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Tata Group to Focus on Defence, May Expand GEC

Defence & aerospace identified as growth and focus area by Cyrus Mistry in 2014

Tata Group Gets Ready for Defence Play

Tata group has a six-member Group Executive Council to give strategic guidance to chairman **Cyrus Mistry**

The order book for Tatas in defence and aerospace could be similar to last year's ₹10,000 crore

With govt looking to encourage private sector participation in the defence sector, **Tatas, Mahindra Group, Ashok Leyland, Bharat Forge and Kirloskars**, among others, have evinced interest in the sector

Group cos working in defence and aerospace: Tata Advanced Systems, Tata Advanced Materials, Tata Motors, Tata Power SED, TAL Manufacturing Solutions, Tata Technologies, TCS, Tata Steel, Tata Elxsi and Titan (Precision Engineering Division)

Tata group will focus on four key areas to drive business: defence and aerospace, realty and infrastructure, consumer and retail, and financial services

Defence is an important focus for the group and in the future we would not rule out having someone to look after this segment

Mukund Rajan
Tata brand custodian and council member



The Tata Group may expand its group executive council (GEC) to include a new member with responsibility for defence and aerospace.

“Defence is an important focus for the group and in the future we would not rule out having someone to look after this segment,” said Mukund Rajan, Tata brand custodian and council member.

The group of six was formed to give strategic guidance to chairman Cyrus Mistry. Defence and aerospace was one of the four clusters identified by Mistry in 2014 as growth and focus areas for the group. The other three were realty and infrastructure; consumer and retail; and financial services. The order book for the business group in defence and aerospace could be similar to last year's ₹10,000 crore, Rajan said.

The defence sector has attracted the interest of the Tatas, Mahindra Group, Ashok Leyland, Bharat Forge and the Kirloskars among others with the government looking to encourage private sector participation and easing overseas investment rules.

“Defence will see huge traction from business houses because the purchases are going to be high, with government's Make in India thrust. Large contracts over a long period of time and single-client focus will see more private players take part in it,” said a defence analyst who didn't want to be named. Around 60% of India's defence needs are met through imports -that's expected to change.

The Tata group's revenue from the sector in FY16 is pegged at around ₹2,650 crore, up 7.5% from last year. Revenue from the business has grown at a compounded annual growth rate of 18% in the last five years. The Tata firms have been part of the country's defence projects since 1950s and the focus now is on mobility solutions, aerospace, missiles, radars, electronic warfare systems, manned and unmanned platforms, integration of C4I (command, control, communications, computers and intelligence) and homeland security systems.

The group companies working in defence and aerospace include Tata Advanced Systems and its subsidiaries, Tata Advanced Materials, Tata Motors, Tata Power Strategic Engineering Division

(SED), TAL Manufacturing Solutions, Tata Technologies, Tata Consultancy Services, Tata Steel, Tata Elxsi and Titan Company (Precision Engineering Division).

“There will also be a thrust towards homegrown products and at least 70% of the defence products are expected to be indigenous,” said Vernon Noronha, vice-president, defence and government business, Tata Motors, which makes armoured vehicles. The company's defence focus will be on combat vehicles.

Another unit targeting a total defence market that's seen at Rs. 700,000 crore in the next 10 years is Tata Power SED. The company has a presence in artillery, armour, air de fence and night vision sensors. Growth areas will include artillery, launchers, guns and precision guidance equipment.

“We have invested ₹500 crore in defence and have received approval of ₹700 crore more from the board for the manufacturing plant in Vemagal, Karnataka,” said Rahul Chaudhry, chief executive officer of Tata Power SED. Tata Advanced Systems CEO Sukaran Singh said it has hired expatriates with 20-30 years of experience in the business and they are being shadowed by Indian recruits. TASL's ongoing projects include missiles, aerospace, radar, optronics and command and control systems.

The Hindustan Times
17 Mar, 2016

Group eyes Rs. 2,650-cr revenues from defence

Mumbai: The Tata Group expects revenue from its defence and aerospace business to touch Rs. 2,650 Crore in 2015-16 (up 7.5% from a year ago) with substantial investments going ahead, coupled with a strong push for the Make in India initiative.

“Already we are seeing revenue grow at a compounded rate of 18%. Clearly, there will be substantial new investment, expansion of facilities and more jobs,” said Mukund Rajan, member, group executive council and brand custodian, Tata Sons.

Several Tata Group companies including Tata Motors, Tata Power Strategic Engineering Division (SED), Tata Advanced Systems, Tata Technologies, Tata Consultancy Services and Titan have at least some business in the defence and aerospace business.

Many of these companies are working with global players such as Boeing, Sikorsky, Rolls Royce and Lockheed Martin. “We would be open to strategic acquisitions, particularly where technology can be absorbed,” Rajan said.

Some of the group companies that have stepped up investments include Tata Power SED, which is setting up a new factory at Vemagal in Karnataka with an initial investment of ₹500 crore.

The government has increased its pace of floating request of proposals for procurement, said Vernon Noronha, vice-president, defence, Tata Motors. Follow-up processes are also being expedited, he added.

