

Newspaper Clips

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HARNESSING HYDROGEN

SPACE FUEL FOR URBAN SHUTTLES

After three decades of research, scientists at IIT-Delhi have developed autos that run on hydrogen and cause negligible pollution

Jayashree Nandi | TNN

It's the main fuel of NASA's space shuttle launchers and will now power a test fleet of autos in the city. Hydrogen, so far used terrestrially in some avant-garde customized cars and experimental bus fleets, will run 15 autorickshaws developed as part of an IIT-Delhi project. But unlike London's hydrogen buses and California's Hydrogen Highway project that use complicated fuel-cell technology, the Delhi autos will be built around cheaper internal combustion engines.

Professor LM Das of IIT-D, who has perfected the technology, explains the rationale for hydrogen power: "Hydrogen is like a slightly temperamental child. You need to tame it. Once controlled, it can be much more efficient than even compressed natural gas (CNG)".

Das says he conceived the idea of using compressed hydrogen as an automotive fuel with Delhi's air pollution in mind. In the early '80s, it was a bold initiative — an idea ahead of its time. Lay acquaintances thought he was talking about making a hydrogen bomb. De-

tractors in the scientific community dismissed his research as a freak project.

But Das soldiered on alone over the next three decades as associates came and went. "No one can turn a blind eye to the environmental degradation caused by vehicles. In fact, before CNG came, Delhi had become unlivable. So, despite all the criticism that my research was too futuristic, I pursued it. Now the world knows that aggressive steps are required to mitigate the environmental damage that has been done," he says.

Unlike petroleum-derived hydrocarbon fuels, pure hydrogen does not produce toxic carbon monoxide or the heat-trapping carbon dioxide on combustion. There are no oxides of sulphur, nor any particulates. Water vapour and oxides of nitrogen (NOx) are the only byproducts. Although NOx is a pollutant, Das claims their engine has been optimized to reduce its emission greatly. "We got the best efficiency and very low emissions," he says.

As a member of the government-appoint-

ed core group on automotive research, Das had worked on a hydrogen fuel assignment from United Nations Industrial Development Organization (UNIDO) and the International Centre for Hydrogen Energy Technologies (UNIDO-ICHET) based in Istanbul, in 2006. Over the next three years, the engines were developed at IIT. A conventional CNG engine was used with modifications for compressed hydrogen gas.

While the project at IIT-D's Department of Energy Studies resembled a turnstile, one man alone stayed on with Das — lab technician GP Singh. The 14-member team stabilized after the project was officially taken over by automobile firm Mahindra that has built up a strong presence in alternative energy with hybrid and electric vehicles. The new system was implemented on autos provided by the company and trials were done inside the IIT campus.

Apart from developing the autos — branded Mahindra HyAlfa and shown to the public at last month's Auto Expo — Das' team is also working on two hydrogen-fuelled minibuses with a 2014 deadline. Senior project scientist, GP Subhash, who quit his job at the University of Petroleum and Energy Studies to join Das, says the Ministry of New and Renewable Energy (MNRE) is keen on developing a hydrogen-run minibus. "The Rs 15-crore project aims to develop two mini buses by 2014.



DRIVEN: THE TEAM THAT DEVELOPED THE HYDROGEN AUTO; (BELOW) THE HYALFA AT LAST MONTH'S AUTO EXPO



The idea will take some time to be part of our daily lives. But we are at it to prove the efficiency of hydrogen fuel," he says.

Meanwhile, the HyAlfa, which resembles Mahindra's Alfa autos commonly seen in NCR towns, awaits its commercial launch and will be the first mass-produced hydrogen-run internal combustion engine vehicle in the world. The higher price of the modified engine and fuel system is a challenge, though, for its target market. The economics of running these autos in Delhi is yet to be worked out. But Das, Subhash and their team are looking forward to the day when the technology will become an example for the world and give Delhiites a chance to have a smooth ride with less noise and smoke.

HYDROGEN DOES NOT PRODUCE TOXIC CARBON MONOXIDE OR THE HEAT-TRAPPING CARBON DIOXIDE ON COMBUSTION

'Hang me for so-called omission... but let them go through democratic process'

Days after G Madhavan Nair and three other scientists were barred from occupying government positions for their role in the Antrix-Devas deal, the former ISRO chairman explains why ISRO took up the project and says the government has sent out "a very wrong message" to the scientific community. The session was moderated by Assistant Editor Amitabh Sinha



AMITABH SINHA: What is the Antrix-Devas deal and the alleged scam all about? In 2000, there was a conscious decision by the government that this resource of satellite-based transponders should be for both government and private use. They entrusted the Department of Space to build more satellite capacity and provide it to private users as well. But a private operator cannot have a foreign satellite and beam it over India. It is only through DoS that they can do so.

