
24 May, 2016

Parrikar to attend security dialogue in S'pore

Defence Minister Manohar Parrikar will next month travel to Singapore for the key Shangri-La Dialogue focussing on inter-governmental security and also undertake a two-day bilateral visit to Vietnam to deepen military ties.

Parrikar is expected to leave for Singapore on June 3 to attend the inter-governmental security forum on June 4, defence ministry sources said here on Monday. Last year, Minister of State for Defence Rao Inderjit Singh had represented India at the Shangri-La Dialogue which focusses on security in the Asia-Pacific region.

The Shangri-La Dialogue is an inter-governmental security forum held annually by an independent think-tank, the International Institute for Strategic Studies, and is attended by defence ministers and military chiefs of 28 Asia-Pacific countries.

Last year, US Defence Secretary Ashton Carter had attended the dialogue. Among the issues that are likely to be discussed are freedom of navigation and security issues concerning the Asia-Pacific region.

Parrikar will then travel to Vietnam, which is involved in a territorial dispute with China in the South China Sea. Last year, India and Vietnam had decided to enhance their bilateral defence cooperation and signed a joint vision statement for five years.

Vietnam, which is building a naval deterrent to China with Russian-made Kilo-class submarines, is keen on India training its submarine personnel. It also has expressed interest to acquire Indian-made BrahMos supersonic cruise missile, a deal for which India is open to. Vietnam may become the first country to be supplied the 290 km-range BrahMos weapon system, a joint venture of India and Russia.

Business Standard
24 May, 2016

Mr Modi's defence report card

By Ajai Shukla

The Modi government has not lived up to the muscularity the prime minister promised while campaigning

On Thursday, this government will mark its second anniversary in power. Even before chief minister Narendra Modi became Prime Minister Modi, serving and retired soldiers, sailors and airmen hoped that, unlike the United Progressive Alliance (UPA), the Bharatiya Janata Party (BJP)

would nurture a long neglected military. How successfully has the National Democratic Alliance (NDA) government met those expectations.

In electioneering, Mr Modi talked up a muscular, populist alternative to Manmohan Singh's widely ridiculed milquetoast image. [In the 1940s, HT Webster created the comic strip character, Caspar Milquetoast, describing him as "the man who speaks softly and gets hit with a big stick."] On September 15, 2013, two days after being anointed the BJP's prime ministerial candidate, Mr Modi promised a huge gathering of military veterans in Rewari he would give the military its due - both in money and attention. Declared the future PM: "My friends, the problem is not on the border, the problem is in Delhi... and, thus, we will have to find its solution also in Delhi! Until we do not have an efficient and patriotic government in Delhi, it does not matter how capable our military is, or how modern our equipment."

In April, just days before voting, Mr Modi released the BJP's manifesto, which included, in unprecedented detail, pledges to rewrite defence policy, restructure procurement, modernise weaponry, and make India a defence manufacturing hub. Yet, the soaring expectations of the generals, admirals and air marshals who were jumping onto the BJP bandwagon were clearly unrealistic. Reading between the lines, the manifesto clearly prioritised economic development: "Comprehensive national security is not just about borders, but in its broad terms includes military security; economic security; cyber security; energy, food and water and health security; and social cohesion and harmony. To effectively address the issues of national security, we need to address the issues of human resources, science and technology, system of governance and money."

Given that, the real decline in defence allocations should have been expected. From about 1.8 per cent of gross domestic product (GDP) in the UPA's last two Budgets, defence allocations declined to 1.73 per cent in Mr Modi's first two Budgets; and just 1.65 per cent of GDP this year. To dress this up, Finance Minister Arun Jaitley changed the basis of calculation this year, adding into the defence allocations the expenditure on the "pensions" and "defence ministry" heads, which had never previously been counted as a part of the defence budget. This is not to suggest subterfuge; pensions and ministry staff expenditures legitimately belong to the defence budget. But doing that diverted attention from this year's reduced allocations and made the defence budget look fatter. By the previous methodology, this year's allocations would have been Rs 2,49,099 crore (\$37.18 billion). Using the new calculation, defence allocations rose to Rs 3,40,922 crore (\$51 billion). Even so, at 2.26 per cent of GDP, this remains well short of the recommended allocation of three per cent of GDP that defence planners say is needed over a sustained period to modernise India's huge inventories of obsolescent weaponry. Furthermore, even more so than preceding governments, the NDA is failing to spend its allocations. On March 31, billions of unspent dollars were returned to the treasury.

In fact, Mr Modi's money problem is less one of insufficient allocations than of poor expenditure priorities. Using the new basis of calculation, three-quarters of this year's defence budget is for "revenue expenditure" - running expenses like salaries, pensions, housing, equipment maintenance, fuel, training, etc. A mere quarter is for "capital expenditure", or modernising the army with new weaponry and kits. Despite India's cheap manpower, 55 per cent of the budget goes towards the payroll. This ratio is being skewed further with the One Rank, One Pension (OROP) scheme bloating the pension bill, and the Seventh Pay Commission recommending 15 per cent salary increases. Without higher defence allocations, there will be even less for capital expenditure. Mr Modi seems aware of this conundrum, having warned his military commanders that growing numbers would adversely affect modernisation. Yet, there is no decisive move to trim the flab.