Tata Motors along with Bharat Forge and US-based General Dynamics, is one of the bidders for the estimated ₹60,000 crore Future Infantry Combat Vehicle programme (FICV).

DCNS First to Apply for 100% FDI in High-Tech Defence Tech

Ship Shape French co DCNS has sought approval to set up fully-owned Indian subsidiary that will develop advanced systems to give submarines more endurance underwater

In the first major foreign investment proposal for high-end defence technology after the government relaxed rules last year, French firm DCNS has sought approval to set up a fully owned Indian subsidiary that will develop advanced systems to give submarines more endurance underwater.

DCNS, a global leader in submarine systems, has requested clearance from the Foreign Investment Promotion Board to invest over ` . 100 crore in DCNS India Pvt Ltd, which is currently restricted to providing services, officials involved in the process told ET.

The French company has applied under a special category that considers applications for high-end critical defence technology not available in the country . In rules that were changed in November, FDI of up to 49% has been allowed in defence under automatic rule and proposals with higher investment levels have to be approved on a case-by-case basis by FIPB in consultation with ministries.

DCNS declined to comment on the development. Analysts said the proposal will be a test case for the new policy , which does away with cumbersome process that involved approval by the Cabinet Committee on Security for all applications above 49%.

“Technology on offer is cutting-edge and will prove critical in India's next line of submarines (P75I). The ball is now in the government's court. Whatever is decided could serve as a yardstick for future proposals,” Ankur Gupta of EY India said.

Officials said the DCNS proposal is structured around the new policy that is aimed at development and manufacturing of high-tech and complex equipment in India. The technology that DCNS wants to bring is Air Independent Propulsion (AIP) systems, which give conventional submarines substantially greater endurance underwater.

AIP is essential for future Indian submarines, with the Defence Research & Development Organisation also trying its hand at a developmental project. There are also plans to fit the AIP system on some Scorpene submarines that are under construction in Mumbai. DCNS, which has contracted six Scorpenes, is in contention for a follow-on order for at least two more.

The French company , which is also bidding for a mega-contract to build four landing platform docks in partnership with Reliance Defence, has asked for 100% FDI as it wants to develop AIP equipment in India with local companies, including preparation of detailed drawings, 3D modelling and design for future submarine systems.

Despite efforts to market India as a defence manufacturing hub, actual FDI inflow in the sector has been dismal, with just over Rs. 1crore flowing in last year.



The Economic Times
17 Mar, 2016

Intel Unit Fell to Politics: Parrikar

Controversial TSD Intelligence, including the attempt at TSD formation by Gen VK Singh, fell to political point scoring

Bringing back the debate on a controversial intelligence unit set up by former Army Chief Gen VK Singh, defence minister Manohar Parrikar said in Parliament that the outfit 'set up to eliminate terrorists' fell to political point scoring.

Speaking on a debate on the Pathankot attack in Lok Sabha, Parrikar said that the Technical Support Division (TSD) became a political issue and said that there have been several instances where military intelligence has been 'sacrificed at the altar of political goals'.

"Intelligence which was developed, whether it is Deep Assets or the attempt of TSD formation by Gen VK Singh, fell to the political aspirations, to the political policies and political scoring point," Parrikar said, while defending the handling of the Pathankot attack by his government.

The minister, who faced strong questions from the opposition on the attack and counter operations, said that the Army was in overall charge of the mission and rejected reports that there was confusion on who was in command.

Asserting that the Pathankot attackers were 'totally foiled' in the attempt in 'creating a big scenario', Parrikar described the attack on the air base as a 'mini war'. "This has to be treated as a war. Let us be very clear. Even small incidents of terrorism of this nature have to be treated as a war and they have to be given the same importance as well as secrecy they need," the minister said.

Parrikar, however, refused to comment on the nationality of the attackers despite several questions by the opposition. "There were some foreign trainees. I cannot reveal as to which country they belong to...I think, we totally foiled the attempt of the terror ists in creating a big scenario," he said. On criticism that the operation took a long time to eliminate the terrorists, Parrikar said the 'incident took only 43 hours' as there were clear instruction on not losing any soldier to enemy fire.

Home Minister Rajnath Singh, who also answered the opposition on the number of attackers, said a forensic report has been received that confirmed the presence of terrorists in the last building that was razed to the ground by the Army.

Manohar Parrikar: Small incidents of terror must be treated as war

Sending out a message to Pakistan, India today said it wants good relations but not at the cost of its "pride, dignity and self-respect".

Small incidents of terrorism must be "treated as a war", Defence Minister Manohar Parrikar said in Lok Sabha on Wednesday during a discussion on the terror attack at the Pathankot airbase. He added that "our enemies cannot go scot-free."

"This has to be treated as a war. Even small incidents of terrorism of this nature have to be treated as a war... You cannot have a running commentary about such operations on television etc. This puts security forces in danger," Parikkar said.

"We are definitely in the process to ensure that our enemies don't go scot-free," he also said.

Clarifying that he had never tweeted about the Pathankot operation being over prematurely, Parrikar said, "There was, probably, a small error which was immediately corrected." On January 2, a tweet from Home Minister Rajnath Singh said "all five terrorists have been neutralised," and it was later withdrawn.