In 2008, we had up to 200 transponders of which 120 were leased out for commercial operations. Since our capacity was not adequate for use by private operators, we hired 80 transponders on foreign satellites. DTH followed in 2004-5—Doordarshan and Tata Sky began to provide DTH services, partly through our satellites and partly through hired satellites from Europe. Once that was established, we went into providing communication services. We thought of bringing in hand-held communications. When Dr Kasturirangan was ISRO chairman, he had interacted with Forge Advisors in USA and they said they had critical patents and they were willing to form a joint venture with Antrix to toward this technology and deploy it here. A committee was formed with K N Shankara as chairman to look at the technical, commercial and financial aspects of the project. At the end of the study we came out with a joint venture. ISRO was to provide the transponder. We told them that if they have to work with Antrix, they have to form an Indian company as we do not have the mandate to work with foreign companies. So they registered an Indian company by the name of Devas Multimedia and they took the responsibility of providing the ground segment and the receiver technology with the clear understanding that ISRO's responsibility was only to provide the transponder capacity.

Devas had to get all the clearances needed for operating the system on the ground from the authorities concerned. The satellite was almost ready for launch when a named a few things took a negative turn and the process to annul the agreement began. That culminated in 2011. We thought everything was settled. Then the findings of one committee (BK Chaturvedi) and one panel (Pratyush Sinha) looking into the deal got some how linked and it is suddenly being said that there were procedural lapses in the deal. Now the reports have come out. The Chaturvedi Committee met all the people concerned. They have gone into the details of delegated powers of the Space Commission and Antrix, the leasing arrangement of transponders, etc. But the second panel has exaggerated statements and named a few people for acts of omission and commission which, according to me, is unfair. The Chaturvedi committee has said there is no financial loss to the government and there is no spectrum sale involved. There are some minor procedural lapses.

Why did ISRO take up this project? Simply because a country needs a mobile communication system. Today, at least 30,000-40,000 villages don't have any connectivity. If you have a hand-held device, one can provide multimedia services even to remote parts of the country. So, new technology coming to the country was the primary driver. For ISRO, a high-power satellite with deployable antenna, providing multimedia services from space would have been unique and we would have been the third country in the world to have that technology.

DILIP BOBB: What are the commissions and omissions that you are being charged with in the deal? The Chaturvedi committee was very fair. They stated that I did not keep the government informed of the Devas deal. But in the same

time frame, Tata Sky was negotiating with us. We leased them 12 transponders. We did not inform the government about that. Antrix Corporation is a commercial wing of the Department of Space that is a registered government company. It has got its own by-laws. The buck stops with the board of directors. They are authorised to lease out transponders for commercial purposes. Department of Space is not authorised. When we build a satellite and go to the government for approval, it takes two to three years to go into orbit. At the time of the proposal, I may have one person or two persons interested. As and when the satellite becomes operational, the agreement is firm. The Cabinet note says the majority of the capacity, 80 to 90%, will be leased out to private operators. We did not name the operators because it was never the practice. Suppose Devas backed out from the technology part of the agreement, we would have to find someone else and go for government approval again. I did not want that. It is a decision of the Antrix Board and there was no malintention in the reporting. It has been the standard practice from 2000 onwards.

COOMI KAPOOR: Do you think that matter was blown out of proportion due to rivalry within the department? I would not say that I am puzzled by the developments. First there was the BN Suresh committee appointed by the Space Department. In May 2011, the committee's report detailed the merits and the demerits of the project and said it to be pursued. They did not say there were any procedural lapses. What they said is that keeping in mind the current utilisation of S-band, we have to look at what changes have to be made for the future. They said a formal MoU has to be signed between Antrix and Devas—these are procedural steps.

COOMI KAPOOR: Why then have two committees looked into the deal? This is puzzling. I am not privy to any of these documents. I know there was a Space Commission meeting in 2010. Based on certain data presented at the meeting, they said the deal should be terminated. Then, the Department of Space went to the Cabinet Committee on Security to terminate the deal. That process remained hidden from us. The Pratyush Sinha committee says that in 2010, Devas sold shares to some foreign companies. Secondly, CAG brought out a report saying that the spectrum evaluated comes to ₹2.75 lakh crore. These two factors put together led to a panic reaction. The Chaturvedi committee has given the answer (to why let residential and space spectrum not the same): one mobile tower covers 10-15 km and serves 10,000 to 20,000 customers; a satellite covers an area of 500 km—we have five beams and we serve 50,000 customers. Therefore, the earning opportunity on the ground is much more. Therefore, the Chaturvedi committee said there is no anomaly (in pricing of spectrum). They also said that there is no procedural lapse in not informing the government. Now, people are trying to justify their panicky reactions.

SUNIL JAIN: If you look at the 2G scam, A Raja was entitled to give his point of view whereas here you were not given that chance. The Chaturvedi committee has two members—Prof Roddam Narasimha and B K Chaturvedi. They gave us the opportunity to present our viewpoints and those were fully reflected in the final report. The Sinha panel sent us a questionnaire comprising 20-30 questions, asking about issues related to the spectrum aspect. We asked to be called. They did not call us. I thought I should meet

Pratyush Sinha personally. I finally gate-crashed a meeting to meet him. Half the time was spent in exchange of pleasantries. I was asked to give clarifications on a few points, which I sent within the next 24 hours. The committee recommended that action be taken as per the Pension Rules or any other rules. While taking action, a memo or a chargesheet has to be issued to individuals and after that a hearing is held. That process did not take place. We learned of the punishment meted to us through the media. Even today, we have not been given the orders. Why was it kept a secret from us?

