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Induction of submarines only as turn-key project

By **Ajit K Dubey**
in New Delhi

SEEKING to change the old practice of inducting incomplete warships, the defence ministry and the Indian Navy are now planning to induct the first Scorpene-class submarine INS Kalvari only when it is full ready for operational deployment.

This is a major change in thinking of the government as earlier the shipyards would hand over warships to the Navy and then would continue trials on the systems on board and the vessels would be made fighting fit long after their official induction.

"The defence ministry is of the view that the vessels should be commissioned in service only if they are ready for deployment in operations moments after they are commissioned into the service," Navy sources told MAIL TODAY here.

"That is why, we have asked the original equipment manufacturer Mazagon Dockyards Limited and the French DCNS to complete all trials, including sensors and weapon fitment, before it is handed over to the Navy for operations," they said.

Given the importance of the vessel for the country, it is most likely that Prime Minister Narendra Modi would induct the submarine into the navy in presence of Parrikar.

The INS Kalvari is first of the six Scorpene-class submarines being built by the MDL in Mumbai with DCNS under a Rs 23,000-crore project and is delayed by four years due to issues related to make in India equipment for the vessels.

This can result in the navy



The INS Kalvari is first of the six Scorpene-class submarines being built by the MDL in Mumbai.

WHAT NEXT

- 6 Scorpene class submarines are being built at MDL shipyard in collaboration between DCNS of France.
- INS Kalvari first of the class to be inducted in Navy
- Defence ministry, Navy to induct submarines, warships only after they are ready for induction
- Government is changing old philosophy of inducting vessels, then carrying out trials on their equipment

waiting for a few more months before it gets to lay its hands on its first new conventional submarine to be inducted after gap of almost two decades. The 'Kalvari' (Tiger Shark) was planned to be inducted by the Navy by the end of 2016.

The issue of changing the warship commissioning philosophy was first felt when Prime Minister Modi commissioned the indigenous warship INS Kolkata in MDL in 2014.

While inducting the vessel, Prime Minister Narendra Modi said induction of Kolkata would deter the enemies of the nation, it was soon pointed out that the INS Kolkata was not

really complete. Several key weapon systems and sensors were missing and were either being developed or yet to be procured including the Barak-8 air defence missiles and towed array sonars which could give it the capability to detect enemy submarines in waters.

"The thinking is now that the manufacturer should complete each and every work related to the submarine and hand over a fully complete vessel to the force," said navy sources.

Parrikar had launched the submarine in March last year for sea trials where the vessel has sailed for over 1,000 hours till now.

Thu, 05 Jan, 2017

India-US defence relationship on excellent path: Pentagon

Pentagon has asserted that the defence relationship between India and the United States is on an excellent path and will continue to be so in the next administration and beyond.

"We think the defense relationship with India is on an excellent path and will continue to be so in the next administration and beyond," said Pentagon Press Secretary Peter Cook.

The statement assumes significance as it comes days ahead of President-elect Donald Trump's inauguration.

"Our relationship with India, you've seen the commitment made by this department and this secretary of defense (Ashton Carter) and -- and this administration to improving our defense relationship with -- with India," Cook said.

"And that's, obviously, there's several aspects to it. There are limits on what we can do in terms of technology -- the export of technology to India or any other country,"

Carter, who is known as a friend of India and strong believer in a robust India-US defence relationship, is the only American Defence Secretary to have so many trips to India.

Indian Defence Minister Manohar Parrikar and Carter in December had finalised India's designation as a "Major Defence Partner" of the United States, institutionalising the progress made to facilitate defence trade and technology sharing with India to a level on par with the United States' closest allies and partners, and ensures enduring cooperation into the future.

"On change in export control laws of the U.S that would help India acquire better defense and technology," the Pentagon Press Secretary said.

"And we'll continue to abide by -- by the law and to work with India in -- in places where we can, where it's appropriate for that kind of -- for specific technology to be exported. Again, not just to India but to -- to any country, but we're gonna follow the law," he added.

The India-U.S. defence relations in recent years have moved along a remarkable upward trajectory. Marked progress on agreements, including the signing of a Defense Framework Agreement in 2015, have laid a blueprint for collaboration between our defense establishments and enabled deeper cooperation. Joint exchange opportunities - in both personnel and training exercises - have expanded and strengthened our bilateral cooperation. The recent signing of the Logistics Exchange Memorandum of Agreement (LEMOA) has facilitated additional opportunities for practical engagement and exchange.