Parrikar said a total of six terrorists were killed. "Using all these weapons and also Air Force helicopters, finally, around 5.30, one terrorist was killed by DSC jawan and the remaining three were eliminated there. So, at that moment, at 3 o'clock, the same day, I had conducted a meeting and we had come to a conclusion that there were probably more terrorists. That is why the operation was kept on. Next day at 11 o'clock, the other two terrorists were engaged when they started firing," Parrikar said.

Parrikar was replying after Opposition MPs attacked the PM, Home Minister Rajnath Singh and Parrikar for the government's handling of the terror attack. They also questioned the government's policy on Pakistan. "When they failed in conventional wars, as they failed in 1965 and 1971, the enemy resorted to a thousand cuts, trying to bleed India. Pathankot has to be taken as a part of asymmetric war," Parrikar said.

Stating that intelligence build-up cannot take place overnight, Parrikar referred to the Technical Services Division (TDS), a secret intelligence unit that was set up by MoS, External Affairs, and former Army Chief, General V K Singh.

"Intelligence which was developed, whether it is deep assets or the attempt of TDS formation by General V K Singh, fell to political aspirations, to political policies and political point-scoring. It is not only Ishrat Jahan," Parrikar said. "I can quote many instances when military intelligence has been sacrificed at the altar of political goals," he added.

नवभारत टाइम्स
17 मार्च, 2016

CISF ने मनाया 47वां स्थापना दिवस

वि, नई दिल्ली ने पिछले हफ्ते गाजियाबाद स्थित (सीआईएसएफ) केंद्रीय औद्योगिक सुरक्षा बल :5वीं आरक्षित वाहिनी परिसर, इंदिरापुरम में भव्य तरीके से अपना 47वां स्थापना दिवस मनाया। इस अवसर पर गृहमंत्री राजनाथ सिंह चीफ गेस्ट थे। इस मौके पर उन्होंने सलामी ली और परेड का निरीक्षण किया। इस दौरान सीआईएसएफ के डीजी सुरेन्द्र सिंह ने कहा कि 3000 कर्मियों के साथ एक छोटी शुरुआत से सीआईएसएफ पिछले

47 वर्षों में एक सक्षम बल के रूप में स्थापित हुआ है। उन्होंने कहा कि सीआईएसएफ आज 1,42,000 से ज्यादा सुरक्षाकर्मियों के साथ राष्ट्रीय महत्व के 322 संवेदनशील प्रतिष्ठानों को सुरक्षा प्रदान कर रहा है। सीआईएसएफ का अपना फायर विंग भी है, जो 91 प्रतिष्ठानों को आग से सुरक्षा प्रदान कर रहा है। इस अवसर पर गृहमंत्री राजनाथ सिंह ने विभागीय प्रकाशन 'सेन्टिनेल-2016' और 'संरक्षिका' मैगजीन का विमोचन किया। उन्होंने अपने संबोधन में परेड कमांडर व परेड में भाग लेने वाले सभी बल सदस्यों को उनके उत्कृष्ट प्रदर्शन के लिए बधाई दी। गृहमंत्री ने कहा कि सीआईएसएफ एक अद्वितीय बल है जिसने विभिन्न क्षेत्रों सुरक्षा का दायित्व संभाला है।

Deccan Herald
17 Mar, 2016

Army chief presents President's Standard to two regiments

Jaisalmer: Army chief General Dalbir Singh on Wednesday presented the President's Standard to the 75 Armoured Regiment and 43 Armoured Regiment. The ceremony took place at the Jaisalmer Military Station where both the regiments conducted a mounted parade with the indigenous Arjun tanks, Defence spokesperson Lt Col Manish Ojha said in a statement.

Besides presenting the ceremonial flag on behalf of the President, the army chief also released a 'special cover' to commemorate the event. He also addressed and congratulated the officers and soldiers on the occasion.

Raised on March 12, 1972, the 75 Armoured Regiment has a unique distinction of being the only unit of the Indian Army to be raised on captured Pakistani Territory 'Sakna' (26 km inside Pakistan), whereas the 43 Armoured Regiment is the first armoured regiment to be equipped with India's indigenous tank MBT Arjun.

The President is the supreme commander of the three wings of the armed forces.

पंजाब केसरी
17 मार्च, 2016

सेना हर चुनौती के लिए तैयार

जैसलमेर, (विमल भाटिया): थल सेनाध्यक्ष जनरल दलबीर सिंह सुहाग ने बुधवार को कहा कि 75 और 43 कवचित रेजिमेंट ने मिशाल कायम करते हुए हर मुकाम को हासिल किया है। चाहे वो आंतरिक सुरक्षा हो या सीमाओं की रक्षा या यूएनओ मिशन। सेना हरदम हर चुनौती के लिए तैयार रहती है। मौका था दोनों रेजिमेंट को राष्ट्रपति प्रणब मुखर्जी की ओर से ध्वज प्रदान करने का।