SUNIL JAIN: You make a distinction between 'satellite' spectrum and telecom spectrum—that 'satellite' spectrum cannot be priced at the same rate as telecom spectrum. Yet, the 2010 auctions of Broadband Wireless Access spectrum was in the 2.3 GHz band while your 'satellite' spectrum is in the 2.5 GHz band and that can also be used for telecom. So why should they be priced so differently? Theoretically, even telecom companies can use 2.5 GHz band. But the policy reserves the S-band for space communication, and this is

coordinated with the ITU. Even if we desire to use it for ground application, ITU will deny it.

SUNIL JAIN: Wasn't Antrix-Devas entering into deals to sell the spectrum to various telcos at a premium? The Pratyush Sinha report talks of this. That is why I said they (Devas) will have a tough time. In today's time, Devas programme would have been a commercial flop—if you pay too much to service providers, it cannot take off. If something is not allowed under the policy or is unfair, I would have pulled the plug. Anyone wanting to use it for telecom would have to go to DoT and get its permission. There are a number of provisions in the agreement which gives us power to cancel it at any time. In transponder leasing, we put tight clauses—the transponder has to be used for the intended purpose. If it is used for other purposes, we will switch off the transponder.

MANEESH CHHIBBER: You have blamed the current ISRO chief K Radhakrishnan for the mess. No, it is not about an individual. For the six years that I was in charge, as head of the department, I am to be held responsible for every launch failure and success. Similarly, for what happened between 2009 until 2010, (Radhakrishnan) should take the responsibility. There is nothing personal about it. The first day, I became wild and made some remarks but I will not do that now.

SWARAJ THAPA: The Chaturvedi report said there was no full disclosure to the appropriate authorities on the Devas deal. You say there was no requirement. But was the issue discussed in meetings at lower and internal levels? For instance, the report mentions that the Inset Coordination Committee (ICC), which should have also discussed the issue, had met 78 times before 2004 but did not meet even once between 2004 and 2009.

The ICC's mandate is to coordinate inter-departmental activities and to service the government's requirements for satellite-based operations. In 2000, when the satellite policy was announced, the Department of Space was given the full authority to take decisions on transponders, creation of capacity as well as leasing of capacity. We had the Technical Advisory Group that met six times during this period and in two meetings, there were full-fledged discussions on the Devas agreement and whosoever needed to be informed, was informed. I have not hidden any information from those who should have known it.

DILIP BOBB: Would it now be possible for ISRO to enter into agreements with private parties? We have taken away the faith of private players and foreign companies after we cancelled the Antrix-Devas deal. With the cancellation, these people will think twice.

ANUBHUTI VISHNOI: How disappointed are you with the government's decision? What do you think are the larger implications of this decision on the scientific community in India? The government has sent out a very wrong message to the scientific community. I am prepared to bear full responsibility for the so-called omission of not informing the government explicitly about the Devas deal. They can hang me for it. But let it go through the democratic process, let them send me a memo saying on such counts you are chargesheeted and let me send my explanation. Let them take action as per the rules. I learned from my gurus, Dr Vikram Sarabhai and Dr APJ Kalam,

that you will not be blamed for doing your job. For the first time, I have learned the opposite.

PRACHI: If the ban on you is revoked, would you take up a government job? What for? If the government wants, let them come to me. I cannot take blind decisions especially after being slapped.

SHARDA SRIVASTAVA (Doon Public School, Paschim Vihar): How do you feel when fingers are pointed at you regarding the Devas deal? Do you feel betrayed? There is no point to that kind of emotion—it will serve nothing. What matters is that we bring out the truth.

SWARAJ THAPA: In hindsight, do you think the Cabinet note should have specified very clearly who and for what purpose the transponders were being leased? I did not want to be in my hands by saying Devas was the only player. If somebody else comes in, I should have the flexibility to give it to them. That is why we said 'a few private parties'. If you have a licence fee to pay for your house and vehicle, it goes to the municipal authorities. It does not go to the state chief minister. The matter stops with the body that is responsible for it. Here the matter stopped with Antrix.

RAVISHITWARI: It is unfair to compare 2G spectrum with this, but there the private players knew the value of the spectrum being sold. Here too, Forge knew it? That is where the difference lies. Forge came for hand-held communication devices for satellite. At that time there was no suggestion of ground application. This is hindsight. They realised that a hand-held device on the highway and in rural villages is perfect but for cities with high-rise buildings, it does not work unless there is a repeater on the ground. This was a late awakening. If they had started negotiating with DoT (for a terrestrial licence), it would have been goodbye to the contract.

KARAN (Doon Public School, Paschim Vihar): Why was the government not informed about the loss regarding the deal? There was a committee set up for it. They went through all computations, and they said there was no loss.

RAJ KAMAL JHA: How did you choose Forge? They were in touch with us since 2003. When Dr Kasturirangan was chairman, they made a presentation to him when he was in Washington. Then they sent us the proposal that was submitted to the Shankara committee. This wasn't through a tendering process. Our policy was first-cum-first basis.