Meanwhile, equipment acquisition proceeds randomly. Like with the UPA government, contracts for new weaponry are pursued not on the basis of how urgently the item is needed, but in the leisurely order in which proposals clear the endless obstacle course of ministry procedure. Every

official knows the military's most critical needs - artillery and air defence guns for the army; torpedoes, sonars and air defence missiles for the navy; and mid-air refuelling aircraft and strike aircraft for the air force, to name a few. There exists a fast-track procedure for urgent purchases. Even so, glaring operational voids remain, providing reassurance to our foes.

Similarly, the military's operational capability remains hamstrung by the weakness of tri-service operational command and planning. The defence minister has repeatedly promised to address this issue; the PM himself told the military's top commanders on December 15 that: "Jointness at the top is a need that is long overdue. We also need reforms in senior defence management... This is an area of priority for me." Yet, action: zero.

Admittedly, the defence ministry got off the blocks late, after languishing for almost six months under the additional charge of the finance minister - something Mr Modi has never explained. After Manohar Parrikar's appointment in mid-November 2014, he has tried to reform the way his ministry does business. Despite opposition from his conservative bureaucrats, Mr Parrikar has pushed through badly needed measures to partly level the playing field between the public and private sectors; and he is popular with private sector industrialists for his consultative approach. However, he has promised more than delivered. A new defence procurement procedure (DPP-2016) has been only partly released. The ministry continues to grapple with an ill-conceived initiative to replace the public sector monopoly with a private sector one, dominated by a few "strategic partners". A pragmatic "blacklisting policy" remains blocked. Despite Mr Parrikar's laudable backing of indigenous development programmes, and the policy prioritisation of 'Made in India' (designing and developing platforms in the country) over 'Make in India' (manufacturing in India to foreign blueprints), few such projects have been initiated so far. The drive to reform defence policy and revitalise operational readiness is far from yielding results.

*Press Information Bureau (GoI, MoD)
24 May, 2016*

INS Tarmugli Joins the Indian Navy

The Indian Navy today commissioned the highly maneuverable Fast Attack Craft INS Tarmugli at the hands of Vice Admiral HCS Bisht AVSM, Flag Officer Commanding-in-Chief, Eastern Naval Command at a formal ceremony held at Naval Dockyard, Visakhapatnam. INS Tarmugli is being based in Visakhapatnam under the Naval Officer-in-Charge (Andhra Pradesh) and would be deployed for coastal patrol and surveillance operations along the East Coast of India.

Built by M/s Garden Reach Shipbuilders and Engineers Ltd (GRSE), INS Tarmugli is the first Follow-on Water Jet Fast Attack Craft (WJFAC), is an improved version of WJFAC, earlier constructed by GRSE. Conceived, designed and built indigenously, the commissioning of this ship completes the addition of another chapter to the nation's 'Make in India' initiative and indigenisation efforts in the field of warship design and construction.

Named after a picturesque island in the Andaman group, the 320-tonne INS Tarmugli, measuring 48 meters in length, can achieve speeds in excess of 30 knots. The ship is manned by a team comprising four officers and 41 sailors with Commander Sreejith S Nair at the helm as Commanding Officer. The ship is capable of operating in shallow waters at high speeds and is equipped with enhanced fire power. Built for extended coastal and offshore surveillance and patrol the warship is fitted with advanced MTU engines, water jet propulsion and the latest communication equipment.

The ships armament consists of a 30 mm CRN 91 gun manufactured by Ordnance Factory Medak. An electronic day-night fire control system namely Stabilised Optronic Pedestal (SOP) manufactured by Bharat Electronics Limited (BEL) controls the gun. The ship is also equipped with

two 12.7 mm heavy machine guns (HMG) and multiple medium machine guns, besides shoulder-launched Iglu surface-to-air missiles to combat aerial threats.

नवभारत टाइम्स

24 मई, 2016

नेवी पुरानी सबमरीन्स से काम चलाने को मजबूर

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■ नई दिल्ली : पिछली यूपीए सरकार की ओर से नेवी की सबमरीन्स के आधुनिकीकरण के फैसले में टालमटोल को एनडीए सरकार ने भी जारी रखा है, जिससे 1999 में नेवी के लिए 24 सबमरीन्स का बेड़ा खड़ा करने के फैसले पर अब तक अमल नहीं हो पाया है। नए फैसले भी नहीं लिए जा रहे हैं। इससे मजबूरी में नेवी को अपनी पुरानी सबमरीन्स को अपग्रेड करने का फैसला लेना पड़ा है।

रक्षा सूत्रों ने बताया कि नेवी अपनी सबसे पुरानी सबमरीन आईएनएस सिंधुकेसरी को आधुनिक बनाकर नया रूप देने के लिए रूस भेज रही है। 48 सौ करोड़ की लागत से 6 सबमरीन्स का आधुनिकीकरण किया जाएगा। नब्बे के दशक से पिछली सदी के अंत तक नौसेना के लिए रूस की 10 डीजल सबमरीन्स