इस अवसर पर भारत में बने अर्जुन टैंकों पर परेड का आयोजन भी किया। उन्होंने कहा कि इन रेजिमेंट ने ऑपरेशन ट्राइटेड, रक्षक और विजय में नाम के अनुरूप कार्य किया। उन्होंने कहा कि इस ऐतिहासिक अवसर पर इन रेजिमेंट

समारोह

थलसेना अध्यक्ष ने किया ध्वज प्रदान

को स्टैंडर्ड प्रदान करने में भाग्यशाली महसूस कर रहा हूँ और आशा है कि यह रेजिमेंट अपनी जिम्मेदारी को और बखूबी निभाएगी। यह ध्वज हमेशा आदर्श प्रेरित करता रहेगा। इस ऐतिहासिक परेड के अवसर पर थलसेनाध्यक्ष ने एक 'विशेष कवर' का भी विमोचित किया। इस अवसर पर दोनों रेजिमेंट के करीब 400 से ज्यादा पूर्व सैनिक और अधिकारी मौजूद थे। असल में 75 कवचित रेजिमेंट 1972 में लेफ्टिनेंट कर्नल विजय सिंह (बाद में लेफ्टिनेंट जनरल) और 43 कवचित रेजिमेंट की स्थापना 1981 में लेफ्टिनेंट कर्नल बी.एम. कपूर की कमान में गठित की गई।

Deccan Herald
17 Mar, 2016

'Regulating encryption won't protect data'

Intel security head seeks global approach to check hacking

Bengaluru: Intel security group's chief technology officer Steve Grobman said that promulgating legislation on encryption only will not protect data from any cyber attack.

"We have been facing the challenge that devices can no longer protect data and the hackers can protect data at the application level. So there is nothing like the government is coming up with policy or procedures on encryption which will protect data," he told Deccan Herald.

"You can legislate on encryption. But since it is really complex mathematics, it is not possible to control. We have to move on and help the enforcement to come up with new ways to protect data," he said.

Grobman made this comment as the FBI wanted Apple's help to get more data from the iPhone used by a shooter during the San Bernardino attacks. Technology companies have rallied behind Apple against FBI asking to write software that would lift security features preventing it from cracking the passcode on the phone.

"If you make policies on this, it will further degrade security for the general public. We have hackers who are using ransomware to hack and ask money to access data. They demand more money from the end-client directly," he said.

Grobman said there are a lot of basic changes with the arrival of technologies like advance computing and cloud computing. "Public and private cloud can give scope for hackers to attacking sensitive data. In SaaS business model too, companies are delegating their work to others and so there is some scope for attack. In both cases, encryption can protect data to minimum level," he said.

Since Intel is in the hardware and software space, he said there is a need for ecosystem to be built across the world to bring down cyber attacks.

The Economic Times
17 Mar, 2016

Oxford Prof Solves 300-year-old Math Mystery, Awarded



An Oxford University professor has won a £500,000 prize for cracking a 300-year-old mystery mathematical theorem described as an "epochal moment" for academics. Sir Andrew Wiles has been awarded the Abel Prize by the Norwegian Academy of Science and Letters for his proof of Fermat's Last Theorem, which he published in 1994. The 62-year-old will pick up the award and a cheque for six million Norwegian Krone (£495,000) from Crown Prince Haakon of Norway in Oslo in May, for an achievement that the academy described as "an epochal moment for mathematics". First formulated by French mathematician Pierre de Fermat in 1637, the theorem states: There are no whole number solutions to the equation $x^n + y^n = z^n$ when n is greater than 2. "Wiles' proof was not only the high point of his career but also the culmination of a remarkable personal journey that began three decades earlier," the academy said. PTI

Indian-Americans win big at science talent search

Washington: Indian-American students dominated the \$1 million Intel Talent Search contest with two of them emerging winners in Innovation and Research category.

Also, four other young scholars bagged the second or third positions in the prestigious competition.

Of the three first-place awards, Indian-Americans won two - Amol Punjabi won the First Place Medal of Distinction for Basic Research, while Maya Varma won the First Place Medal of Distinction for Innovation. Same was the case with the second and third spots in all the three categories, as per the list of winners released by Intel Science on Tuesday.

Paige Brown from Maine won the First Place Medal of Distinction for Global Good.

"They and the rest of the top winners of Intel STS 2016 are using science and technology to help address the problems they see in the world and will be at the forefront of creating the solutions we need for the future," said Maya Ajmera, president and CEO of Society for Science & the Public, and alumna of the Science Talent Search.

Seventeen-year-old Amol from Massachusetts developed a software that could help drug makers develop new therapies for cancer and heart disease.

He is the lead author of a paper on nanoparticles published in ACS Nano and co-author of a paper on a related topic in Nanoscale.

Varma(17), from California, used \$ 35 worth of hobbyist electronics and free computer-aided design tools to create a low-cost smartphone-based lung function analyser that diagnoses lung disease as accurately as expensive devices currently used in medical laboratories.

Four new giant alien planets discovered

Astronomers have discovered four new giant exoplanets, with masses from 2.4 to 5.5 times that of Jupiter, orbiting stars much bigger than our Sun.