RAKESH SINHA: What is the gap between the Chinese and Indian space programmes?

In most of the areas we are better off. Like launch reliability, satellite technology. Unfortunately, on manned missions we are lagging behind terribly.

COOMI KAPOOR: Is the manned mission an extravagance we can't afford? Not at all. When you send two people into orbit, it means that we are setting up facilities where we can understand the human physiology in a better way. The spin-off in the medical field is tremendous. After USA and Russia, we would have been the third country to launch the manned mission if we had taken up the programme in 2010.

* Question asked by an online reader
Transcribed by Pragya Kaushika

IDEA EXCHANGE



WHY DID ISRO TAKE UP THIS PROJECT? SIMPLY BECAUSE A COUNTRY NEEDS A MOBILE COMMUNICATION SYSTEM. TODAY, AT LEAST 30,000-40,000 VILLAGES DON'T HAVE ANY CONNECTIVITY. IF YOU HAVE A HAND-HELD DEVICE, ONE CAN PROVIDE MULTIMEDIA SERVICES EVEN TO REMOTE PARTS OF THE COUNTRY. SO, NEW TECHNOLOGY COMING TO THE COUNTRY WAS THE PRIMARY DRIVER. FOR ISRO, A HIGH POWER SATELLITE WITH DEPLOYABLE ANTENNA, PROVIDING MULTIMEDIA SERVICES FROM SPACE WOULD HAVE BEEN UNIQUE AND WE WOULD HAVE BEEN THE THIRD COUNTRY IN THE WORLD TO HAVE THAT TECHNOLOGY'

IT'S NOT ROCKET SCIENCE

STILL REACHING FOR THE SKY

LIFT THE VEIL If India's space programme, the world's fifth largest, is to pull off manned missions and other ambitious projects, it urgently needs to enact a law eliminating grey areas, such as the one that gave rise to the controversial Antrix-Devas deal, says **ZIA HAQ**

In a slum along the Mysore Road in Bangalore, the headquarters for the state-run Indian Space Research Organisation, or Isro, dozens of dish antennas jut out from crowded rooftops. They pick up signals directly from one of several home-grown satellites, making 24/7 television possible and spurring direct-to-home services.

"The cable guys stopped servicing our area because nobody would pay," says S Sudhir, a resident who maintains a public toilet in Bangalore. "Now we can buy recharge TV coupons for even a day's viewing. This is easy on the pocket."

Most Indians would consider making satellites and sending them into space high-tech activities far removed from their lives. Yet these activities are closer home than they realise.

The ATMs that urban Indians frequent and constantly want more of use satellites signals to dispense cash. A national telemedicine programme uses home-grown satellites to connect remote health centres to big hospitals.

Since India launched its first satellite 37 years ago, it has aggressively harnessed its large folla of satellites for many gains. It is among the world's top six space-investing nations, says EuroConsult, a Paris-based consulting firm, indicating India's commitment to space amid more basic pressing problems, such as the lack of toilets for more than half the country's population.

India's space budget last year rose 22% from the previous year. \$2,788 crore, 0.14% of its GDP, nearly half of what the central government spends on healthcare.

Over the next four years, the government will spend 15% more each year on space, a CII-Antrix-Devas deal says estimates. In 2014, this will amount to nearly \$10,000 crore.

Both India and China are seen as emerging leaders in space research and technology, even as traditional heavyweight US whittles down its space science.

US whittles down its space science — after the last Atlantis flight in 2011, it stopped its shuttle missions.

Yet a botched public-private project called the Antrix-Devas deal has come at a sobering moment in India's so-far-so-good space history. On January 13, alleging that the deal violated rules, the government barred four top scientists, including the architect of a planned moon mission, G Madhavan Nair, from future government roles.

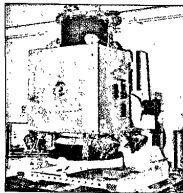
The \$766 crore contract between state-run Antrix Corporation and Devas Multimedia was looked upon in favour of Devas, ruled a panel set up by the prime minister, who oversees the space department.

While scientists ought to be accountable and punished if guilty, the government cancelled the Antrix-Devas deal, saying that it did not fall within the ambit of the 1999 SatCom policy, the only policy India has relating to space science.

The incident has therefore revealed a huge lacuna in the space sector; the lack of a comprehensive space law, which most nations with an active space programme have. None of this may have happened had the government heeded several calls over the years from various experts for a national space law.

"You need a space law not when things are going right but when they go wrong," says Professor VS Mani, a former Isro chair of International Space Law at Delhi's Jawaharlal Nehru University. "Otherwise, you have nothing to fall back on, as has happened now."

A DEAL ABORTED BEFORE TAKE-OFF



■ The Chandrayaan-1 satellite. PTI PHOTO

Antrix, the commercial arm of India's national space agency, signed a contract with the privately held Devas Multimedia in 2005 to lease 90% of a special type of spectrum of radio waves, which is what satellites use to communicate with earth. Isro was also to build, lease and launch two satellites under the deal.