(This story has not been edited by Business Standard staff and is auto-generated from a syndicated feed.)

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THE TIMES OF INDIA

Thu, 05 Jan, 2017

Lt Gen Bakshi calls on Parrikar again

Second Meet Since Rawat's Appointment

Eastern Army Command chief Lt Gen Praveen Bakshi met defence minister Manohar Parrikar on Wednesday, the second time he has done so after the government decided to supersede him and Southern Command chief Lt Gen P M Hariz to make General Bipin Rawat the Army chief.

Both sides were tightlipped about the meeting amid speculations that the government could offer Lt Gen Bakshi some post, after he retires in July on turning 60. But the government has ruled out that Lt Gen Bakshi

is in line to become the country's first chief of defence staff, a new four-star general post that is in the works as part of the proposed higher defence management reforms, as was earlier reported by TOI.

Between the two meetings with Parrikar, first on December 21 and the other on Tuesday, Lt Gen Bakshi had on December 31 announced he would not resign and continue to lead the EAC with "full professional sincerity" as before. Incidentally, he is on a monthlong leave till January 26.

While some contended Lt Gen Bakshi should have quit after being superseded for the top post in line with the longstanding military ethos and tradition, the senior officer himself also conveyed that he wanted to fight the "smear campaign" against him.

As reported earlier, anonymous letters alleging irregularities in the use of the EAC chief's emergency financial powers were apparently sent to authorities when the government was in the process of deciding who would replace Gen Dalbir Singh Suhag as the Army chief on December 31. But no substance was found in the allegations.

THE ASIAN AGE

Thu, 05 Jan, 2017

Army Chief: Hard response will hit Pakistan terror strategy

Surgical ops sought to show India won't accept terror as new normal: MEA.

New Delhi: The ministry of external affairs said on Wednesday that the surgical strikes by the Indian Army against terrorists operating from Pakistan-occupied territory in 2016 was carried out with the aim that India "will not countenance continued terrorism as the new normal in our (Indo-Pak) relationship," adding that India had shown that "we will not back down in the face of assaults against the security of our people". This came even as new Army Chief Gen. Bipin Rawat said India would give a calibrated, "hard" response to terror activities that would compel Pakistan to completely rethink its strategy on supporting insurgency and terrorism.

The MEA also said that it "cannot have a peaceful conversation" with Pakistan "under the spray of bullets", adding that "talks and terror cannot go together".

Meanwhile, Army Chief Gen. Rawat told news agency PTI, "While we do agree that we have to retaliate and ensure that the pain is felt by the terrorists and their supporters, the response need not be the same every time... We will calibrate the response in a manner that hits them hard and compels them to think in the long-run whether they need to completely rethink their strategy on supporting insurgency and terrorism in our state".

On Wednesday evening, in an opening statement at an MEA conference on foreign policy achievements to mark the completion of the "mid-term" of the NDA government, minister of state for external affairs Gen. (retd.) V.K. Singh said, "All the countries of the region, barring one, have demonstrated their willingness to stand together against the menace of terrorism that could undermine their collective hopes. India too, has shown that we will not back down in the face of assaults against the security of our people, the prosperity of the region and the interests of the international community. The aim of the surgical strikes that we conducted was to convey to Pakistan that we will not countenance continued terrorism as the new normal in our relationship. Our own good faith has been amply demonstrated time and again through repeated initiatives." to normalise the relationship. However, as we have often stated, talks and terror cannot go together."

When asked why India does not snap diplomatic ties with Pakistan amid demands by some in the ruling BJP to teach Pakistan a lesson militarily, the MEA later said, "The engagement with Pakistan needs to continue. We have to deal with them with eyes open and not minds closed. Talk of inflammation does not help. We hope Pakistan sees the path of reason."

Army Chief Gen. Rawat also said that not every incident needs to be seen from the same perspective as there are a "large number" of terrorists operating in the Kashmir Valley who are always attempting to carry out some sort of violence against the security forces and citizens.

Thu, 05 Jan, 2017

With medals in short supply, soldiers now buy them at markets

The Medals Department Is Responsible For the Issue of These Awards That Soldiers Wear Proudly During Ceremonial Functions

New Delhi: The army is grappling with a short supply of medals, forcing combat-hardened soldiers to buy duplicate ones from the market. Soldiers are awarded medals for bravery, distinguished service, and other key landmarks in their military careers.

