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India Taps Global Market for Tejas Jets

By Sudhi Ranjan Sen



India has approached foreign manufacturers to make 100 single engine fighter-jets in India.

Not enough Indian made Tejas Fighters available; New Delhi goes to the global market. Within days of India and China ending the Doklam stand-off, India has approached foreign manufacturers to make 100 single engine fighter jets in India, top sources have told India Today TV.

The fighter jets are expected to cost India several billion dollars. New Delhi has been forced to take this route because Hindustan Aeronautic Limited (HAL) — a defence public sector undertaking cannot produce enough Tejas, the indigenously made single engine fighter jet, fast enough. There are only two companies that manufacture single engine fighters: F-16 produced by the American aerospace giant Lockheed Martin and Grippin manufactured by the Swedish aerospace company Saab.

The Indian Air Force (IAF) should have about 42 squadrons — each squadron comprising between 14-16 jets of fighters. But, at least 11 squadrons of fighters — of the aging Russian made Mig-21 and Mig-27 will be decommissioned in the next three years. With 11 squadrons going out, the IAF needs at least 200 fighters. Recently, the Modi-led NDA government contracted to buy 36 French made Rafale jets to make up for the dwindling number of fighters. The IAF has ordered about 120 Tejas fighters. It raised the first Tejas squadron with just three fighters in 2016. But Tejas still has a long way to go before it is fit for operational deployment. HAL is trying to ramp up the production capacity, but cannot produce more than 8-12 fighters annually. The Ministry of Defence (MoD) has asked the Indian Air Force to finalise the Request for Information (RFI) — the first step to floating the global tender, sources told INDIA TODAY TV.

The fighters will be made in India through the “Strategic-Partnership” (SP) route that was cleared by the union cabinet recently. Under the SP route, the IAF will decide on the technology that it needs whereas the government will decide on the foreign equipment manufacturer who will have an Indian partner. Under PM Modi’s flagship ‘Make in India’ programme, the MoD gives preference to weapon platforms and equipments that are designed, developed and manufactured in India.

“Of the 100 single-engine aircraft that we plan to manufacture, 18 fighters — one squadron — will be bought in a fly-away condition,” a source told India Today TV. The IAF expects to induct the first aircraft within three years of signing the contract and rest 82 within a decade.

Business Standard

Emerging Revolution in Drone Affairs

By Mathew Maavak

Imagine a swarm of rubber band-catapulted armed mini-drones flying in large formations over a battlefield? Now, ponder the fact that each drone was modified, armed and operationalised from off-the-shelf models worth less than \$200 each. The future of aerial warfare has landed.

China recently demonstrated this possibility when state-owned China Electronics Technology Group Corporation launched a record breaking 119 drones in mission formation. The breakthrough was not in the numbers per se; rather it was in “swarm intelligence” — the harmonic integration of multiple low-tech drones with smart sensors and artificial intelligence (AI).

Future warfare will likely be asymmetric in terms of size, scope and impact, leading to a partial shift away from costly military-grade UAVs (unmanned aerial vehicle) to multi-UAS (unmanned aerial system) swarms designed to overwhelm enemy defences. Drones will be variously fitted with reconnaissance cameras, electronic jamming devices, missiles, warheads and even machine guns and sniper rifles. A “drone hive” within flying distance can store, launch and recharge these swarms with digital efficiency.

The US, Israel and China currently lead the world in military drone technology. China’s arsenal of 1,300 military drones is set to grow quantitatively and qualitatively over the next few years due to its global monopoly in commercial drone production. Companies like DJI, Zerotech and Ehang, among numerous others, mass produce hundreds of thousands of drones per annum, capturing 85 per cent of the global market in the process.

There are no contemporary countermeasures against swarms of disposable, 3D-printed drones. Directed energy beams may be an option if such swarms are detectable by radar. Upon discovery, however, the swarm may be prompted to disperse and regroup in smaller numbers to neutralise enemy defences. As a deterrent weapon, such swarms are theoretically unsurpassable in terms of cost, efficiency and in the ability to create a territorial cordon sanitaire with minimal risk of escalation. Suicidal terrorists will be neutralised by miniature kamikaze drones. What more can a jawan ask for along the Line of Control in Kashmir? Make in India drones? But where does India stand in this transformative Revolutions in Military Affairs (RMA)? Although it is acquiring local and foreign drones for a variety of anticipated missions, the Israeli Searchers, Herons, Harpys and Harops remain the spear tip of the Indian arsenal. However, these drones collectively cost hundreds of millions of dollars to the exchequer, necessitating a closer look into alternative drone paradigms that are more cost-effective and lethal.

Military drones will remain indispensable as they can replace the human pilot and remain operational for extended periods of time under a variety of terrains, altitudes and weather conditions. The edge possessed by hi-tech military drones, however, will be blunted as soon as they fall into enemy hands. Iran had reportedly reverse-engineered a US RQ-170 Sentinel it captured in 2011, and subsequently used the knowledge gleaned to bring down two more US RQ-11s as well as a ScanEagle drone.