को खरीदा गया था, जिसमें एक 4 साल पहले एक सबमरीन दुर्घटनाग्रस्त हो गई थी, जिसमें 17 नौसैनिक मारे गए थे। नेवी के पास फिलहाल 13 डीजल सबमरीन्स हैं, जिसमें से रूस की 9 और जर्मन एचडीडब्ल्यू की 4 सबमरीन्स हैं। बाकी 2 एटमी सबमरीन्स रूसी चक्र और भारतीय अरिहंत हैं। अरिहंत अभी समुद्री परीक्षण के दौर से ही गुजर रही है। पाकिस्तान के पास फिलहाल 5 फ्रांसीसी डीजल सबमरीन्स हैं। चीन से 8 सबमरीन्स और खरीदने का उसने आर्डर दिया है। चीन के पास 60 सबमरीन्स हैं, जिनमें से एक दर्जन एटमी पनडुब्बियां हैं। आम तौर पर डीजल सबमरीन्स की उम्र 4 दशक की होती है। सिंधु केसरी को 1989 में नेवी में शामिल किया गया था जो अब 27 साल की हो चुकी है। करीब 12 सौ करोड़ की लागत से इतनी पुरानी सबमरीन को मजबूरी में ही अपग्रेड कर नया रूप दिया जा रहा है।



The road ahead for India-US ties

Prime Minister Narendra Modi is visiting the US the fourth time in his two years in office. This, taken with President Barack Obama's visit to India in 2015 as chief guest at our R-Day celebrations, indicates that both sides want to work together to expand bilateral ties in a way that their respective expectations are met and find as much common ground as possible on international issues where the views of the two countries differ.

Challenge

The challenge before India is to enlarge the areas of understanding with the US, soften the edges of differences over a whole host of political, security and economic issues that are inescapable between a power that wants to maintain its hegemony, and a slowly rising power like India that is sensitive about the inequities of the present international system in which its say is limited and is unable to change US policies that hurt its interests. In the circumstances any viable Indian strategy would be to harness US support wherever possible to promote the government's development agenda which alone can make India strong and increase its weight in global decision-making. This requires an assiduous engagement of the US for building the right political atmosphere for promoting our interests. However, building a stronger relationship with the US will severely test our diplomatic skills because of the constant US pressure to open up our economy more, usher in big-bang reforms, make regulatory changes, introduce legal structures that suit US corporate interests, tighten IPR provision and so on. At the political level, we have to guard against closeness to the US affecting our freedom of action in foreign policy. If we seek some gains from wooing America, the US will look for reciprocal gains. The challenge will be to maintain a balance between the two. Undoubtedly, the process of consolidation of India-US ties is being given personal attention by Modi and Obama. Indian policymakers believe that White House oversight is required to push the relationship forward, as the State Department is seen as wedded to past positions and prejudices developed during the Cold War and nurtured even afterwards on nonproliferation, Pakistan and human rights issues. Not that this means that the White House can be counted to deliver what India wants. George W Bush was stubbornly soft on Pakistan on terrorism and Obama has not so far done anything dramatic in India's favour.

Re-galvanizing

In fact, Modi has been personally energetic in re-galvanising the US relationship that had begun stagnating in the UPA's second term. He has struck a personal rapport with Obama and worked constructively with him on issues like climate change and renewable energy. His business-friendly credentials and assiduous cultivation the US corporate sector, his development plans for India for which he seeks US involvement and soon have made India an attractive partner in the eyes of the US.

On several fronts, Modi has been clearing the ground for closer India-US ties. He has resolved the rift over our nuclear liability legislation. Progress has made in negotiations with Westinghouse for supply of nuclear reactors. Defence cooperation with the US has been expanded. India-US military exercises are expanding. In the Joint Strategic Vision for AsiaPacific and the Indian Ocean Regions announced during Obama's January 2015 visit India boldly accepted that the security of these two maritime domains was inter-linked, with China's new assertiveness, its naval expansion and its illegal actions in the western Pacific in view.

Expectations

If the positive direction of India-US relations is set to continue, any expectation that the US will radically change its policies on issues that are vital to India's security would be misplaced. The US will not sanction Pakistan for its terrorist activities against India and will want to supply military assistance despite revived Congressional opposition. The US will counter China only where it directly challenges US power. It will, therefore, treat China as a potential adversary in the western Pacific but as a partner in our region, as its willingness to promote a Chinese role in Afghanistan in collaboration with Pakistan shows. The US does not consider the Taliban as a terrorist organisation and is willing to accommodate it politically in Afghanistan in a Pakistani-brokered deal. The US is not taking a position on the CPEC or Gwadar. No wonder, as some US officials acknowledge, India and the US have 95 per cent convergence in the east and 5 per cent convergence in the west. India and the US are clashing on WTO issues. The US has not delivered on India's APEC membership, or that of NSG and MTCR. During the Nuclear Security Summit, Obama surprised us by implicitly equated India and Pakistan on nuclear missteps. The issues involving our IT industry remain unresolved.

During his June visit, Modi will address the US Congress. He was denied this opportunity in September 2014. This shows the distance travelled in the relationship since then.

The Times of India
24 May, 2016

India can't equate itself with France on NSG: China

By Saibal Dasgupta

China will not budge from its stance against India's entry into the powerful Nuclear Suppliers Group (NSG), and assume the same approach for "all-weather friend" Pakistan, because neither country has ratified the nuclear Non-Proliferation Treaty (NPT), the Chinese foreign ministry said on Monday, ahead of President Pranab Mukherjee's four-day China tour.