Army sources said while there was no shortage of medals awarded to soldiers for gallantry, the defence ministry's department of medals had failed to issue the other variety of medals during the last seven to eight years. The difference between original and duplicate medals is that the former have a soldier's name and service number engraved on them.

"Medals that are awarded at investiture ceremonies are available. But the problem is with other awards that soldiers are automatically entitled to after completing a certain number of years in service, serving in difficult areas or taking part in some operation," a senior officer said.

The medals department is responsible for the issue of these awards that soldiers wear during ceremonial functions. It is learnt the department is saddled with a backlog of more than 14 lakh medals of different types. Most soldiers posted here have been sourcing medals from markets in Delhi Cantt.

Thu, 05 Jan, 2017

'Tyagi bought properties with kickbacks'

New Delhi: Former Air Chief SP Tyagi, an accused in the AgustaWestland case, allegedly bought at least four properties in Gurgaon by making payments for them in cash and the CBI suspects he may have used bribe money he got in the deal to make these purchases, sources said.

"Under the rules, the former Air Chief was supposed to inform the government about these purchases but didn't do it...that's why the CBI is scrutinising them," said a senior CBI official who spoke on the condition anonymity.

The CBI made its first arrests — of Tyagi, his cousin Sanjeev alias Julie, and lawyer Gautam Khaitan — in the case on December 9 on charges of receiving and facilitating bribes in the `3,727-crore deal to buy 12 AgustaWestland choppers for ferrying senior government dignitaries.

Tyagi has got bail in the case from the CBI special court but the agency has challenged the decision in the Delhi high court. The CBI special court on Wednesday also granted bail to Sanjeev and Khaitan.

The Enforcement Directorate, which is probing the money laundering angle in the case, has claimed that Tyagi's three cousins — Sanjeev, Sandeep Tyagi and Rajiv Tyagi — got 10.5 lakh euros (around `7 crore) between 2004 and 2011.

The CBI has alleged that Tyagi changed key parameters for buying the choppers, which later helped AgustaWestland bag the deal. The Tyagis have denied the charge.

The CBI is also probing a few pages, purportedly in the handwriting of Christian Michel, an alleged middleman in deal, where alleged bribe money has been written against some initials. The CBI is trying to find out about politicians who were the end beneficiaries in the deal. The pages were recovered by Italian investigators who originally probed the matter.

“Guido Haschke, another middleman in the deal who entered into a plea bargain with Italian authorities in return for a lighter punishment, has named a few of the beneficiaries during his deposition,” said the officer.



Thu, 05 Jan, 2017

China's stance on terror self-defeating, says India

New Delhi wants Beijing to help blacklist Pak-based terror mastermind Masood Azhar.

India on Wednesday said that China is following “double standard” on terrorism and asked Beijing to support its campaign to blacklist Pakistan-based terror mastermind Masood Azhar.

Addressing the mid-term press conference of the MEA to mark two-and-a-half years of the government of Prime Minister Narendra Modi, Minister of State for External Affairs M.J. Akbar said China's block at the 1267 committee of the UN Security Council that prevented India from blacklisting the terror boss was “self-defeating”.

‘Listen to world's voice’

“China should listen to the voice of the world and we hope that Beijing can be persuaded to see the evil of the menace,” said Mr. Akbar and added, “as a responsible and mature nation, China will understand the double standards of this self-defeating purpose,” said Mr. Akbar.

Reiterating the government's position on terror, Mr. Akbar said India had zero tolerance for terrorism. “Talks and terror do not, cannot go together,” he said, emphasising that the government would consider dialogue with Pakistan only after cross-border terror ends.

The press conference, led by both Ministers of State for External Affairs, V.K. Singh, and Mr. Akbar projected the diplomatic trajectory of the Modi government since May 2014 and acknowledged that despite tranquillity on India-China border, there remained “divergences” in bilateral ties, including China's stand on Pakistan-based terror outfits such as Jaish-e-Mohammed (JeM).

Mr. Akbar's was the first Minister-level response from India after China blocked India's New Year eve bid to blacklist Masood Azhar under the counter-terror 1267 committee of the UN Security Council. Following the block, Pakistan had criticised India's move as “politically motivated”.

Surgical strike, a message

India, however, was not in favour of stalling dialogue with Pakistan on the need to stop cross-border terrorism as it had delivered the necessary message to Pakistan and the world, with the surgical strike of September 28, Mr. Akbar said.