Most of the time, there is no need to use expensive military drones when specially outfitted commercial ones can do the job. Indian military planners should consider weaponising commercial drones as a pro-tem measure before swarms of Chinese aerial sentries are deployed over the Himalayan frontiers.

Local engineering institutions can be approached by the Indian military to develop complex algorithms-based swarm intelligence for a new generation of disposable drones. Here is where the technical knowledge of students and their youthful propensity for gaming form a perfect fit. Using a similar logic, the United States Special Operations Command (SOCOM) will be hosting a ThunderDrone contest this month for drone buffs to simulate every possible battle scenario. Drone hobbyists and DIY buffs are driving the drone evolution in the US, reflecting a global bottom-up process which India can co-opt for the latest ideas and innovation.

Emulating China’s sprawling drone production complex is futile as the sector thrives on a symbiotic industrial ecosystem that churns out a host of smart devices for a variety of industries. This is a reason why smartphone manufacturer Xiaomi has emerged as an otherwise unlikely leader in drone production.

India not only needs a new drone strategy, it needs a new industrial model to create next-generation defence products and services. Here is where the Make in India initiative, with its focus on the Industry 4.0 (i4.0) paradigm, can change the way local products are designed, manufactured and refurbished. What India currently lacks in physical infrastructure can be compensated by its strengths in the software sector. A new generation of digital scientists will be needed to oversee the conveyor belts of India’s future i4.0 smart factories.

Drones will be increasingly ubiquitous in sectors ranging from disaster relief to logistics to fire fighting to journalism to farming, among others. This is a \$100-billion global market by 2020 that India cannot afford to ignore.

It is no longer a laughable proposition to tinker with toy drones before colonising future skies. The Wright brothers, after all, had revolutionised flight – and changed human trajectory forever – after fiddling in their bicycle repair shop a century ago.



Fri, 01 Sep, 2017

Govt Sacks 13 Ordnance Factories Officers

The Government on Thursday sacked 13 officers of Indian Ordnance Factories Service for their unsatisfactory performance. There are 39 Ordnance factories manufacturing weapons and manned by nearly 1,700 Group 'A' officers of this service and this is the first time such a measure was taken. Moreover, the dismissal comes in the backdrop of ordnance factories repeatedly failing to meet the production timelines and the Armed Forces do not have ammunition and spare parts to fight an intense war for more than 10 days.

The forcible retirement of these officers came after the Government initiated rigorous screening of overall performance of its officers, based on their service records, Defence Ministry officials said here. The pruning was undertaken to improve the performance of ordnance factories by making its officers accountable to ensure delivery of quality products to Armed Forces in prescribed timelines.

The Indian Ordnance Factories Service, which is an organised Group 'A' central service is responsible to ensure that the factories are always geared to cater to varied logistical needs of the armed forces. Nearly 1,720 officers of this service provide requisite leadership to more than one lakh employees of the ordnance factories which manufacture weapons ranging from missiles to rifles.

The Comptroller and Auditor General (CAG) in its report tabled in Parliament last month flagged its concern over inordinate delays in production of ammunition and weapons

As regards premature retirement of 13 officers, officials said action was taken as per Fundamental Rule 56(j) and Rule 48(1)(b) of Central Civil Service (pension) Rules, 1972. After having assessed the overall performance of the Indian Ordnance Factories Service, the Government then decided to retire 13 officers in public interest due to their overall unsatisfactory performance, they said.

The Government can review the performance of all central service officers after they above the age of 50, officials added.



Fri, 01 Sep, 2017

Army Reforms Alone Won't Work

Integrate the three services to improve efficiency

Editorial

The recently concluded Doklam standoff is a stern warning of the importance of a credible military capacity. One of the continuing problems in the Indian military is the excessive number of civilian personnel in its ranks. This means that despite the impressive statistic of having a million plus military, less than half are combat personnel. The Narendra Modi government has reportedly ordered the implementation of many of the

recommendations of the Shekatkar committee which seeks to redress this problem. If properly implemented, it would result in India adding an additional three divisions without having to increase the number of overall personnel.

The Indian military's 'tooth-to-tail' ratio stands today at about one soldier to 1.15 civilians, when the number should preferably be reversed. A McKinsey study, using 2008 data from the Institute of International Strategic Studies, showed that in Israel the combat plus combat support component of the military was 44%. Relatively, Japan scored 40% while China had a figure of 34%. India, however, came in at a lowly 25%. Similar recommendations have been made over the decades. The Krishna Rao committee was able to abolish stretcher-bearers and animal transport units in the 1980s. But the real reforms required are still being avoided. The most important is the integration of the three services. For example, the Army, Air Force, and Navy wastefully have their own separate logistics networks which results in considerable redundancy. Tri-service integration and the creation of theatre commands remains a bridge too far it seems even though it would arguably do more to enhance India's combat readiness than almost any other policy change.

At least the military will have a powerful incentive to do its best to implement the changes. Military reforms are among the most difficult to carry out because of the sensitivities concerned and the web of vested interests that will oppose change in any form. Given their importance to national security, however, the government would do well to put the Shekatkar recommendations on the fast lane.



