

CURRENT AFFAIRS FOR I.A.S. (PRE.) 2011

SCIENCE & TECHNOLOGY

DEFENCE, SPACE AND NUCLEAR TECHNOLOGY

India launch the indigenously developed warship “INS Chennai”

- Mr. Antony launch the “INS Chennai,” the third missile destroyer of Project-15A, being built for the Navy at the Mazagon Docks.(Mumbai)
- When commissioned into the Navy in 2013, it will be the most potent vessel with state-of-the-art weapons and sensors, along with its predecessors — “Kolkata” and “Kochi.”
- “Chennai,” the third and last Kolkata class warship is a 6,700-tonne destroyer, 163 metres long and 16 metres wide. It is propelled by four gas turbines, and is designed to achieve speeds in excess of 30 knots. This indigenously designed ship will have state-of-the-art weapons and sensors, stealth features, an advanced action information system, a comprehensive auxiliary control system, world class modular living spaces, sophisticated power distribution system and a host of other advanced features.
- It will be fitted with the indigenous supersonic BrahMos surface-to-surface missile system.
- 95 per cent of the country’s trade was through sea lanes.

India-Singapore naval exercises begin

- The navies of India and Singapore hold annual exercises this year, in the Andaman Sea and the Bay of Bengal. The 2010 edition of the Singapore Indian Maritime Bilateral Exercise (SIMBEX) has eight platforms, five Indian and three Singaporean that take part in the exercise, besides fixed and rotary aircraft.
- The cooperation was formalised in 1994, when the Singaporean naval ships started training in the anti-submarine warfare with the Indian Navy.
- This year’s exercise was the 17th in the SIMBEX series. The Republic of Singapore Navy (RSN) is sending RSS Intrepid (formidable class frigate) and

RSS Victory (Victory class missile corvette). These ships will also call at Port Blair and Visakhapatnam.

Work is in pace for GSLV-D3 launch

- Things are getting set for the lift-off of the GSLV-D3 (Geo-synchronous Satellite Launch Vehicle – Development flight 3) from Sriharikota on April 15 around 4.30 p.m. The three stages of the gigantic vehicle have already been stacked up in the sophisticated Vehicle Assembly Building in the second launch pad on the seashore. It will put in orbit an advanced communication satellite called GSAT-4.
- The significance of the mission is that the GSLV will be powered for the first time by India’s own cryogenic upper stage. This stage with its engine, electronics and fuel tanks was built at the Liquid Propulsion Systems Centre (LPSC) of the Indian Space Research Organisation (ISRO) at Mahendragiri in Tamil Nadu. The previous five GSLV missions from Sriharikota were propelled by the Russian cryogenic engines.
- Cryogenic engines that use liquid oxygen and liquid hydrogen at very low temperatures are needed to put heavier, communication satellites in a geosynchronous transfer orbit with an apogee of 36,000 km. and a perigee of 200 km.
- The VSSC has built GSLV-D3 which is 49 metres tall and weighs 419 tonnes. The 2,200-kg GSAT-4 has been built by the ISRO Satellite Centre, Bangalore.
- Mr. Veeraraghavan said three highlights of the GSAT-4 were its communication system in Ka-band; its GAGAN payload which would help in the landing accuracy of commercial aircraft at airports in India; and the satellite’s electric propulsion system which would help in correcting the spacecraft’s attitude and ensuring a longer life in orbit.
- (GAGAN stands for GPS-aided Geo-augmented Navigation System. GPS is short for Global Positioning System. The Ka-band will help in relaying more information).

- The ISRO achieved a big breakthrough in the “exotic” cryogenic technology when it fully qualified its own cryogenic stage with a 720-second full duration test at Mahendragiri on November 15, 2007.
- ISRO officials said it was not easy to handle liquid oxygen at minus 183 degrees Celsius and liquid hydrogen at minus 260 degrees Celsius; putting them on fire from such low temperatures; and burning the hydrogen in a controlled manner.

Discovery lifts off successfully with three women crew members

- The Discovery space shuttle blasted off from NASA’s Kennedy Space Center in Florida, Carrying a crew of seven astronauts as well as equipment and supplies, it took off on a 13-day mission aboard the International Space Station (ISS).
- The shuttle, a multi-purpose logistics module, carries three women-mission specialists — Dorothy Metcalf-Lindenburger, Stephanie Wilson and Naoko Yamazaki.
- The ISS, which orbits the Earth at a height of some 400 km, is due to be finished next year and is about 90 per cent complete.