The newly detected worlds are enormous and have very long orbital periods ranging from nearly two to slightly more than four earth years.

The researchers, led by Matias Jones of the Pontifical Catholic University of Chile, used the 1.5 m telescope at the Cerro Tololo Inter-American Observatory and the 2.2 m telescope at La Silla observatory in Chile, and the 3.9 m Anglo-Australian telescope in Australia.

Using spectrographs mounted on these telescopes, the researchers monitored a sample of 166 bright giant stars observable from the southern hemisphere.

They computed a series of precision radial velocities of four giant stars - HIP8541, HIP74890, HIP84056 and HIP95124.

According to them, these velocities show periodic signal variations, that could be explained by the presence of planetary companions.

HIP8541b is the most massive of the newly found planets. With a mass of about 5.5 Jupiter masses, this exoplanet also has a much longer orbital period than the other three worlds, equal to 1,560 days.

New method may turn carbon dioxide into concrete

Los Angeles, PTI: Scientists, including one of Indian-origin, have devised a unique method that may harness carbon dioxide (CO₂) emissions from power plants to create a new, sustainable kind of concrete.

About 5 per cent of the planet's greenhouse gas emissions come from concrete, researchers said.

An even larger source of CO₂ emissions is flue gas emitted from smokestacks at power plants around the world. Carbon emissions from those plants are the largest source of harmful global greenhouse gas in the world, they said.

A team of researchers at University of California, Los Angeles (UCLA) has been working on a unique solution that may help eliminate these sources of greenhouse gases.

Their plan is to create a closed-loop process: capturing carbon from power plant smokestacks and using it to create a new building material - CO₂NCRETE - that would be fabricated using 3D printers.

"What this technology does is take something that we have viewed as a nuisance - carbon dioxide that is emitted from smokestacks - and turn it into something valuable," said J R DeShazo, professor of public policy at the UCLA Luskin School of Public Affairs.

"This technology tackles global climate change, which is one of the biggest challenges that society faces now and will face over the next century," said DeShazo.

"We hope to not only capture more gas, but we are going to take that gas and, instead of storing it, which is the current approach, we are going to try to use it to create a new kind of building material that will replace cement," said DeShazo.

"The approach we are trying to propose is you look at carbon dioxide as a resource - a resource you can reutilise," said Gaurav Sant, associate professor and Henry Samueli Fellow in Civil and Environmental Engineering at UCLA.

Non-toxic way to power smartphones, cars discovered

Washington, PTI: MIT researchers, including one of Indian-origin, have come up with an alternative system for generating electricity to power smartphones, computers and electric cars, which harnesses heat and uses no metals or toxic materials.

The batteries that power the ubiquitous devices of modern life are mostly made of toxic materials such as lithium that can be difficult to dispose of and have limited global supplies.

The new approach is based on a discovery announced in 2010 by researchers from Massachusetts Institute of Technology (MIT) - a wire made from tiny cylinders of carbon known as carbon nanotubes can produce an electrical current when it is progressively heated from one end to the other, for example by coating it with a combustible material and then lighting one end to let it burn like a fuse.

That discovery represented a previously unknown phenomenon, but experiments at the time produced only a minuscule amount of current in a simple laboratory setup.

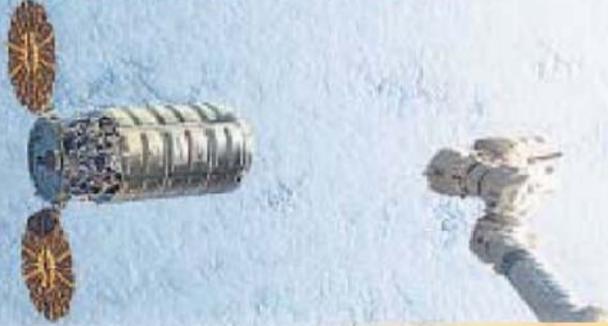
Now, researchers have increased the efficiency of the process more than a thousand fold and have produced devices that can put out power that is comparable to what can be produced by today's best batteries. They caution, however, that it could take several years to develop the concept into a commercialisable product. Much of researchers' work has focused on not just improving the efficiency of the process but also "developing the theory of how these things work." One key finding that helped to verify the theory is that sometimes the wave of heat produces a single voltage, but sometimes it produces two different voltage regions at the same time, they said.

"Our mathematical model can describe why that occurs," said Strano, whereas alternative theories cannot account for this.

According to researchers' theory, the thermopower wave "divides into two different components," which sometimes reinforce one another and sometimes counter each other.

SPACE BLAST

What would happen if a large fire broke out inside a spacecraft? Nasa is planning an experiment to find out



SAFETY AIM

While Nasa has set off tiny, controlled fires in space before, it has never tested how large flames react inside a space capsule flying in space

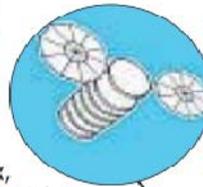
WHY FUEL FIRE?