“You can see the situation in our neighbouring country. It is a regrettable situation,” said Mr. Akbar, referring to Pakistan.

Mr. Singh also highlighted that the surgical strike of September 28, ten days after the Uri attack, had delivered the expected results.

“The aim of the surgical strike was — we have sent a message to the whole world that terrorism will not be acceptable as the new normal,” said Mr. Singh.

The press conference highlighted the government's campaigns at the UN, and the Nuclear Suppliers Group (NSG) and stated that it remains focused on the smooth implementation of the “neighbourhood first” policy to ensure better ties with Nepal, Bangladesh, Sri Lanka and other members of the region.

Thu, 05 Jan, 2017

After drill, Chinese aircraft-carrier tests weapons in SCS

A group of Chinese warships led by its sole aircraft carrier is testing weapons and equipment in exercises this week in the South China Sea that are going to plan, China's foreign ministry said Wednesday. Exercises by the ships, in particular the aircraft carrier Liaoning, since last month have unnerved China's neighbors, especially at a time of heightened strain with self-ruled Taiwan, which Beijing claims as its own, and given long-running territorial disputes in the South China Sea.

China says the Soviet-built Liaoning and the other ships conduct routine exercises that comply with international law.

"The Liaoning aircraft carrier group in the South China Sea is carrying out scientific research and training, in accordance with plans," Chinese foreign ministry spokesman Geng Shuang told a regular news briefing.

"The purpose is to test the performance of weapons and equipment," he said.

The People's Liberation Army Navy said on its official microblog this week that the aircraft carrier conducted drills in the South China Sea with its fighter jets and helicopters. U.S. warships have also been conducting what they call "freedom of navigation" patrols through the South China Sea over the past year as concern grows about Chinese construction of air strips and docks on disputed reefs and islands.

The group of warships sailed through waters south of Japan and then rounded east and south of Taiwan late last month on their way to the south China province of Hainan. Taiwan's defence minister warned at the time that "the threat of our enemies is growing day by day".

Taiwan media have reported that the Liaoning could sail north up the median line of the Taiwan Strait, the narrow body of water separating Taiwan and China, on its way to its home port of Qingdao.

Thu, 05 Jan, 2017

Close brush with comet

NASA says mysterious object is set to fly close to Earth this week.

Washington: The National Aeronautics and Space Administration's (Nasa) asteroid- and comet-hunting NEOWISE project has detected a mysterious object hurtling towards the Earth.

The object has been named C/2016 U1 NEOWISE. Nasa has pinpointed it as a comet, but the other, dubbed 2016 WF9, has left it slightly more baffled, according to The Sun. The comet is set to fly close to Earth this week, but the mystery object isn't expected to make an appearance till February.

On 25 February, WF9 will approach Earth's orbit at a distance of nearly 51 million kilometres from our home planet. The object is "not a threat to Earth for the foreseeable future", Nasa said. Nasa says chances are that it could be visible using a good pair of binoculars. However, the visibility isn't guaranteed because the space agency isn't able to predict the comet's brightness.

"2016 WF9 could have cometary origins," said deputy principal investigator James 'Gerbs' Bauer at Nasa's JPL. "This object illustrates that the boundary between asteroids and comets is a blurry one; perhaps, over time this object has lost the majority of the volatiles that linger on or just under its surface."

While 2016 WF9 is dark like a comet, it appears to lack the characteristic dust and gas cloud that defines a comet. The comet is moving farther away in the south with each passing day and once it reaches its closest point to the Sun on January 14 it will start an outward journey that will take it beyond the outer solar system and won't be visible for thousands of years to come.

At its farthest distance from the Sun, WF9 it approaches Jupiter's orbit. Over the course of 4.9 Earth-years, it travels inward, passing under the main asteroid belt and the orbit of Mars until it swings just inside Earth's own orbit. After that, it heads back toward the outer solar system. Nasa explains that objects similar to WF9 have multiple possible origins; it might once have been a comet, or it could have strayed from a population of dark objects in the main asteroid belt.

At a distance of nearly 51 million kilometres from Earth, this pass will not bring it particularly close. The trajectory of WF9 is well understood, and the object is not a threat to Earth for the foreseeable future. WF9 is relatively large: roughly 0.5 to 1 kilometre across. It is also rather dark, reflecting only a few percent of the light that falls on its surface. This body resembles a comet in its reflectivity and orbit, but appears to lack the characteristic dust and gas cloud that defines a comet.