Radiation poisoning a reminder of need for better ‘nuclear security’

- Though far less dangerous than plutonium or enriched uranium — the raw material for making nuclear bombs — the cobalt isotope which leaked when a worker cut open a piece of metal in a Delhi market his employer had acquired this as scrap .
- Cobalt-60 is used for medical purposes, industrial radiography for non-destructive testing and in the food processing industry for irradiation purposes. Like other radioactive material with industrial applications, the isotope is normally housed in a sealed container with lead shielding within whatever equipment it forms a part of.
- The Atomic Energy Regulatory Board (AERB) is meant to maintain a ‘cradle to grave’ system to keep track of such equipment, including through on-site inspections. But given its manpower limitations, radioactive material does get ‘orphaned’, eventually finding its way to the scrap market.
- India is not alone in facing this problem. The U.S. Nuclear Regulatory Commission has reported losing track of over 1,500 sealed sources since 1996, with more than half that number untraceable.

India developing sub-sonic missile

- India is developing a sub-sonic 1,000-km range cruise missile, ‘Nirbhay,’ DRDO chief V.K. Saraswat said.

‘Radioactive gas can detect nuclear tests’

- In a breakthrough, scientists have isolated an exotic radioactive gas which, they claim, would make it easier to detect underground nuclear tests from air samples.
- A global network of monitoring stations constantly samples the air for signs of underground nuclear tests. One thing the stations look for is the radioactive gas xenon-133.
- Nuclear explosions produce an excited form called xenon-133m, in which the atomic nucleus is boosted to a higher-energy state, but it is not known exactly how sensitive detectors are to this form as there has been no way to make pure samples of xenon-133m with which to test them.

INS Betwa deployed in Gulf of Aden

- The Navy has deployed INS Betwa with an armed helicopter and marine commando team for anti-piracy patrol in the Gulf of Aden.
- INS Betwa, 16th Indian Navy ship deployed in the area since October 2008, has replaced INS Beas. Warships of several other countries are also deployed in the Gulf of Aden. On average, 16-18 warships are there at any given time.

Army agrees to acquire indigenous Akash missile

- The Army has finally agreed to acquire the indigenous two-stage ramjet ‘Akash’ missile.
- Induction will depend on the delivery schedule Bharat Dynamics Limited, which makes the missile, is able to maintain.
- In 2008, the IAF placed orders for two squadrons of the Akash Medium Range Surface-to-Air Missile (MR-SAM) for Rs. 1,222 crore. This was the first-ever contract from the defence services for an indigenous tactical weapon system of this class.

India’s own cryogenic rocket launch fails

- India’s ambitious quest to achieve total independence in cryogenic technology for launching satellite launch vehicles suffered a setback, with the indigenous cryogenic engine in a Geo-synchronous Satellite Launch Vehicle (GSLV-D3) failing to ignite and the vehicle tumbling into the sea.
- The mission to put communication satellite GSAT-4 in orbit thus ended in failure.
- The cryogenic technology is crucial to put heavy satellites in geo-synchronous transfer orbit at an altitude of 36,000 km.

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- In a first trial, a U.S.-made Unmanned Aerial Vehicle (UAV) successfully flew over the dense forests of Bastar at night. It will be deployed in anti-Maoist operations.

Obama sets Mars target for NASA

- U.S. President Barack Obama set the National Aeronautical and Space Administration on a firm trajectory to a Mars landing when he said: "By the mid-2030s, I believe we can send humans to orbit Mars and return them safely to Earth. And a landing on Mars will follow."
- In a speech on space exploration in the 21st century, delivered at the John F. Kennedy Space Centre in Florida, Mr. Obama said that by 2025, he expected to see new spacecraft designed for long journeys that would allow the United States to begin "the first-ever crewed missions beyond the Moon into deep space".