As the fire rages inside the spacecraft, Nasa will measure its size, how quickly it spread, the amount of heat it let out and how much gas was emitted

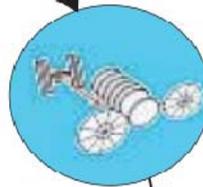
The results will help build better detection systems and find the right material to use when building spacecraft

SPARKING THE FIRE

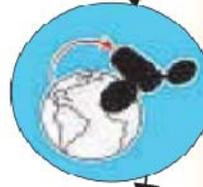
STEP 1: An Orbital ATK Cygnus capsule will take off from Earth on March 23, carrying supplies for the International Space Station. It will also contain a box, called Saffire-1, carrying the material that will be burned



STEP 2: Once astronauts on the space station empty Cygnus of supplies and load it with trash, it will undock and start its journey towards Earth



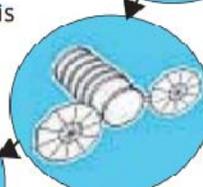
STEP 3: Scientists on Earth will trigger the fire once Cygnus is far away from the ISS



STEP 4: Saffire-1 has sensors and video cameras to capture data as the flame spreads



STEP 5: When the experiment ends, Cygnus will stay in orbit, while data is sent back



STEP 6: Cygnus will re-enter Earth, and burn up when it touches the atmosphere



SPACE TRAGEDIES

Jan 27, 1967

Virgil Grissom, Edward White and Roger Chaffee died when a fire swept through the Apollo 1 craft during ground tests

Jan 28, 1986

The launch of Space Shuttle Challenger, with the first teacher-astronaut Christa McAuliffe, was being watched live, when 73 seconds after takeoff, the shuttle erupted in a fireball

Feb 1, 2003

Columbia broke apart while re-entering Earth, killing the entire crew, including Indian-American Kalpana Chawla.

New cell generates electricity from waste tomatoes

Washington: Scientists, including one of Indian-origin, are developing a biological-based fuel cell that uses damaged or waste tomatoes to produce electricity.

"We have found that spoiled and damaged tomatoes left over from harvest can be a particularly powerful source of energy when used in a biological or microbial electrochemical cell," said Namita Shrestha, South Dakota School of Mines and Technology.

"The process also helps purify the tomato-contaminated solid waste and associated waste water," Shrestha said.

Tomatoes are a key crop in Florida, said Venkataramana Gadhamshetty, professor at South Dakota School of Mines and Technology.

Florida generates 396,000 tonnes of tomato waste every year, but lacks a good treatment process, said Gadhamshetty who began the research at Florida Gulf Coast University.

"We wanted to find a way to treat this waste that, when dumped in landfills, can produce methane - a powerful greenhouse gas - and when dumped in water bodies, can create major water treatment problems," he said.

The team developed a microbial electrochemical cell that can exploit tomato waste to generate electric current.

"Microbial electrochemical cells use bacteria to break down and oxidise organic material in defective tomatoes," Shrestha said.

The oxidation process, triggered by the bacteria interacting with tomato waste, releases electrons that are captured in the fuel cell and become a source of electricity.

The natural lycopene pigment in tomatoes, the researchers have found, is an excellent mediator to encourage the generation of electrical charges from the damaged fruits.

"Typical biotechnological applications require, or at least perform better, when using pure chemicals, compared to wastes," Gadhamshetty said.

"However, we found that electrical performance using defective tomatoes was equal or better than using pure substrates. These wastes can be a rich source of indigenous redox mediators and carbon, as well as electrons," he said.

Found: A pattern in prime numbers

Two academics have shocked themselves and the world of mathematics by discovering a pattern in prime numbers. Primes - numbers greater than 1 that are divisible only by themselves and 1 - are considered the building blocks of mathematics, because every number is either a prime or can be built by multiplying primes together - 84, for example, is $2 \times 2 \times 3 \times 7$.

Their properties have baffled number theorists for centuries, but mathematicians have usually felt safe working on the assumption they could treat primes as if they occur randomly. Now, however, Kannan Soundararajan and Robert Lemke Oliver of Stanford University in the US have discovered that when it comes to the last digit of prime numbers, there is a kind of pattern.

Apart from 2 and 5, all prime numbers have to end in 1, 3, 7 or 9 so that they can't be divided by 2 or 5. So if the numbers occurred randomly as expected, it wouldn't matter what the last digit of the previous prime was. Each of the four possibilities -1, 3, 7, or 9 -should have an equal 25% chance of appearing at the end of the next prime number.

But after devising a computer program to search for the first 400 billion primes, the two mathematicians found prime numbers tend to avoid having the same last digit as their immediate predecessor -as if, in the words of Dr Lemke Oliver they "really hate to repeat themselves".

The pattern -already being referred to as 'the conspiracy among primes' -has left mathematicians amazed that it could have remained undiscovered for so long. THE INDEPENDENT

The Asian Age
17 Mar, 2016

Smartphone microscopes can detect skin cancer

Mobile phone-based microscopy can be used to diagnose skin cancer accurately in settings where a traditional microscope is not available, according to a new study.

Researchers at The University of Texas Health Science Centre at Houston (UTHealth), said smartphone microscopes could improve the detection of skin cancer in developing countries.