"China, along with other countries, has been maintaining that there should be a thorough discussion on whether non-NPT countries can join NSG, and this decision should be made on consensus. This applies to all non-NPT countries, including Pakistan," said Hua Chunying, the ministry's spokesperson, at a media briefing.

India recently said there was no rule that restricts NSG membership to NPT signatories, citing the example of France, which had become a member despite not ratifying NPT for a while. Countering the Indian argument, Hua said, "France was a founder of the NSG so the issue of its acceptance... does not exist."

Mukherjee arrives in the southern city of Guangzhou on Tuesday evening, and will reach Beijing late Wednesday. He will meet Chinese President Xi Jinping and other top officials before leaving Beijing on Thursday.

China has been building nuclear power plants and conducting other commercial deals in the nuclear energy sector, which some observers see as a violation of NPT. But it wants to block India because an NSG membership will make it possible for New Delhi to access sensitive technologies and materials from different parts of the world, analysts here said.

Latest in list of Chinese fakes: India President

By Saibal Dasgupta

An imposter has managed to sneak past Chinese censors to set up an account in the name of President Pranab Mukherjee on the country's Twitter equivalent, Sina Weibo, which has more than 500 million users.

The account is identified as 'India President' and features India's map within a circle. The imposter has also posted several comments ahead of Mukherjee's four-day tour, beginning with a greeting but moving on to posts aimed at showing India in poor light.

"Hello China! Looking forward to meeting you," reads a post dated May 4. "What do you think... what is the biggest flaw in our country?" asks a subsequent post, before the user himself offers an answer, "The people of our country are several times more (sic) than China, but the development is not as good as China, I think." It's unclear how the imposter slipped past Sina Weibo's internal scrutiny, which has been very stringent since a government crackdown on several internet sites for allowing "misleading information".

The Economic Times
24 May, 2016

Hare-Brained Notion of Indo-Pak Parity

Beijing has opposed India's membership of the Nuclear Suppliers Group, in the run-up to President Pranab Mukherjee's forthcoming visit to China. The ostensible objection is that India is not a signatory to the Nuclear Non-Proliferation Treaty (NPT). However, Beijing's opposition has more to do with cultivating Pakistan, whom it wants to equate with India.

New Delhi and its allies within the 48-member NSG can address this objection in two ways. One, stress that India's objection to the NPT is that it is an unequal treaty, not non-proliferation. India's track record on this score is impeccable. And, as part of the Indo-US civil nuclear deal, India has taken several measures that allay concerns about proliferation. New Delhi must show its willingness to consider taking some additional measures, in line with other nuclear-armed states, relating to information sharing, and tracking of uranium through the fuel cycle to improve confidence in its commitment to non proliferation. Two, New Delhi must aggressively contest China's efforts to ensure parity between India and Pakistan. This effort is flawed and dangerous and ignores the real threats, amplified by the Pak establishments close to jihadi elements, relating to insider theft, onward proliferation, accident, sabotage or unauthorised use. There is, too, concern about proliferation of tactical nuclear weapons, under the control of relatively junior army officers. There are no such concerns with democratic India.

Beijing mounted a similar campaign in 2008. India needs to remind the world that its membership of NSG will not unleash a nuclear proliferation race. It must stress that any attempt, no matter how tangential, to equate India and Pakistan will not aid the cause of nuclear safety and security. Instead, it could have the opposite and more dangerous effect.

Mail Today
24 May, 2016

A farewell to arms trade ban as US lifts Vietnam sanctions

The United States announced an end to its embargo on sales of lethal arms to Vietnam on Monday, "a historic step that draws a line under the two countries' old enmity and underscores their shared concerns about Beijing's growing military clout.

The move came during President Barack Obama's first visit to Hanoi, which his welcoming hosts described as the arrival of a warm spring and a new chapter in relations between two countries that were at war four decades ago. Obama, the third US president to visit Vietnam since diplomatic relations were restored in 1995 has made a strategic 'rebalance' towards Asia a centrepiece of his foreign policy. Vietnam, "a neighbour of China", is a key part of that strategy amidst worries about Beijing's assertiveness and sovereignty claims in the South China Sea.

The decision to lift the arms trade ban which followed "intense debate within the Obama administration" suggested that such concerns outweighed arguments that Vietnam had not done enough to improve its human rights record and that Washington would lose leverage for reforms. Obama told a joint news conference with Vietnamese President Tran Dai Quang that disputes in the South China Sea should be resolved peacefully and not by whoever "throws their weight around". But he insisted the arms embargo move was not linked to China. "The decision to lift the ban was not based on China or any other considerations. It was based on our desire to complete what has been a lengthy process of moving towards normalisation with Vietnam", he said.

former foe showed "hearts can change and peace is possible". The sale of arms" Obama said, "would depend on Vietnam's human rights commitments" which would be made on a case-by-case basis. Human Rights Watch reacted with dismay to Washington's decision to toss away a critical lever it might have had to spur political reform in the communist party-ruled state.

Phil Robertson, the watchdog's Asia director, said in a statement that even as Obama was lifting the arms embargo, "Vietnamese authorities were arresting a journalist human rights activists and bloggers on the street and in their houses."