HOW WOULD THE DEAL HAVE HELPED?

India's reliance on foreign satellites for hand-held satellite phones would have ended, potentially bringing affordable telecommunication to 40,000 villages that cannot be serviced by terrestrial networks. Internet access would have increased. Only two other countries, the US and Japan, have this technology.

WAS SPECTRUM GIVEN AWAY CHEAP?

No sale of spectrum took place. The government revoked the deal in February 2011 before Devas could apply to the department of telecom for a spectrum licence.

WHAT ARE THE MAIN CHARGES?

- 1 Isro didn't find other partners before accepting Devas's proposal.
- 2 India's satellite policy offers non-exclusive use only, but the deal was exclusive to Devas.
- 3 Details were not fully divulged to the cabinet during its presentation.

WHO ARE DEVAS'S PROMOTERS?

Devas is led by Isro's former chief technology officer. It has experts with experience in large telecommunication firms. Deutsche Telekom, partially owned by the German government, bought a stake in 2009. This change in shareholding is one of the things the government was concerned about because of a dilution in equity and the ushering in of a strategic foreign shareholder. US-based Columbia Capital and Telecom Ventures is also an investor.

WHAT ARE THE RESPONSES?

- 1 The 1999 SatCom policy, the only one that governs such deals, simply does not provide for auctioning or competitive bidding. It's a first-come-first-served policy.
- 2 Devas had exclusivity by virtue of having the technology to execute it.
- 3 It has never been the practice to state all details, including technical ones, to the cabinet.

ONLY ISRO WAS LIABLE FOR LOSSES.

In the deal, Devas was considered an international customer for legal purposes, even though it is registered in Bangalore, which is a discrepancy.

IT WAS THE DEPARTMENT OF TELECOM'S JOB TO CHARGE APPROPRIATE PROFITABLE FEES FOR SPECTRUM.



■ The earth as seen from Chandrayaan-1. PTI PHOTO

There are several grey areas. Nair argues that the SatCom policy clearly did not require him to scout around for other partners before accepting Devas's proposal, which he says could have brought telecommunication to 40,000 villages that cannot be serviced by terrestrial networks. "Nair could not have had criminal intent," says Yash Pal, educator and scientist. But dealing with crime requires a law in the first place. India has already signed several international space treaties, which is a prerequisite for embarking on space projects. These treaties, however, cannot be enforced in India until Parliament enacts corresponding laws under Article 253 of the Constitution.

As India plans big-ticket projects, such as manned space outings, it needs to plug this fundamental shortcoming. Regardless of whether Nair is guilty or no, the lack of comprehensive regulation is bad for space science, which will increasingly have to depend on private participation to flourish. "It's about time," says Mani, "for the government to make the rules of the game clear."



■ G Madhavan Nair, former chief of ISRO. ANUJA NAGARAJ/PTI PHOTO

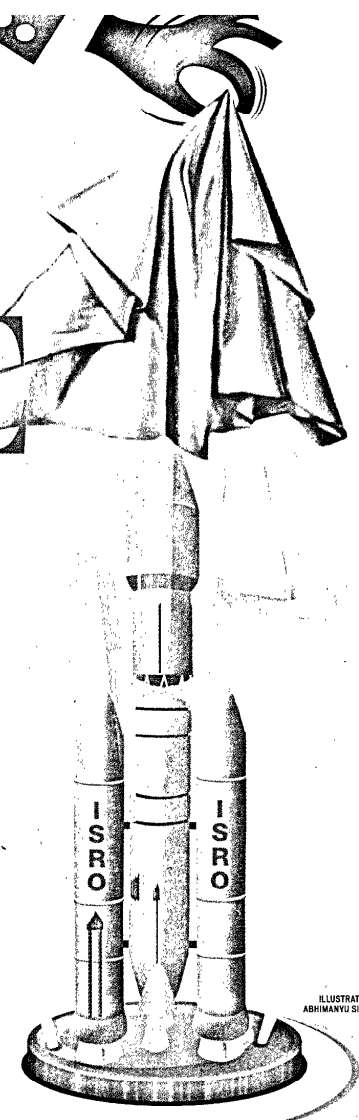


ILLUSTRATION: ABHIMANYU SINHA

BANGALORE: The high-security headquarters of the Indian Space Research Organisation, or Isro, betrays no sign that the institution has just weathered its first big crisis — not over a rocket falling to take off but of credibility.

In the main hall, a giant model of a rocket that heralds India's coming-of-age stands tall. But talk about the Antrix-Devas deal, and some unease begins to show.

Looking to bury the botched deal, India's national space agency still has big plans. Over three decades, it has pioneered projects that have practical utility on earth over symbolic space outings that are a show of nationalistic might.

Just last year, India successfully launched a rocket into space carrying three satellites. Three years ago, it pulled off a stunning unmanned moon mission that carried not just Indian equipment but also that of the US's Nasa and Russia. It planted the Indian flag on the moon, the fourth country to do so, took photographs that impressed Nasa's scientists and investigated the differences between the moon's near and far sides, relative to the earth. Isro is now working vigorously on the moon mission's second phase.