Cartosat 2B leaves for Sriharikota

- After the failure of the GSLV-D3 launch, the Indian Space Research Organisation (ISRO) flagged off the Cartosat 2B high resolution satellite's journey to Sriharikota.
- The remote sensing satellite is now en route to Sriharikota from where it will be launched by PSLV-16, along with four other satellites,
- The 700 kg. Cartosat 2B will carry a state-of-the-art panchromatic camera with a spatial resolution less than one metre — high enough to spot a car, for instance — and will have applications in urban and rural infrastructure development and management, Geographical Information System (GIS) and other areas where detailed mapping is required.
- StudSat, the first-ever 'PICO' (small) satellite, designed in India by a consortium of 13 students from seven colleges in Bangalore and Hyderabad, weighs less than a kilogram. The payload of the satellite consists of a CMOS camera that has a ground resolution of approximately 90 metres. The mission life of the satellite is around six months and the total development cost was around Rs. 55 lakh.

India's first anti-submarine warfare corvette launched

- Launching the country's first Anti Submarine Warfare Corvette (ASWC) for the Indian Navy at the Garden Reach Shipbuilders & Engineers (GRSE) Limited .M.M.

Pallam Raju, Union Minister of State for Defence, said three more such P-28 Corvettes will be launched by the GRSE by 2015.

- Named Kamorta, after an island in the Andaman Sea, the ASWC is indigenously built and is designated as a frontline warship with anti-submarine warfare capabilities and a very low signature of radiated underwater noise.
- The ASWC Kamorta will be docked at the Eastern Naval Command.

Navy to have air enclave at CIAL

- With an eye on its future aviation requirements, the Navy plans to carve out an air enclave on the sprawling campus of the Cochin International Airport Limited (CIAL).
- The enclave would house maintenance hangars capable of sheltering the Navy's future air assets, especially the medium range maritime reconnaissance aircraft that it is scouting for. The hangars would also have the capacity to provide back-end support to the operation of a squadron from the enclave.
- They will also be equipped to back up full-load operation of the long range maritime reconnaissance aircraft, Boeing P8-I, if required. As per the contract that the Navy has signed with Boeing for the purchase of eight P8-I aircraft, the delivery of the first would take place in 2013.

Saras crash probe report mentioned dozens of lapses

- The report of the investigation into the crash of Saras, the light transport aircraft, near on March 6, 2009 that killed all three crew members on board, enumerates dozens of lapses, including an insufficient pre-flight debriefing, a poor telemetry system and "lack of crew coordination."
- The report, prepared by a board constituted by the Directorate-General of Civil Aviation (DGCA)

Power from first Kudankulam unit by December

- It is indeed a good news for the energy managers of power-starved Tamil Nadu. Electricity will start cascading from the first unit of the Kudankulam Nuclear Power Project (KKNPP) by December. The mandatory pre-commissioning milestone event of loading of 'dummy fuel assembly' into the reactor core of the first of the 2 X 1,000 MWe unit began.

India-US naval exercise begins

- Navies of India and the United States have begun annual war exercises involving anti-submarine warfare surface firings, visit board, search and seizure and submarine operations.
- The 14th edition of MALABAR in the Arabian Sea will see frontline units of the U.S. Navy's 7th Fleet and Indian Navy's Western Fleet taking part in the 10-day exercise.
- During MALABAR CY10, the U.S. Navy will be represented by ships from CTF 70 of its 7th Fleet, based at Yokosuka, Japan. The CTF will include the Cruiser USS Shiloh (CG 67), Destroyers USS Chaffee (DDG 90), USS Lassen (DDG 82) and Frigate USS Curtis (FFG 38). In addition, one Los Angeles class nuclear powered submarine, USS Annapolis (SSN 760), two P3C Orion aircraft and a 28 member US Navy Special Forces team will also participate in the exercise.
- The Indian Navy will be represented by INS Mysore, an indigenous Delhi Class guided missile destroyer and three guided missile frigates, INS Godavari, INS Brahmaputra and INS Tabar.
- In addition, one Shishumar class submarine, INS Shankush, Sea Harrier fighters, other fixed and rotary wing aircraft are also scheduled to participate in the bilateral exercise. Naval cooperation epitomises the long-term strategic relationship between them.