In one fell swoop "President Obama has jettisoned what remained of US leverage to improve human rights in Vietnam — and basically gotten nothing for it", he said. Obama told the news conference with President Quang that Washington would continue to speak out for human rights "including citizens" right to organise through civil society. Quang, who actually announced the US embargo lift before Obama could do so, was until recently minister of public security, which activists say harasses and arrests dissidents. Obama will on Tuesday meet entrepreneurs and tout a Trans-Pacific Partnership trade deal he has championed in which Vietnam would be the biggest beneficiary of the 12 members. ---@Reuters

The Statesman
24 May, 2016

China not against military pact in SCS

China today said it has no objection to "normal" military cooperation between countries in the South China Sea if it is conducive to regional stability, days after Beijing raised "concern" over participation of India in Malabar exercise with the US and Japan near the disputed sea.

"We have noted the relevant report. Concerning the normal military cooperation we have no objection to that. We hope that military cooperation such as this is conducive to peace and regional stability," Foreign Ministry spokesperson Hua Chunying said.

A Chinese official had earlier said that Indian ships taking part in maritime exercise in the South China Sea was a matter of "concern".

The official said the colonial tactics of "divide and rule" was being used. "When there is some trouble in the South China Sea, India is worried. When Indian ships participate in maritime exercises in the South China Sea, of course China will show concern," the official told reporters in New Delhi last week.

Guided missile stealth frigates,INS Satpura and INS Sahyadri, INS Shakti, a sophisticated fleet support ship, and INS Kirch, a guided missile corvette, had set sail on May 18 on a two-and-a-half month long operational deployment to the South China Sea and North West Pacific.

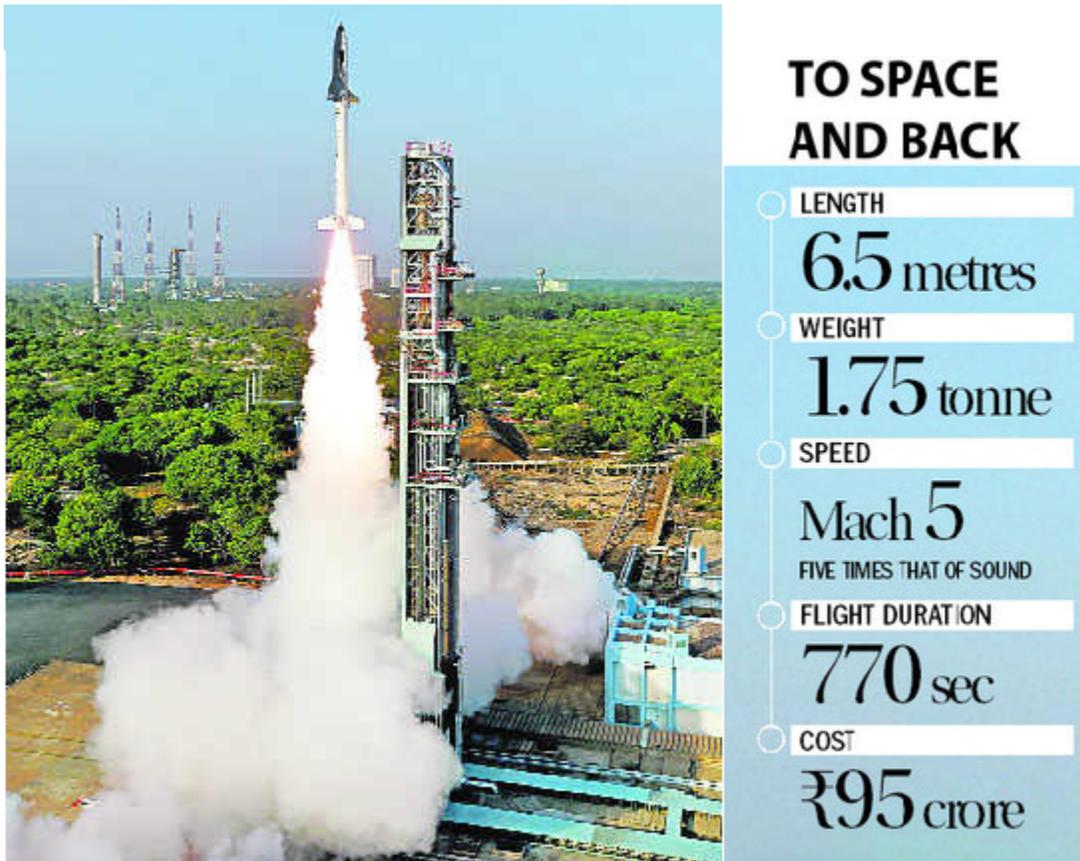
They will also take part in the Malabar exercise near the South China Sea.

The Tribune
24 May, 2016

ISRO launches first ‘swadeshi’ shuttle

By Shubhadeep Choudhury

The Indian Space Research Organisation (ISRO) today successfully launched its maiden “swadeshi” space shuttle with the winged Reusable Launch Vehicle-Technology Demonstrator (RLV-TD) from Sriharikota in Andhra Pradesh, fulfilling its mission objectives in the first crucial test to make space travel easier and cheaper in future.



A scale version of a ‘Reusable Launch Vehicle’ is launched from Sriharikota on Monday.