"Our goal is total self-reliance in all branches of space science and technology," says K Radhakrishnan, Isro's chief.

Last year, the space agency said it would launch its first manned mission to space in 2016. This will require an astronaut-training centre, for which designs are being prepared.

Analysts say India, which is emerging as a key player in the multi-billion dollar space sector, intends to compete hard with an equally ambitious China. Another one of Isro's major initiatives involves developing India's own regional satellite navigation system worth \$70,000 crore, an answer to the GPS system operated by the US department of defence, on which India depends.

Aiming even higher, Isro is already pressing its scientists to develop a cutting-edge air-breathing rocket engine known as a sramjet.

This could give India a far more affordable version of the reusable single-stage space vehicle, which is something similar to America's famous space shuttles.

LAST YEAR, THE SPACE AGENCY SAID IT WOULD LAUNCH ITS FIRST MANNED MISSION TO SPACE IN 2016. THAT'S JUST FOUR YEARS AWAY.

— Zia Haq

ISRO'S BIG-TICKET PLANS

THE NEXT FIVE YEARS will see Isro launch some of its biggest missions yet. Isro has traditionally focused on space missions that have ground utility, rather than symbolic ones.

HOME-GROWN SATELLITES have enabled direct-to-home satellite television to cover the entire country. VSATs provide applications such as data and video connectivity, village telephony, broadband connectivity and ATMs.

SATELLITES CONNECT 60 speciality hospitals to 306 remote and rural hospitals and 16 mobile ambulances. About 55,500 classrooms are linked through satellite networking. These classes include the whole gamut of the education system, from primary to higher education.

THE SECOND UNMANNED PROJECT, Chandrayaan-II, is set for launch in 2013's first quarter as a precursor to a manned space mission planned for 2016.

ON THE DRAWING BOARD is an astronaut-training centre.

ISRO HAS BEEN EYING a share of the billion-dollar satellite business after it first bid for a lucrative commercial satellite-launch and sent up an Italian orbiter in 2007 from a base in India.

IT IS KEEN TO DEVELOP INDIA'S own regional satellite navigation system worth \$70,000 crore, an alternative to the US's GPS system.

THE BIGGEST BREAKTHROUGH could come from Isro's plan to develop an air-breathing rocket engine called sramjet. This could give India a far more affordable version of the US's space shuttles.

INTERVIEW G MADHAVAN NAIR, FORMER CHIEF OF ISRO

'I have been made a scapegoat'

As a child, G Madhavan Nair, former head of Isro, dreamt of going to the moon. As an adult, he became the architect of India's moon mission. However, his dream run at Isro ended in a nightmare following the controversial Antrix-Devas deal. Nair sought to make a clean breast of things in an interview to Zia Haq.

Excerpts:

Why were you keen on the deal?

We have lost a great opportunity. The deal was to rid India of its reliance on foreign satellites for hand-held

satellite communication. Nearly 40,000 villages that cannot be covered under normal terrestrial networks would have got telecom links, apart from Internet-based services.

But no bids were invited for the deal.

The existing policy provided only for deals based on a first-come-first-served basis. We had the mandate to lease satellite capacity. Isro's responsibility was limited to building and launching satellites. Spectrum or frequency would have been allotted by the telecom department at its determined price so it could have still vetoed the deal if it had felt there was something amiss.

You maintain there was no wrongdoing.

Absolutely. The entire deal was in conformity with the existing SatCom policy. You cannot retrospectively

apply rules. We would have got the assured 13.8% returns over the project period of 12 years, one of the highest so far.

But you had told HT earlier that there was some 'procedural deviation'.

Yes, to the extent that instead of naming the exact private partner in one of the communications, we said "some private parties." That is a minor procedural quibble. That's all.

What are your grievances?

The Pratyush Sinha inquiry committee has made a scapegoat of scientists. A different policy was in force then, to which the deal fully conforms. There was no sale of spectrum, unlike what is being made out. The government has confirmed there was no financial loss at all on account of the deal. So why this witch-hunt?

Economic Times ND 12/02/2012 p-13

He Can Start, But Can He Phaneesh?

Phaneesh Murthy is in a hurry to make a come back as an IT big boy. But in his third and ongoing attempt he may have to negotiate an activist hedge fund

:: Lison Joseph

Phaneesh Murthy, 47, is often called Indian information technology (IT) sector's come-back kid. And he can't wait to get back into the big boys' league.

In 2003, when iGate – the firm he heads – acquired Quintant Systems, media reported that Murthy was back with a bang. But that was not to be.

In 2009, when Satyam Computer was put up for sale, Murthy tried his luck again to come back. Again, another fizzle.

Finally last year, Murthy made his third come back, sort of, when iGate acquired Patni Computer Systems for \$1.2 billion. With that, Murthy is not stuck in the middle anymore, where there is an excess of mid-sized firms looking to survive.

The come-back analogy makes better sense in the context of Murthy's rapid rise up the corporate hierarchy and his sudden disappearance from the main stage under not-so-enviable circumstances.

That Incident

A decade ago, in 2002, everything was going well for Murthy, extremely well in fact for the ace salesman at Infosys – he even had a board seat.