First indigenous stealth frigate commissioned

- INS Shivalik, India's first indigenous stealth frigate, which is commissioned at Mazagon Dock Limited.
- The 143-metre long vessel, with 6,100 tonne displacement, has been designed and built in India. More than 60 per cent of its value was met within the country. MDL is building two other warships in the Shivalik series under Project-17: INS Sayahdri which will be commissioned by the end of this year, and INS Satpura by the middle of next year.
- Explaining the salient features of INS Shivalik, its Commanding Officer Captain M.D. Suresh said the warship was a generation ahead of the frigates that the country had. It operated on a leaner crew; its stealth features helped it generate less noise, reducing underwater detection, while the design deflected signatures.
- The frigate is armed with missiles, has helicopter support, mounted guns and a combat management system that can effectively coordinate all weapons

and sensors onboard, giving it the ability to deal with multiple threats. The warship can be on a voyage for three-four weeks without fuel replenishment.

Hi-tech equipment for reactor handed over to AEC chief

- Marking a milestone in the development of sophisticated technology for India's ambitious nuclear power programme, Andhra Pradesh Chief Minister K. Rosaiah handed over a fuelling machine head for the Advanced Heavy Water Reactor (300 MWe) to Atomic Energy Commission (AEC) chairman Srikumar Banerjee .
- Receiving the gigantic equipment manufactured by Hyderabad-based MTAR Technologies Private Ltd. for Bhabha Atomic Research Centre (BARC), Mr. Banerjee described it as a "marvel of engineering, which is the first of its kind in the world."
- BARC conceptualised and carried out the detailed design of the fuelling machine head and subsequently entrusted the task of manufacturing the prototype to MTAR. The 65-foot machine weighs 40 tonnes and is a vital component of the AHWR.
- NPCIL chairman S.K. Jain said that with plans afoot to increase nuclear generation to 63,000 MWe in the next 25 years, nuclear reactors would not be imported on a turnkey basis. Major components would be sourced.

Pilot production of airborne BrahMos begins

- Pilot production of the air-launched version of the India-Russia BrahMos missile has started in Russia in line with plans to fit it in the IAF's Su-30MKI fighter aircraft by 2012.
- The first few missiles for factory tests have been manufactured at the Strela production association in the Orenburg Region.
- The 2.55-tonne BrahMos supersonic anti-ship missile has been modified, shedding 500 kg and getting a new ignition engine to fire the missile at high altitudes.
- The Su-30MKI also required modifications to fit the missile under its belly and integrate it into the plane's fire control system. The Sukhoi Corporation is working to strengthen the wings so that two more missiles can be fitted in the flanks.
- Experts said the BrahMos-armed Su-30MKI would be a game changer in the Indian Ocean, giving the IAF a deeper strategic reach and an extra deadly punch. With a range of 290 km, the missile will allow the pilot

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to hit enemy vessels while staying well outside the reach of their air defences. Travelling at a top speed of Mach 2.8 barely 3-4 metres above the sea surface, the missile cannot be intercepted by any known weapon system in the world.

- Russia's Irkut Corporation, which manufactures Sukhoi aircraft, counts on the air-launched BrahMos missile to increase the demand for Su-30 fighters in international markets.
- The sea and ground-launch versions of BrahMos missiles have already been successfully tested and put into service by the Indian Army and Navy. So far, the missiles have been assembled at the Strela plant, and manufacturing facilities are also being set up in Thiruvananthapuram with Russian assistance.
- BrahMos Aerospace, a joint venture between India and Russia, has started designing a hypersonic version of the BrahMos missile, BrahMos-II.

All radioactive sources of varsity irradiator accounted for: AERB

- The Atomic Energy Regulatory Board (AERB) has identified and accounted for all the cobalt-60 radioactive sources originally present in the gamma cell irradiator of the Chemistry Department of Delhi University.
- It would be recalled that the irradiator, supplied by the Atomic Energy of Canada Ltd. (AECL) in 1968, had been in disuse since 1985 and was auctioned away to scrap dealers on February 26. This had found its way to the metal scrap market of Mayapuri in West Delhi.
- According to the details provided by the AECL, the source chamber had provision for 54 pencils of Co-60 of which only 16 were occupied at the time of supply based on the requirements specified by the user. Each cylindrical pencil is made of 7 'slugs' or pieces of Co-60, each measuring about 2.5 cm x 0.6 cm stacked together and all the pencils constitute a unit that can be placed around any material to be irradiated with gamma rays. The AERB claimed that they were able to account for all the 112 slugs of the 16-pencil Co-60 source unit.