Thu, 05 Jan, 2017

ISRO to launch record 103 satellites at one go in February

India's space agency ISRO will launch a record 103 satellites — all but three of them foreign — at one go on a single rocket in the first week of February in what will be a major feat not attempted by any country.

As India looks to grab a larger slice of the lucrative commercial space market, 100 of the 103 satellites set for launch by ISRO's workhorse rocket PSLV-C37 in February from from its Satish Dhawan Space Centre in Sriharikota in Andhra Pradesh belong to foreign nations, including the US and Germany.

“We are making a century by launching over 100 satellites at one go,” S. Somnath, Director of the Liquid Propulsion Systems Centre of the Indian Space Research Organisation (ISRO), told a plenary session on the second day of the ongoing Indian Science Congress here today. The space agency had earlier planned a launch of 83 satellites in the last week of January, of which 80 were foreign ones. But with the addition of 20 more foreign satellites, the launch was delayed by a week and will now take place in first week of February, Somnath said.

He, however, did not specify the number of countries that would launch its satellites in this mission, but said it includes nations like the US and Germany. “These will be 100 micro-small satellites, which will be launched using a PSLV (Polar Satellite Launch Vehicle)-C37. The weight of the payload will be 1350 kgs, of which 500-600 kgs will be the satellite's weight,” Mr. Somnath added. The launch will be a major feat in country's space history as no exercise on this scale has been attempted before. Last year, ISRO launched record 20 satellites at one go. The highest number of satellites launched in a single mission is 37, a record that Russia set in 2014. The US space agency NASA launched 29. Prime Minister Narendra Modi's pet South Asian satellite project, meanwhile, will take off in March.

The South Asian satellite will be a part of GSAT-9, which will be launched in March this year, M. Nageshwara Rao, Associate Director of ISRO said. The communication satellite was to be launched in December 2016, but was slightly delayed as some other satellites are to be launched before that.

Sources said talks with Afghanistan to have the country on-board for the project is in its final stages. Envisaged as a gift to its neighbours, the project, earlier known as SAARC satellite, faced stiff resistance from Pakistan. The neighbouring country wanted it to be launched under the aegis of the South Asian regional forum. It later backed out of the project. Apart from India, the satellite will benefit Sri Lanka, Maldives, Bangladesh, Nepal and Bhutan.

Wed, 04 Jan, 2017
(Online)

Rare galaxy spotted over 359 million light-years away

The galaxy named PGC 1000714 appears to belong to a class of rarely observed Hoag-type galaxies.

Scientists have for the first time observed a rare galaxy with two outer rings surrounding a red core located about 359 million light-years away from Earth. The galaxy named PGC 1000714 appears to belong to a class of rarely observed, Hoag-type galaxies. It has a well-defined elliptical-like core surrounded by two circular rings. “Less than 0.1 per cent of all observed galaxies are Hoag-type galaxies,” said Burcin Mutlu-Pakdil, a graduate student at University of Minnesota in the US.

Hoag-type galaxies are round cores surrounded by a circular ring, with nothing visibly connecting them. The majority of observed galaxies are disc-shaped like our own Milky Way. Galaxies with unusual appearances give astronomers unique insights into how galaxies are formed and change.

The researchers collected multi-waveband images of the galaxy, which is only easily observable in the Southern Hemisphere, using a large diameter telescope in the Chilean mountains.

While galaxy shapes can be the product of internal or external environmental interactions, researchers speculate that the outer ring may be the result of this galaxy incorporating portions of a once nearby gas-rich dwarf galaxy. These images were used to determine the ages of the two main features of the galaxy, the outer ring and the central body.

While the researchers found a blue and young (0.13 billion years) outer ring, surrounding a red and older (5.5 billion years) central core, they were surprised to uncover evidence for second inner ring around the central body. To document this second ring, researchers took their images and subtracted out a model of the core. This allowed them to observe and measure the obscured, second inner ring structure.

“We’ve observed galaxies with a blue ring around a central red body before, the most well-known of these is Hoag’s object. However, the unique feature of this galaxy is what appears to be an older diffuse red inner ring,” said Patrick Treuthardt, an astrophysicist at the North Carolina Museum of Natural Sciences.