A reputed rainmaker, Murthy played golf with senior executives of US corporations and got millions of dollars worth of contracts for Infosys. Under Murthy's sales leadership, Infosys grew from around \$20 million in revenues in 1992 to \$700 million in 2002.

And then, Murthy, an alumnus of IIT (Chennai) and IIM (Ahmedabad) got embroiled in sexual harassment allegations by a female co-worker.

In the wake of another female colleague also making similar allegations, Infosys decided to play it safe and opted for an out-of-court settlement with the complainants by paying \$3 million and the firm's designated rainmaker was forced to walk away from all that could have been.

Murthy, once a blue-eyed boy of Infosys founder NR Narayana Murthy, even got \$570,000 in bonus payout that year.

Selling India

Back in 1990s, when IT was still a sunrise sector, selling for Infosys meant selling the Infosys brand as much as selling the Indian brand. Murthy would famously start his sales pitches with power point presentations about India, follow it up by serving an Indian snack before getting into the hardcore sales pitch.

Colleagues from Murthy's Infosys years and iGate recall him being an excellent salesman, but not equally successful in commanding employee loyalty. The dealmaker, they say, had trouble in taking no for an answer.

After his exit from Infosys, Murthy worked as strategic adviser for Quintant Services, which was acquired by iGate, where Murthy got the CEO tag.

All that is history. Murthy is now back in the news, partly may be, because he is in a hurry.

Patni Puzzle

He is in the news for his "aggressive" integration of Patni with iGate. To be sure, Patni, was almost thrice the size of iGate and private equity firm Apax Partners had to lend Murthy a funding hand to help him punch much above his weight in an ambitious, highly leveraged buyout.

With a debt bill of about \$770 million from the Patni acquisition, Murthy needs to generate enough cash to repay it all. Trickily for Murthy, most of the cash is on Patni books. Taking a short-cut, Murthy merged the sales forces of iGate and Patni, so he could book all new deals on iGate's books. Some analysts think that may be good for iGate, but not so much for Patni's minority shareholders.

The long route to integration would be to do it post de-listing and when iGate owns Patni 100% and does not have to worry about minority shareholder interest. But then, coming back into the main stage after a decade, Murthy may not be in a mood to wait.

He wants to de-list Patni, listed on Indian bourses and the New York Stock Exchange. iGate owns about 82% in Patni, but among the remaining share owners is a particularly activist hedge fund, Elliott Management Corp, which mopped up a lot of Patni shares in last few months from the open market to build up a formidable minority investor position with 9.4% ownership.

Should He Have Waited?

Murthy, not quite known for his consensus building approach, may be in for some lessons in negotiation, some analysts think, on account of his fast-paced assimilation of Patni with iGate.

"I am not denying that there can be two points of view on this matter," Murthy says about whether close integration should have waited till after de-listing.

Elliott, known on Wall Street for its ability to get managements of large corporations to toe its line, might have some advice for Murthy.

Only time will tell, if Patni will indeed become his vehicle for the real come back or if it turns out to be another case of stillborn come back as in 2003 and 2009. ■

With a debt bill of \$700 mn Murthy needs to generate enough cash to repay it all



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US to honour Amartya Sen for work on poverty

Chidanand Rajghatta | TNN

Washington: India's Nobel Prize-winning economist Amartya Sen is among nine scholars named by president Obama for the United States National Humanities Medal, the White House announced on Friday.

Sen, who retains his Indian citizenship, is the first Indian to be honoured with the medal that is typically awarded to US nationals through its 16-year history. The White House citation describes him as an economist and a philosopher while recognizing him "for his insights into the causes of poverty, famine, and injustice".

"By applying philosophical thinking to questions of policy, he has changed how standards of living are measured and increased our understanding of how to fight hunger," the White House citation said. Sen helped create the United Nations Human Development Index.

The National Humanities Medal, bestowed on 133 individuals since it came into existence in 1996, "honours individuals or groups whose work has deepened the nation's understanding of the humanities, broadened our citizens' engagement with the humanities, or helped preserve and expand Americans' access to important resources in the humanities," the White House said.

While Indian scholars and experts of Indian-origin have previously won White House recognition in science and engineering in the form



MATTER OF PRIDE: Sen is the first Indian to be honoured with US National Humanities medal

of National Medals, this is a first in humanities.

Sen, who won the Nobel Prize for Economics in 1998, is currently the Thomas W Lamont University professor and professor of Economics and Philosophy at Harvard University, and divides his time between US and India. He is a close friend and adviser to PM Manmohan Singh, who was his contemporary in Oxford and Cambridge, while president Obama is a late-80s alumnus of Harvard Law School.

Sen is among four (an unusually high number) foreign-born luminaries in a distinguished list this year that includes the American poet John Ashbery; historians Robert Darnton and Cuba-born Teofilo Ruiz; Ghanaian-British-American philosopher Kwame Anthony Appiah; music scholar Charles Rosen; literary scholars Andrew Delbanco and Ramón Saldivar; and the educational program National History Day. The ceremony will be webcast live at 1.45 pm on February 13, from the White House East Room.