Orissa girl's project adjudged best by NASA

- A project on satellites, submitted by a school student has been selected as the best by the United States' National Aeronautics and Space Administration

(NASA). The project by Prateeksha Das of Class XII in the Ispat English Medium School, run by the Rourkela Steel Plant, won a prize of \$2,000. She has been selected for the prestigious Bruce M—Clark Memorial award. She has been invited to make a presentation at the International Space Development Conference in Chicago from May 27 to 31. Her project was on water, oxygen, creation of gravitational force and temperature control in space.

Russia to develop lander for Chandrayaan-II

- Russia will develop a lander that will ferry a rover to explore the moon's surface as part of the Chandrayaan-II mission, slated for launch in 2013, project director of Chandrayaan-I and II M. Annadurai said.
- The GSLV will be the launch vehicle for Chandrayaan-II and the prime responsibility of realising the lander is Russia's.
- Unlike Chandrayaan-I, whose moon-impact probe did a hard-landing on the moon, the lander ferried by the Chandrayaan-II orbiter to soft-land on the moon's surface would be about 1,200 kg. While the rover interface would be done by us, the lander interface with the rover would be developed by Russia.
- The purpose of Chandrayaan-I was to understand what the entire moon contained. But now, the effort would be to understand it in situ. Originally, we wanted to have chemical-mineral analysis, but now that Chandrayaan-I has shown us traces of water on the moon's surface, the emphasis could also be on confirming the finding.

India's plan for safe Indian Ocean

- India has proposed a three-pronged approach that would enable countries on the Indian Ocean rim to work together for better protecting their sea lanes and tackling natural calamities.
- Admiral Verma, who spoke at the second Indian Ocean Naval Symposium (IONS) in Abu Dhabi, pointed out that Indian ocean littoral countries needed to prepare themselves well to tackle three key issues; humanitarian disasters, protection of the environment and the scourge of piracy.
- The naval chief proposed a brainstorming session among member countries that would lead to the conduct of a Humanitarian Assistance and Disaster Relief (HADR) exercise.

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- “HADR could become one of the major fields of IONS activities,” he stressed.
- The Indian Navy, which played a pioneering role in 2008, handed over the chairmanship of the IONS to Naval Staff Brigadier Ibrahim Salim Al Musharrakh, Commander of the United Arab Emirates (UAE) Navy.

Prototype Fast Breeder Reactor crosses milestone

- Applause rang out as the baffle fitted flush inside the main vessel, with just 90 mm of space separating the two contraptions. With that, the tension that had gripped the engineers of Bharatiya Nabhikiya Vidyut Nigam Limited (BHAVINI), which is building the PFBR, was gone..
- Prabhat Kumar, Project Director, BHAVINI, who was happy that the PFBR project had flawlessly crossed the milestone, said “the entire world was looking at India” building the 500 MWe PFBR. Its construction signalled the beginning of the second stage of India’s nuclear power programme, under which a series of fast breeder reactors would be built.
- The PFBR will use plutonium-uranium oxide as fuel and liquid sodium as coolant. It will go critical in March 2012.
- The thermal baffle, with two concentric shells, is about 12.5 metres in diameter and five metres tall. Although the baffle itself weighs 78 tonnes, the total weight handled for its erection was 170 tonnes.
- Under the first stage of the Department of Atomic Energy’s nuclear power programme, a series of Pressurised Heavy Water Reactors, using natural uranium as fuel and heavy water as both coolant and moderator, has already been built.
- Mr. Prabhat Kumar said the baffle would provide passage for the cold sodium to cool the main vessel and bring down the temperature during the normal operation of the reactor from 550 deg. Celsius to 450 deg. Celsius. This was to minimise the effect of creep, thermal fatigue and embrittlement of the structure. The baffle was fabricated at the site by Bharat Heavy Electricals Limited and will be integrated to the main vessel by in situ welding.

Revamp of DRDO planned to make it more accountable

- The Defence Ministry announced plans to make the country’s leading military research organisation, the

Defence Research & Development Organisation (DRDO), more accountable and leaner.