Prime Minister Narendra Modi tweeted: “Launch of India's first indigenous space shuttle RLV-TD is the result of the industrious efforts of our scientists. Congrats to them.”

With the test-firing of the indigenous unmanned model space shuttle, India has joined the race to develop reusable spacecraft to put satellites into orbit after the US’ NASA stopped its space shuttle programme in 2011.

RLV-TD, mounted atop a rocket, separated from the launcher at an altitude of 56 km. It went further up to an altitude of 65 km and began its descent. The 6.5 metre-long scale model weighing about 1.75 tonne re-entered the atmosphere at a speed of around Mach five (five times the speed of sound).

“The vehicle’s navigation, guidance and control system accurately steered it during the descent. After successfully surviving the high temperatures of re-entry (into atmosphere) with the help of its thermal protection system, RLV-TD glided down to the designated landing spot over the Bay of Bengal, at a distance of about 450 km from Sriharikota, thereby fulfilling its mission objectives,” ISRO said in a statement.

“In this flight, critical technologies such as autonomous navigation, guidance and control, reusable thermal protection system and re-entry mission management have been successfully validated,” the statement added.

RLV-TD was tracked from the ground station at Sriharikota as well as from a terminal set up aboard a Coast Guard ship. The total flight duration from launch to landing lasted for about 770 seconds. The winged RLV-TD, the first such vehicle tested by ISRO, was built at Vikram Sarabhai Space Centre at Thiruvananthapuram at a cost of Rs 95 crore.

Preliminary step

- The RLV-TD is a scaled-down model of a reusable launch vehicle being developed
- It is described as ‘a very preliminary step’ in the development of a reusable rocket, the final version of which is expected to take shape in 10 to 15 years
- Reusable rockets could bring down the cost of access to space by 10 times
- "Launch of India’s first indigenous space shuttle RLV-TD is the result of the industrious efforts of our scientists. Congrats to them." — PM via Twitter

The Hindu
24 May, 2016

Reusable Launch Vehicle: ‘New technologies proven’

The successful Reusable Launch Vehicle-Technology Demonstrator (RLV-TD) mission on Monday was “the first step towards India achieving a low-cost access to space,” according to K. Sivan, Director, Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram.

“We have demonstrated a lot of new technologies in this mission. We have to develop a lot more new technologies” to make it a really reusable launch system and enable it to put satellites in orbit,” he said. “We will be concentrating on developing these new technologies from now,” Dr. Sivan said.

An air-breathing propulsion test is planned at Sriharikota in June/July 2016 with the RLV ultimately flying in a hypersonic regime of Mach 25.

‘Fantastic success’

The mission was “a fantastic success, which met all its objectives,” Dr. Sivan said. The winged space plane’s ability to fly at hypersonic speed was demonstrated. The mission management of its re-entry into the atmosphere at a hypersonic speed of Mach 4.9 was proven. The vehicle withstood the fiery re-entry, proving the re-usable thermal protection systems wrapped around it. Then it touched down in the predicted area in the Bay of Bengal, 425 km east of Sriharikota. “A space plane flying at hypersonic speed is a new venture for the ISRO. Till now, we were only doing rockets,” Dr. Sivan said.

N. Shyam Mohan, Project Director, RLV-TD, called it “a clean flight.” The separation of the RLV/space plane from the booster rocket at an altitude of 56 km was “smooth” and “all controls worked as specified.”

The hypersonic re-entry was perfect. Dr. Shyam Mohan said the mission's complexity came from the fact that the space plane, which sat on top of the booster rocket, had to be separated from the rocket at a specified altitude.

"We are really excited about the mission's success," Dr. Shyam Mohan said. "We are now confident of developing a winged, reusable launch system."

The Hindu
24 May, 2016

ISRO's quest for a space shuttle

As many as 600 engineers from ISRO centres, NAL, IITs and IISc were involved in the development of the RLV-TD over a period of eight years.

The test flight of the RLV-TD on Monday represented the first step towards the ISRO programme to master the reusable launch vehicle technology.

Termed the Hypersonic Flight Experiment, it was the first of a sequence of four test flights to validate various technologies. Designed and developed by Vikram Sarabhai Space Centre (VSSC) at a cost of Rs. 95 crore, the RLV-TD weighing 1.75 tonnes used a thermal protection system (TPS) including 600 heat-resistant silica tiles and a Carbon-Carbon nose cap to withstand the high temperature during atmospheric re-entry.

The first Indian aircraft structure to fly up to Mach 5, the double delta wing RLV posed a challenge for VSSC engineers to manage the high instability of a winged body mounted on a booster rocket during launch. The design of the air frame, development of mono propellant thrusters for guidance and control and advanced avionics for mission management were other challenges.

The new developments for RLV-TD include the composite movable fin, flush air data system to measure the surface pressure on the aircraft, onboard computer, high resolution data acquisition system, lithium ion battery, patch antennas and radar altimeter.

As many as 600 engineers from ISRO centres, National Aerospace Laboratories, IITs and Indian Institute of Science were involved in the development of the RLV-TD over a period of eight years.'

The Indian Express
24 May, 2016

ISRO RLV launch: First baby step in reusable space vehicle tech, says VSSC chief

ISRO's RLV space shuttle launch is also a big leap for technological development, said Dr K Sivan, director of the Vikram Sarabhai Space Centre in an interview.