"Doctors in some remote areas don't have access to the high-powered microscopes we use to evaluate skin samples," said Richard Jahan-Tigh, assistant professor of dermatology at UTHealth.

"Doctors there could use their smartphones to photograph growths and forward them for examination," said Jahan-Tigh.

"We did a head-to-head comparison with a traditional light microscope and while the smartphone microscope wasn't as accurate it resulted in the detection of about 90 per cent of the non-melanoma skin cancers," said Jahan-Tigh, who conducted the study with colleagues at McGovern Medical School and Harvard Medical School.

"With the smartphone microscope, the detection rate for melanomas was 60 per cent," he said.

"This is a good first step to show that smartphone microscopy has a future in dermatology and pathology," Jahan-Tigh said.

A smartphone microscope can be made with a 3 mm ball lens, a tiny piece of plastic to hold the ball lens over the smartphone lens and tape to grip everything in place.

Deccan Herald
17 Mar, 2016

Smartwatches track finger in mid-air

Washington: Scientists, including those of Indian-origin, have developed a new sonar technology that allows you to interact with mobile devices by writing or gesturing on a tabletop, a sheet of paper or even in mid-air.

An app, FingerIO tracks fine-grained finger movements by turning a smartphone or smartwatch into an active sonar system using the device's own microphones and speakers.

Since sound waves travel through fabric and do not require a line of sight, users can even interact with a phone inside a front pocket or a smartwatch hidden under a sweater sleeve.

Researchers at University of Washington (UW) showed that FingerIO can accurately track two-dimensional finger movements to within 8mm, which is sufficiently accurate to interact with today's mobile devices.

"You can't type very easily onto a smartwatch display, so we wanted to transform a desk or any area around a device into an input surface," said lead author Rajalakshmi Nandakumar, doctoral student at UW.

Flick of finger

"I don't need to instrument my fingers with any other sensors - I just use my finger to write something on a desk or any other surface and the device can track it with high resolution," Nandakumar said.

Using FingerIO, one could use the flick of a finger to turn up the volume, press a button, or scroll through menus on a smartphone without touching it, or even write a search command or text in the air rather than typing on a tiny screen.

FingerIO turns a smartwatch or smartphone into a sonar system using the device's own speaker to emit an inaudible sound wave.

That signal bounces off the finger, and those "echoes" are recorded by the device's microphones and used to calculate the finger's location in space.

Advantages

Using sound waves to track finger motion offers several advantages over cameras and other technologies like radar that require both custom sensor hardware and greater computing power, said assistant professor Shyam Gollakota.

"Acoustic signals are great - because sound waves travel much slower than the radio waves used in radar, you don't need as much processing bandwidth so everything is simpler," said Gollakota.

The researchers created a FingerIO prototype app for smartphone and a smartwatch customised with two microphones, which are needed to track finger motion in two dimensions.

The researchers asked testers to draw shapes such as stars, squiggles or figure 8s on a touchpad next to a smartphone or smartwatch running FingerIO. Then they compared the touchpad tracings to the shapes created by FingerIO's tracking.

The average difference between the drawings and the FingerIO tracings was 0.8 centimetres for the smartphone and 1.2 centimetres for the smartwatch.

"Given that your finger is already a centimetre thick, that's sufficient to accurately interact with the devices," said graduate student Vikram Iyer.

The Tribune
17 Mar, 2016

For 10 paise, check milk adulteration in seconds

Those trading in adulterated milk and playing with the health of millions, watch out! For, a new technology has arrived to detect the adulteration in milk in just 45 seconds.

The novel technology has been developed by CSIR — Central Electronics, Engineering Research Institute (CSIR-CEERI), Plinai, and is based on acquiring electrochemical fingerprint coupled with multivariate data analysis techniques. Responding to a question relating to adulteration of milk

during the Question Hour in Lok Sabha, Science and Technology Minister Harsh Vardhan said: “There are no systems currently available globally based on similar methods.”

Armed with the technique, the government hopes to popularise it in villages and the first milk collection centres of dairies. The system developed from the technology would detect the level of adulteration, and the adulterants in just about 45 seconds of putting milk to test. The recurring cost for testing a sample through this technology is 5-10 paise.

The technology has been transferred to two industries, namely Rajasthan Electronics and Instruments (REIL), Jaipur (a mini-Ratna PSU) and Alpine Technologies, Surat, for manufacturing and commercialisation. Vardhan urged MPs to fund installation of the system through MPLAD funds in their areas and launch a movement against adulteration of milk.

He said according to reports, over 68 per cent of milk in the country did not conform to the standards set by the Food Safety and Standard Authority of India (FSSAI).

According to the food regulatory authority’s survey in 2011, the most common adulterant was found to be the addition of water. Others include glucose, skimmed milk powder, urea, detergent, refined oil, caustic soda and white paint which are hazardous to human life and could cause serious diseases.