- Despite impressive credentials in several spheres, the DRDO, however, has an equally patchy record of delivering on its promises and satisfying the expectations of the armed forces.
- It is hoped that the formation of a Defence Technology Commission headed by the Defence Minister, hiving off of the DRDO monolith into seven speciality centres and the fusion of some laboratories with others doing the same work but under other Ministries, would address some of the issues underscored by a report of the Parliamentary Standing Committee.
- A human resource expert will be hired to suggest a more project-oriented organisation and a commercial arm which would be more effective in marketing technologies developed by the DRDO.
- The changes have been made on the basis of recommendations made by former Science and Technology Secretary P. Rama Rao which were fine tuned by a committee headed by the Defence Secretary.

Six more fast breeder reactors planned

- The Centre has sanctioned a pre-project funding of Rs. 250 crore to Bharatiya Nabhikiya Vidyut Nigam Limited (BHAVINI) for the construction of two more fast breeder reactors of 500 MWe capacity each at Kalpakkam, near Chennai, according to Prabhat Kumar, Project Director, BHAVINI.
- These two breeder reactors would come up in addition to the 500 MWe Prototype Fast Breeder Reactor (PFBR) already under construction at Kalpakkam.
- The PFBR had the largest and the deepest excavated pit for any nuclear power project in India. It measured 225 metres by 225 metres and was 20 metres deep.

National defence varsity to be set up

- The Union Cabinet accorded in-principle approval for the setting up of an autonomous defence university that is expected to provide inputs to strategic policy making. It will be set up under an Act of Parliament.
- The proposed university, one of the suggestions made to tone up national security by a post-Kargil War review committee, will come up in Gurgaon district of Haryana at a cost of about Rs. 300 crore on a 200-acre campus.

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- NDU will undertake long-term defence and strategic studies and create synergy between the academic community and government functionaries. It will promote policy oriented research on all aspects relating to national security as an input to strategic national policy making.

Committee to look into NAL's capability to build civil aircraft

- The Council of Scientific and Industrial Research (CSIR) has set up a committee to study the capability and of the National Aerospace Laboratory (NAL) to build civil aircraft.
- The panel will be headed by K. Kasturirangan, eminent space scientist and member of the Planning Commission. The development work for the Rs. 2,000-crore RTA project is expected to begin next year,
- The move comes in the wake of NAL's plan to build a 70 to 90-seater regional transport aircraft (RTA) and attempts to resurrect the flight tests of the 14-seater Saras programme.
- The Saras programme suffered a major setback when a prototype crashed during an experimental flight in March 2009, killing two test pilots and a flight test engineer from the Indian Air Force's Aircraft and Systems Testing Establishment (ASTE).
- On the issue of Tejas programme's dedicated flight test pilots, the CSIR officials felt that if NAL was to successfully build civil aircraft, it would need to have its own flight test pilots and not depend on the ASTE or any other organisation.
- Though NAL is primarily a laboratory that focuses on research in composites, it is the only government agency (not even HAL) that had made attempts to build civil aircraft. The Saras and the two-seater Hansa trainer are the examples. While the Saras project has suffered weight and design issues, it had been difficult for NAL to market the Hansa. The government has so far sanctioned around Rs. 300 crore for the Saras programme. (NAL has asked for more funds to build a second Saras production standard aircraft).

Atlantis lifts off into history

- A huge orange plume trailing behind, space shuttle Atlantis lifted off from the Kennedy Space Centre on its last scheduled mission to the International Space Station, signalling the beginning of the end of the three-decade American programme.

- The Obama administration decided to wind up the space shuttle programme that began with Columbia making its maiden voyage in April 1981. Between now and November this year, the last of the two shuttles, Discovery and Endeavor will carry payloads to the ISS and then make their way to museums.

- When Atlantis lands after completing mission STS-132 (Space Transport System), it would have concluded a journey of 100 million miles (1.6 lakh km). Since its maiden voyage on October 3, 1985, the space shuttle will have undertaken 32 missions during which it deployed 14 satellites, docked with Russian Mir space station on seven occasions and 11 times with the ISS.

Defence Technology Commission coming: Saraswat

- A Defence Technology Commission will be set up on the lines of the Atomic Energy Commission to improve the functioning of the Defence Research and Development Organisation (DRDO) laboratories in the country, V. K. Saraswat, Scientific Adviser to the Defence Minister, said.