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Britain safe for Indian students, says UK MP

Madhavi Rajadhyaksha | TNN

Mumbai: Cries of racial attacks against Indians in UK surfaced yet again on Saturday after an MBA student, 26, was stabbed in London. The incident occurred even as Member of UK Parliament and a person of Indian origin, Keith Vaz, was in the city carrying a message of assurance that UK was safe for students. Vaz who has served six terms in the UK Parliament stopped by in Mumbai before visiting Goa and Delhi to soothe Indian ties.

"This is absolutely shocking and very upsetting. We need to find out all the facts of the incident," he said referring to Saturday's attack on Praveen Reddy. Earlier in the day, Vaz had met the family of another victim, engineering student Anuj Bidve (23) who was shot to death on the streets of Manchester in December. "We all feel a sense of outrage about the terrible tragedy. I am glad that someone has been charged and we will know what exactly happened after the trial," said



Vaz, who instituted a fund for Bidve's family. He handed over £1,000 to his kin.

The recent attacks along with change in visa rules have dampened the spirit of students aspiring to head to UK for education. The UK government has recently tweaked visa rules making it harder for students to pursue work in UK after obtaining their degrees and imposed stricter English language tests and scrutiny of private colleges.

Indian sensibilities were further stoked after TV personality Jeremy Clarkson mocked Indian culture on a Christmas special on BBC. "It is offensive that we still

We all feel a sense of outrage about the terrible tragedy (Anuj Bidve's murder). I am glad that someone has been charged and we will know what exactly happened after the trial

Keith Vaz | BRITISH MP

don't have an official apology from BBC. It was an unfair characterization of a country, and Clarkson should have personally come down to India and tendered an apology," said Vaz who has written to the director-general of BBC demanding such a move.

Vaz also spoke out against the sponsorship of Dow Chemicals for the upcoming Olympics in London, another contentious issue that has strained Indo-UK ties in recent times. Emphasising the need to re-energize India's ties with the UK, Vaz said India was emerging as more important to Britain than even the US.

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By 2013, a bionic eye for the blind?

Washington: In a pioneering research, scientists claim to be developing bionic eyes for the blind, which they say will be ready for human trials by 2013.

An international team, led by Monash University, says the bionic eye implant will suit people who have lost their sight through traumatic injury or tumours, as well as for those with diseases affecting eyes like glaucoma and retinal disorders. "We have made significant progress since beginning last year and are confident we will have a device that could treat the majority of patients who are clinically blind," said team leader Arthur Lowery.

He added, "Our device will directly stimulate the

brain's vision centre using a miniaturised implant.

The implant is fed with signals from a camera that have been processed to extract the most useful information, depending on what the user needs.

"The implant has many tiles, each with 45 electrodes, designed to give over 650 pixels in all. Due to the powerful and adaptable signal processing, we believe this number of electrodes can provide invaluable situational awareness to the user. The device can also be tuned for use in different environments, both indoors and outdoors."

It does not require a functioning eyeball or optic nerve or visual pathways from the eye to the brain. **PTI**

BREAKTHROUGH

Amar Ujala ND12/02/2012 P-7

एआईईईईई : एसएमएस करेगा अपडेट

● अमर उजाला ब्यूरो

नोएडा (ब्यूरो)। ऑल इंडिया इंजीनियरिंग एंट्रेंस एग्जाम (एआईईईईई) में बैठने वाले छात्रों को परीक्षा और नतीजों तक की सभी अपडेट एसएमएस से मिलेंगे।

एआईईईईई ऑनलाइन एग्जाम कराने जा रहे टीसीएस की ओर से छात्रों को ये अपडेट भेजी जाएंगे। फार्म भरते समय छात्रों ने जो मोबाइल नंबर दिया है उसी पर ये जानकारियां मिलती रहेंगी।

सीबीएसई ने ऑनलाइन परीक्षा के लिए आवेदन करने वाले छात्रों के लिए अपनी पसंद की तिथि चुनने की प्रक्रिया को तीसरी बार आगे बढ़ा दिया है। अब छात्र 15 फरवरी तक अपनी डेट का चुनाव कर सकते हैं।

ऑनलाइन एग्जाम सिर्फ चार दिन आयोजित किया जाएगा। इसके लिए 7 मई, 12 मई, 19 मई और 26 मई का दिन निर्धारित किया है। सीबीएसई की ओर से टीसीएस के स्मॉल एंड मिडियम बिजनेस सॉल्यूशन आईऑन द्वारा

ये अपडेट मैसेज से भेजे गए हैं। छात्रों की संख्या ज्यादा हो गई तो बाद में आवेदन करने वाले छात्रों को किसी दूसरी दिन का चयन करना होगा।

इसके लिए एआईईईईई की ओर से छात्रों को जानकारी मुहैया करा दी जाएगी। इसके बाद 10 मार्च से प्रवेश पत्र जारी कर दिए जाएंगे। छात्रों को 31 मार्च तक प्रवेश पत्र प्राप्त करने का समय दिया गया है। ये सब जानकारी छात्रों को मोबाइल एसएमएस से मिलती रहेंगी।