Galaxy rings are regions where stars have formed from colliding gas.

“The different colors of the inner and outer ring suggest that this galaxy has experienced two different formation periods,” Mutlu-Pakdil said. “From these initial single snapshots in time, it’s impossible to know how the rings of this particular galaxy were formed,” she said.

The researchers said that by accumulating snapshot views of other galaxies like this one astronomers can begin to understand how unusual galaxies are formed and evolve.

While galaxy shapes can be the product of internal or external environmental interactions, researchers speculate that the outer ring may be the result of this galaxy incorporating portions of a once nearby gas-rich dwarf galaxy.

चीन इस साल लांच करेगा रिकार्ड 30 अंतरिक्ष अभियान

बीजिंग, आइएनएस/प्रेट्र : चीन इस साल अपने अंतरिक्ष अभियान के इतिहास में नया अध्याय जोड़ने जा रहा है। उसकी साल 2017 में रिकार्ड 30 अंतरिक्ष अभियान लांच करने की योजना है।

चाइना एयरोस्पेस साइंस एंड टेक्नोलॉजी कार्पोरेशन के अनुसार, इस साल ज्यादातर अंतरिक्ष अभियानों को खाना करने के लिए लांग मार्च-5 और लांग मार्च-7 रॉकेट का इस्तेमाल किया जाएगा। लांग मार्च-5 चीन का सबसे बड़ा कैरियर रॉकेट है। विश्लेषकों का कहना है कि पिछले साल नवंबर में इस रॉकेट के सफल परीक्षण से अंतरिक्ष स्टेशन के निर्माण का रास्ता प्रशस्त हो गया है। लांग मार्च-5 प्रोग्राम के महानिदेशक वांग यू ने कहा कि 2017 नई पीढ़ी के कैरियर रॉकेट

के लिए महत्वपूर्ण है। लांग मार्च-5 चेंग-5 प्रोब को अंतरिक्ष में ले जाएगा। चंद्रमा से नमूने एकत्र करने के बाद यह धरती पर लौट आएगा। दूसरी तरफ लांग मार्च-5 का उन्नत संस्करण लांग मार्च-7 चीन के पहले कार्गो अंतरिक्षयान तियानझोउ-1 को अंतरिक्ष में लेकर खाना होगा। चीन ने पिछले साल 22 अंतरिक्ष अभियान लांच किए थे। जबकि साल 2015 में इसकी संख्या 19 थी। उसने जून 2016 में लांग मार्च-7 का सफल परीक्षण किया था।

चीन ने हाल में अंतरिक्ष मिशन पर जारी श्वेत पत्र में बताया था कि 2018 में चंद्रमा की दूसरी ओर अंतरिक्षयान उतारा जाएगा। ऐसा करने वाला वह दुनिया का पहला देश बन जाएगा।

The Statesman
PEOPLE'S PARLIAMENT, ALWAYS IN SESSION

Chromosome numbers

By Tapan Kumar Mitra

Since gametes are haploid, they cannot be produced from diploid cells by mitosis because mitosis creates daughter cells that are genetically identical to the original parent cell. In other words, if gametes were formed by mitotic division of diploid cells, both sperm and egg would have a diploid chromosome number, just like the parent diploid cells. The hypothetical zygote created by the fusion of such diploid gametes would be tetraploid (possess four homologous sets of chromosomes). Moreover, the chromosome number would continue to double for each succeeding generation - an impossible scenario. Thus, for the chromosome number to remain constant from generation to generation, a different type of cell division must occur during the formation of gametes. That special type of division, called meiosis, reduces the chromosome number from diploid to haploid.

Meiosis involves one round of chromosomal DNA replication followed by two successive nuclear divisions. This results in the formation of four daughter nuclei (usually in separate daughter cells) containing one haploid set of chromosomes per nucleus. The principle of meiosis starts with a diploid cell containing four chromosomeass. A single round of DNA replication is followed by two cell divisions, meiosis I and meiosis II, leading to the formation of four haploid cells.

Meiosis and fertilisation are indispensable components of the life cycle of every sexually reproducing organism, because the doubling of chromosome number that takes place at fertilisation is balanced by the halving that occurs during meiosis. As a result, the life cycle of sexually reproducing organisms is divided into two phases — a diploid (2n) phase and a haploid (1n) phase. The diploid phase begins at fertilisation and extends until meiosis, whereas the haploid phase is initiated at meiosis and ends with fertilisation.