The latest technology

- The new technology to detect milk adulteration is based on acquiring electrochemical fingerprint
- coupled with multivariate data analysis techniques
- The recurring cost for testing a sample through this technology is 5-10 paise. The adulterants will be detected in about 45 seconds of putting milk to test

*The Statesman
17 Mar, 2016*

A case for nuclear energy

India’s Civil Nuclear Power Programme uses thorium and uranium to produce sustainable renewable energy. The Union Budget of India for 2016-17 allocates Rs. 3,000 crore per annum for the next 15-20 years. Finance Minister Arun Jaitley remarked that this investment is required to diversify sources of energy for the future. India currently has 21 nuclear power reactors in seven locations. Together, they produce 5,780 MW of electric power. Two months ago, the Nuclear Power Corporation of India (NPCIL) signed a contract with Électricité de France (EDF) to set up six more nuclear plants around the country. According to the International Agency of Atomic Energy (IAEA), in 2015 India generated a total of 34,644 GW.h of electricity through nuclear power. This amounted to just 3.53 per cent of India’s total energy production. India should increase its reliance on nuclear energy. A recent report released by Greenpeace India indicates that an average Indian was exposed to more lung-damaging particulate pollution than a Chinese in 2015. In both countries there has been an increased use of fossil fuels over the last decade.. Using control technologies, China was able to reduce its particulate pollution by 17 per cent. By contrast, pollution through particles like dirt, soot and smog increased by 13 per cent in India during the same period. According to the World Health Organisation, pollution in major cities in India like New Delhi has worsened over the past decade. India only has 39 air quality monitoring stations whereas China has 1,500. Nuclear power produces no air pollution and no greenhouse gases. It seems time for India to regard nuclear power as a serious alternative source of energy, along with wind, solar and hydropower.

Recently, Japan's Prime Minister Shinzo Abe said Japan "cannot do without" nuclear energy. Nuclear energy is clean; the price is not fluctuating; and nuclear is far and away the densest form of energy in current use. The International Energy Agency (IEA) predicted in 2014 that projects relating to nuclear energy are going to increase by 60 per cent through to 2040. Nuclear energy is under-favoured because of outdated safety and waste disposal concerns and because it has been capital-intensive. Super-safe small modular reactors that reprocess most of the waste should overcome these concerns. It has been estimated that during 2016-17, 41,500 GW.h of energy will be produced through nuclear energy, which is an increase from last year.

According to IEA, India currently has more than 250 million people without electricity supply. Most are in rural households and live below the poverty line. The aim of the government as revealed by Mr Jitendra Singh of India's Department of Atomic Energy is to triple the current nuclear power generation. In order to meet national and especially rural electricity demands, the Modi government should promote nuclear energy.

The Hindu
17 Mar, 2016

NPS can now be 'technically' tax-free, says pension regulator

The tax treatment of retirement savings has become a 'tricky thing'.

Retirement savings accumulated under the New Pension Scheme or NPS can now be totally tax-free at the time of withdrawal under certain conditions and the Pension Fund Regulatory and Development Authority (PFRDA) had only urged the government to bring some parity in the tax treatment of different pension products it competes with, such as the employees' provident fund (EPF), the regulator's Chairman, Hemant Contractor, told *The Hindu* on Wednesday.

The government had introduced a tax on 60 per cent of EPF savings at the time of retirement in the Budget in a bid to make the NPS, savings under which were fully taxable at retirement, more attractive. At the same time, it made 40 per cent of NPS accumulations tax-free. While the EPF tax provision was rolled back last week, the partial tax break for NPS remains.

"Our request was that the NPS should be brought on par with other pension products. That has not exactly happened. Still, this exemption of upto 40 per cent of the retirement corpus is a very big step that the government has taken and it brings us closer to EPF and other pension products," Mr. Contractor said.

"Hopefully, going forward, we should see some parity between the other schemes," he said, adding that the new tax exemption of 40 per cent on NPS savings could technically allow its members to get their savings totally tax-free.

"Under the NPS framework, 40 per cent (of corpus) is mandatorily annuitised and that is tax free. Now, 40 per cent of the rest that may be withdrawn as a lump sum is also tax free. So if you annuitise 60 per cent of your balance (instead of 40 per cent), technically, yes, it's tax-free (entirely)," the PFRDA chairman explained. "If you don't buy an annuity beyond the mandatory 40 per cent, then 20 per cent of your NPS balance would be taxable," he added.

"Not everybody wants to put 100 per cent of their savings in annuity. They want to take some lump sum," Mr Contractor said. An annuity product allows investors to get a steady monthly income on their accumulated corpus. The PFRDA presently allows members to buy such products from five life insurers including LIC of India.

The pension fund regulator, under the administrative control of the Finance Ministry, conceded that the tax treatment of retirement savings has become a 'tricky thing', but asserted that it was not

pitching for NPS to be made totally tax-free. “We are only saying that it should be comparable with the other pension systems. If that is brought about, then there is no discrimination between the schemes,” Mr. Contractor said.

The NPS which is now also referred to as the National Pension System, has 1.18 crore members, including state and central government employees. It has assets of over Rs.1.15 lakh crore. By contrast, the EPF organization under the Labour Ministry oversees assets over Rs.10 lakh crore.

“We have been growing our subscriber base at about 35 per cent a year and we hope it would pick up further after the Budget measures,” Mr Contractor said.