On Monday, the Indian Space Research Organisation (ISRO) embarked on a first-of-its-kind test — hoisting into space what is essentially a scale model of what would be India's indigenously designed space shuttle. The 6.5m-long Re-usable Launch Vehicle–Technology Demonstrator (RLV-TD) weighs about 1.75 tonnes and is the result of more than a decade of development costing around Rs 95 crore. According to ISRO, the RLV-TD lifted off from Sriharikota and touched a peak altitude of over 65 km before its splashdown about 450 km away, in a mission that lasted about 770 seconds.

In a pre-launch interview to Pallava Bagla, Dr K Sivan, director of the Vikram Sarabhai Space Centre (VSSC) in Thiruvananthapuram, and a key force behind the RLV-TD, reveals why ISRO is forging ahead where other powers have failed. Excerpts:

How many countries have tested vehicles that are similar or resemble the space shuttle?

Already, four countries have done this, the US, Japan, France and Russia. They have tested this type of vehicle. The US retired its space shuttles in 2011 and Russia flew once long ago.

In further tests, you will have to put an undercarriage to make it land, maybe in Sriharikota or a new spaceport. Is that the plan?

We have already identified the area where we are going to land this space shuttle, at Sriharikota where a 5-km-long runway will be made.

What benefit does India get by using a winged vehicle?

Mainly, the first and foremost benefit we get is reduced cost of launching satellites. Because right now, the most precious is hardware for which we spend about 80 per cent of the cost, which is then thrown into the sea. However, suppose we are able to recover and reuse it, that way we can reduce the cost of launching. That is what we are going to achieve from this mission.

We have spent about Rs 95 crore on this vehicle for its test. Are those prices likely to come down now? Is the ultimate aim low-cost access to space? If so, is this a baby step, or a leap?

Yes, that is the ultimate aim, reducing cost of access to space... I would say, it's both. It's a baby step in the reusable launch vehicle technology demonstrations. At the same time, it's a big leap in the new technological development for ISRO. So it is a baby step for the reusable launch vehicle area, and at the same time, a big leap in technology development.

The Statesman
24 May, 2016

In Just 100 Microseconds: New system to detect explosives

Scientists have developed a new system that can extract the spectroscopic “fingerprints” in just 100 microseconds and identify a wide range of materials including chemicals used in explosives.

Terahertz spectroscopy uses the band of electromagnetic radiation between microwaves and infrared light.

However, traditional terahertz spectroscopy requires a radiation source that is heavy and about the size of a large suitcase, and it takes 15 to 30 minutes to analyse a single sample, rendering it impractical for most applications.

Scientists including those from Massachusetts Institute of Technology (MIT) in the US developed a new terahertz spectroscopy system that uses a quantum cascade laser, a source of terahertz radiation that is the size of a computer chip.

The system can extract a material's spectroscopic signature in just 100 microseconds.

The device is so efficient because it emits terahertz radiation in what is known as a “frequency comb,” meaning a range of frequencies that are perfectly evenly spaced, researchers said.

Different materials absorb different frequencies of terahertz radiation to different degrees, giving each of them a unique terahertz-absorption profile.

As a proof of concept, the researchers used their system to measure the spectral signature of not a chemical sample but an optical device called an etalon, made from a wafer of gallium arsenide, whose spectral properties could be calculated theoretically in advance, providing a clear standard of comparison. The system's measurements were a very good fit for the etalon's terahertz-transmission profile, suggesting that it could be useful for detecting chemicals.

Flying robots can hitchhike on birds

Boston: Harvard scientists have developed flying microrobots that can use static electricity to perch on bats, birds or butterflies to conserve energy in long-duration flights.

"Many applications for small drones require them to stay in the air for extended periods," said Moritz Graule, who conducted the research as a student at Harvard University.

"Unfortunately, smaller drones run out of energy quickly. We want to keep them aloft longer without requiring too much additional energy," said Graule.

"A lot of different animals use perching to conserve energy, but the methods they use to perch, like sticky adhesives or latching with talons, are inappropriate for a paperclip-size microrobot, as they either require intricate systems with moving parts or high forces for detachment," said Kevin Ma, from Harvard.

The team turned to electrostatic adhesion - the same basic science that causes a static-charged sock to cling to a pants leg or a balloon to stick to a wall.

Maintaining attraction

"In the case of the balloon, however, the charges dissipate over time, and the balloon will eventually fall down," said Graule.

"In our system, a small amount of energy is constantly supplied to maintain the attraction," he said.

The RoboBee, pioneered at the Harvard Microrobotics Lab, uses an electrode patch and a foam mount that absorbs shock.

The entire mechanism weighs 13.4 mg, bringing the total weight of the robot to about 100mg - similar to the weight of a real bee.

The robot takes off and flies normally. When the electrode patch is supplied with a charge, it can stick to almost any surface, from glass to wood to a leaf. To detach, the power supply is simply switched off.

"One of the biggest advantages of this system is that it doesn't cause destabilising forces during disengagement, which is crucial for a robot as small and delicate as ours," said Graule.

The patch requires about 1,000 times less power to perch than it does to hover, offering to dramatically extend the operational life of the robot.