Organisms vary greatly in the relative prominence of the haploid and diploid phases of their life cycles. Fungi are examples of sexually reproducing organisms whose life cycles are primarily haploid but include a brief diploid phase that begins with gamete fusion (the fungal equivalent of fertilisation) and ends with meiosis. Meiosis usually takes place almost immediately after gamete fusion, so the diploid phase is very short, and, accordingly, only a very small fraction of fungal nuclei are diploid at any one time. Fungal gametes develop, without meiosis, from cells that are already haploid.

Mosses and ferns are probably the best examples of organisms in which both the haploid and diploid phases are prominent features of the life cycle. Every species of these plants has two alternative, morphologically distinct, multi-cellular forms — one haploid and the other diploid. For mosses, the haploid form of the organism is larger and more prominent, and the diploid form is smaller and more short-lived. For ferns, it is the other way around. In both cases, gametes develop from pre-existing haploid cells.

Organisms that alternate between haploid and diploid multi-cellular forms in this way are said to display an alternation of generations in their life cycles. In addition to mosses and ferns, eukaryotic algae and other plants exhibit an alternation of diploid and haploid generations. In all such organisms, the products of meiosis are haploid spores, which, after germination, give rise by mitotic cell division to the haploid form of the plant or alga. The haploid form in turn produces the gametes by specialisation of cells that are already haploid.

On the other hand, the best examples of life cycles dominated by the diploid phase are found in animals. In such organisms, including humans, meiosis gives rise not to spores but to gametes directly, so the haploid phase of the life cycle is represented only by the gametes. Meiosis in such species is called gametic meiosis to distinguish it from the sporic meiosis observed in spore-producing organisms exhibiting an alternation of generations. Meiosis is thus gametic in animals and sporic in plants.

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Note ban to feature in R-Day show

THE JAN MARCH

- IT ministry's float participating in the upcoming pageant will illustrate the advantages of PM Narendra Modi's demonetisation measure and his pitch for digital banking
- 21 floats from different states and ministries will participate in this year's Republic Day parade, India's 68th
- Delhi and Uttar Pradesh will send in their tableaux this year
- Abu Dhabi's crown prince Sheikh Mohammed bin Zayed Al Nahyan will be the chief guest in the parade

India exhibits its military might and cultural diversity every Republic Day. But this year's January 26 parade will feature an additional element — a float highlighting the prime minister's signature drives. The information and technology ministry's float participating in the upcoming pageant, highly-placed defence sources told India Today, will illustrate the advantages of PM Narendra Modi's demonetisation measure and his pitch for digital banking.

It will serve as a fitting metaphor for the prime minister's cashless-economy campaign, a top defence official said. In all, twenty-one floats from different states and ministries will participate in this year's Republic Day parade, India's 68th. After a gap of several years, Delhi and Uttar Pradesh are also sending in their tableaux this time, defence sources said. Abu

Dhabi's crown prince Sheikh Mohammed bin Zayed Al Nahyan will be the chief guest in the parade. A contingent of the UAE army will take part in accordance with the new practice to honour the foreign dignitary. The UAE, a strategic alliance partner of Pakistan, has signed resolution with India against state support and sponsoring of terrorism against other countries. There are more than 2.6 million Indians who have been employed in various sectors in the UAE. It is estimated that the large expatriate community sends an remittance of around `95,000 crore very year.

The UAE is also India's third largest trading partner. A unit of NSG, the federal force responsible to undertake counter-terror and counter-hijack operations across the country, will also showcase its contingent for the first time in the parade. The unit will include commandos from both the army and paramilitary-based units of the force. This year's contingent will include 60 black cat commandos drawn from its Manesar station. Thus far, NSG personnel have only been operational in sanitising the parade path and surrounding areas in view of security threat on the Republic Day. Among para-military troops, the Central Reserve Police Force's anti-riot unit and the Central Industrial Security Force columns will also participate in the parade.

There was indecision over two other para forces, namely IndoTibetan Border Police and Sashashtra Seema Bal. The Rajpath extravangaga for the first time comprises a unit of retired military personnel who will drive past in a float instead of marching, official sources said. Besides, T-90 tanks, supersonic BrahMos, Akash and Smerch will showcase the nation's missile power in the event. This time, floats of the three services will carry a distinct flavour of Modi's Make-in-India program, a senior official said. *With Agency Inputs*