IAF gives nod for HPT-32 revival

- The Indian Air Force, which lacks a basic aircraft trainer to train its flying cadets, has given clearance for a parachute recovery system (PRS) to be fitted on the Hindustan Piston Trainer-32 (HPT-32). The PRS, it is hoped, will improve the confidence of HPT-32 pilots, enhance survivability during an emergency in the air and prevent the trainer from dropping out of the sky like a stone.
- The IAF's decision, which is based on the recommendations made by a committee headed by Air Vice Marshal Pradeep Singh, will hopefully revive the HPT-32, a Hindustan Aeronautics Limited-designed and manufactured primary trainer that became operational with the defence forces in 1984, but was grounded last July after a fatality near Hyderabad that killed two senior flight instructors.

Boeing in talks to work with ISRO on moon mission

- Seeking to expand cooperation with the Indian Space Research Organisation (ISRO) on its moon mission, the United States is offering assistance through Boeing, which partners with the National Aeronautics Space Administration (NASA) on its space exploration programme.

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- Having worked with NASA on the Chandrayaan mission, the ISRO is in talks with Boeing, which has a commercial crew development contract with NASA, as a key teammate to initiate the design and development architecture of a commercial transport to and from the International Space Station.
- On commercial crew transportation, the Boeing says it has the expertise to offer the Launch Escape System (LES), Vehicle Health Monitoring System and Abort Triggers (VHMSAT), Life Support System, Crew Accommodations and other areas such as reusable space systems and composite cryogenic tanks.
- The five-stage launch abort system has an adaptor cone attached to the crew module, followed by an abort motor, jettison motor, forward interstage, attitude control motor (ACM) and the nose cone. The ACM steers the launch abort system and the crew module away from the launch vehicle and then orients the crew module for parachute deployment.
- The crew module takes about 90 seconds to touch down from the time when the abort execute command is issued.
- In the run-up to the launch, the VHMSAT is designed to constantly monitor the system and command the escape system in case a failure is detected while the Life Support System removes the carbon dioxide and controls humidity.
- In August last, ISRO invited Boeing to a technology conference on robotic space mission. India carried NASA and other international sensors on the Chandrayaan-1 lunar orbiter and partners with Russia in the development of Chandrayaan-II, planned for launch in the 2013-15 time frame.

Agni-II missile test-fired successfully

- After two successive setbacks, Agni-II surface-to-surface ballistic was successfully flight-tested from the Wheeler Island off the Orissa coast.
- The intermediate range missile can carry nuclear weapons and has a range of more than 2000 km.
- It was fired from a rail mobile launcher by personnel of the Strategic Forces Command at 9.18 a.m., as part of user training exercise.
- After a flight of about 660 seconds, the missile splashed down near the pre-designated target in the Bay of Bengal and met all the mission objectives,

Defence Research and Development Organisation (DRDO) officials said.

- The missile's re-entry vehicle, made of carbon-carbon composites, withstood very high temperatures of up to 3,000 degree Celsius as it descended with a speed of 3.5 km/second after reaching a height of 230 km. It was tested for the full range.
- The missile was test-fired for the third time in last one year by the Strategic Forces Command. During the previous missions, the missile failed to meet the mission objectives after both the launches witnessed problems during the course of the flight. launch was preceded by successful test-firing of Agni-III (3,500 km range) in February and Agni-I (700 km) in March this year.
- The two-stage solid-propelled Agni-II is one of the key weapon systems of the country's nuclear deterrence doctrine and had been inducted into the armed forces. It is 21 metres tall and is capable of carrying a payload of one tonne.

Vishwast to be inducted into Coast Guard fleet

- ICGS Vishwast, the indigenously built, new class OPV (offshore patrol vessel), has been inducted into the eastern command of the Coast Guard at a welcome ceremony at the Chennai Port Trust.
- 'Vishwast' the heaviest and most advanced vessel in the eastern fleet — at 90 metres and displacing 2400 tons. The fifth offshore patrol vessel to join the eastern Coast Guard fleet, it is propelled by 9,100 KW twin diesel engines. At economical speed, it has an endurance of 4,500 nautical miles, and can stay at sea for 17 days without replenishment. The ship is designed to carry one helicopter and five high speed boats.
- 'Vishwast' the capability of performing the role of command platform for conduct of all Coast Guard operations in the high seas and close to the coast.
- 'Vishwast,' designed and built indigenously by Goa Shipyard Limited, is equipped with advanced navigational and communication sensors. Its special features include an integrated bridge system, integrated machinery control system, high power external fire fighting system and an indigenously built gun-mount.



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