Reducing the robot's power requirements is critical for the researchers, as they work to integrate onboard batteries on untethered RoboBees.

"The use of adhesives that are controllable without complex physical mechanisms, are low power, and can adhere to a large array of surfaces is perfect for robots that are agile yet have limited payload - like the RoboBee," said Robert Wood, Professor at the Wyss Institute for Biologically Inspired Engineering at Harvard University.

"When making robots the size of insects, simplicity and low power are always key constraints," Wood said. *The research was published in the journal Science.*

Solar plane lands in Ohio on latest leg of world trip

An experimental aircraft powered solely by energy from the sun landed in Ohio on Saturday night on the latest leg of its historic bid by pilots and developers to fly around the globe without a drop of fuel.

The single-seat Solar Impulse 2 aircraft arrived in Dayton shortly before 10 p.m. local time, some 17 hours after leaving Phoenix Goodyear Airport, the project team said on its official Twitter page. “People told the Wright Brothers & us what we wanted to achieve was impossible,” said Bertrand Piccard after landing. “They were wrong!”

The locale was of special significance to the pilots, as the home base to aviation pioneers Orville and Wilbur Wright. Amanda Wright Lane, a descendant of the brothers, neither of whom ever married, was on hand to welcome the flight. With a wingspan exceeding that of a Boeing 747 but an ultra-light carbon-fibre skin and overall weight of a car, the Solar Impulse cruises at speeds ranging from only 34 to 62 miles per hour (55 to 100 kph). The four engines of the propeller-driven aircraft are powered exclusively by energy collected from more than 17,000 solar cells built into its wings. Excess energy is stored in four batteries during daylight hours to keep the plane flying after dark. The plane can climb to 28,000 feet (8,500 meters), but generally flies at lower altitudes at night to conserve energy. Piccard and Andre Borschberg have been taking turns piloting the plane on each leg of the journey. Both have trained to stay alert for long stretches of time by practising meditation and hypnosis. Mr Borschberg set a new endurance record for the longest non-stop solo flight last July during a 118-hour trans-Pacific crossing, over five days and five nights, from Japan to Hawaii. He also set new duration and distance records for solar-powered flight.

New novel biosensor can detect cancer, Alzheimer’s

Scientists have developed a novel biosensor that can detect molecules associated with neurodegenerative diseases such as Parkinson’s and Alzheimer’s, as well as certain types of cancer.

The device, developed by researchers at the National Nanotechnology Laboratory (LNNano) in Brazil, is a single-layer organic nanometre-scale transistor on a glass slide.

It contains the reduced form of the peptide glutathione (GSH), which reacts in a specific way when it comes into contact with the enzyme glutathione S-transferase (GST), linked to Parkinson’s, Alzheimer’s and breast cancer, among other diseases.

The GSH-GST reaction is detected by the transistor, which can be used for diagnostic purposes. The project focuses on the development of point-of-care devices by experts, using functional materials to produce simple sensors and microfluidic systems for rapid diagnosis. “Platforms like this one can be deployed to diagnose complex diseases quickly, safely and relatively cheaply, using nanometre-scale systems,” said Carlos Cesar Bof Bufon, head of LNNano’s Functional Devices and Systems Lab.

Doubts on IPR policy boost for patents, say experts

By Subhayan Chakraborty

It aims to leverage IPR to reap economic and social benefits on a large scale

The recent Intellectual Property Rights (IPR) policy might lead to a higher number of patents but not necessarily foster innovation, feel legal experts.

The policy, a long time in the making, aims to leverage IPR to reap economic and social benefits on a large scale. However, IP lawyers and experts say while registering of patents might benefit its holder, its effectiveness as a socio-economic tool is in question.

“An indiscriminate push has been provided to registering patents and generating IP assets but the measures to link these with long-term innovation growth has been absent in the policy,” says lawyer Shamnad Basheer, part of the original think-tank constituted to draft the policy. He added no empirical validation has been given to prove a higher number of patents pushed up innovation. The government looked at China, where a record number of more than a million patent applications were filed in 2015, said an expert who'd with the government on IP. China had focused on patent generation on a massive scale since the late 1990s but, opine many, this resulted in proliferation of low-value patents, scoring low on innovation. Less than one cent of China's patents are of intermediate or high value. An equal scenario has been predicted for India.

An official from the department of industrial policy and promotion recently said such patents constitute almost 10 per cent of all applications currently awaiting approval.

“Implementation is the key if the policy is to leverage efficient innovation,” said Nishad Nandkarni, associate partner at law firm Khaitan and Co. While the policy talks about specific research to find which areas in various sectors need new IP creation the most, it does not help that no specific framework has been provided, he added.

On the global front, India continues to be pressurised by developed countries and especially the United States on specific provisions in our patent laws. Chief among this is section 3 (d) of the Patents Act, which stops evergreening of patents after minor adjustments. While major US pharmaceutical companies are the most vocal opponents, their Indian counterparts are also against it.

There is concern over the fact that the policy has kept open the possibility of amendments to such laws, though commerce and industry minister Nirmala Sitharaman recently ruled out accepting of provisions which are stricter than the current Trade Related Aspects of Intellectual Property Rights agreement. The pact came into force in 1994 and sets minimum standards for many forms of IPR for all members of the World Trade Organization.