Fri, 01 Sep, 2017

China says will strengthen patrols along the border

Days after Doklam row ends, China says its reinforcing border controls, patrols to safeguard the country's sovereign security

Beijing: China will strengthen patrolling and defences in the Doklam area, the People's Liberation Army announced on Thursday, days after the end of a two-month standoff with India in the region near the Sikkim border.

Border troops from the two countries were involved in a faceoff in the region, which is under China's control but claimed by Bhutan, from mid-June after Indian soldiers stopped Chinese personnel from building a road over strategic security concerns.

"China's Armed Forces will strengthen patrolling and defence of the Donglang area to resolutely safeguard the country's sovereign security," defence ministry spokesperson Ren Guoqing told a news briefing, using the Chinese name for Doklam. Military has paid "close attention to the situation" and taken "emergency measures to reinforce border controls" since the standoff, Ren was quoted as saying by Xinhua news agency.

"The Chinese military will continue to carry out its mission and responsibilities, strengthen its patrols and garrisons in the Donglang area and resolutely safeguard national sovereignty and security," he added.

The standoff was resolved on Monday as Indian troops withdrew from the area and China, without clearly saying so, gave enough indications that it had halted work on a road construction project that triggered the row. India sent troops into the area in June to stop work on the road in the remote, uninhabited territory. New Delhi said at the time the road would alter the status quo and pose a serious security threat. Ren also said Chinese troops would "resolutely maintain the country's territorial sovereignty and legitimate rights", adding that the Chinese said had used military diplomacy and border contact channels to promote the resolution of the issue.

Neither side has so far offered details of terms of disengagement. On Wednesday, China's foreign minister Wang Yi said India should learn its lesson and prevent such incidents in future.

Fri, 01 Sep, 2017

US gives \$255m in military aid to Pak, with strings attached

By Chidanand Rajghatta

Islamabad Told To Crack Down On Terror Havens

Pakistan can kick and scream all it wants about the US-India partnership to stabilise Afghanistan, but Islamabad will get US guns and butter only if it acts against the terror groups it hosts.

The Trump administration on Wednesday moved decisively against Pakistan's sponsorship of terror groups, notifying the US Congress that it is putting \$255 million in military assistance to the country from the \$1.1 billion in aid authorised for 2016 in an escrow account, unless Islamabad acts against terrorism.

The move is part of the gradual whittling down of foreign aid to Pakistan for its continued undermining of US efforts in Afghanistan with sponsorship of terror.

The latest action came even as Pakistan drummed up protests at home against the hardening US stand, articulated by the US President in a policy speech last week. “We can no longer be silent about Pakistan's safe havens for terror organisations, the Taliban, and other groups that pose a threat to the region and beyond,” Trump had warned, in remarks that implicitly called Pakistan a terrorist state, while pointing out that Islamabad had sponged billions of US dollars in aid. Secretary of state Rex Tillerson had also warned that Pakistan risked the aid.

Instead of being chastened by the warning, the country that hosted Osama bin Laden among scores of well-known terrorists, doubled down in denial, demanding proof of its support for terror groups, many of which operate openly with state support and subsidy.

It's National Assembly on Wednesday unanimously passed a resolution against Trump's statement, calling it “hostile and threatening” and its National Security Committee pledged a “robust response” to the US charge, even as its leaders and officials reached out to China, Turkey, and Saudi Arabia for support.

But instead of glossing over Pakistan's perfidy and backing down as it has often done in the past, Washington on Wednesday tightened the squeeze on the country whose sponsorship of terrorism is well-chronicled and has been repeatedly voiced by US officials and generals. In fact, there is pressure on the Trump administration from hardliners to cut off all aid and declare it a state sponsor of terrorism, and two lawmakers have actually proposed legislation withdrawing the major non-Nato ally status. Some experts have gone so far as to demand that Pakistani generals, politicians, and officials supporting terror be singled out for visa ban.

Pakistan's response to such pressure has been to deride US aid as “peanuts” and look towards China, which gives little aid beyond exploiting business opportunity in the country. Its serial denials are also not taken seriously, considering many UN and US-designated terrorists such as Hafiz Saeed, Masood Azhar, Syed Salahud din and the Haqqani group operate openly, often with government patronage.

Pakistani spinmeisters have reached out to the western media to make the case that US backing of greater Indian role in Afghanistan presents an existential challenge to Islamabad, while linking it to resolution of the Kashmir issue.

But the current administration appears to have wised up to the Pakistan's “strategic depth” policy that it can attain only through backing terrorists against the broader democratic coalition that India and the US support in their efforts to stabilise Afghanistan.

Besides, New Delhi argues that ties between India and Afghanistan predate the concoction of Pakistan a point that has been lost in Washington in the past. US officials now recognise the constructive role played by New Delhi in Afghanistan versus the destructive role played by Pakistan.

39 Successes Later, PSLV Launch Fails

Replacement satellite IRNSS-1H in limbo

In a double whammy to the Indian space programme, the PSLV-C39 mission carrying the replacement navigation satellite IRNSS-1H failed on Thursday evening.

This was the PSLV's first failure — in what was seen as a routine mission — after 39 continuously successful launches and only the second such instance since 1993. “The mission was unsuccessful,” said A.S. Kiran Kumar, Chairman of the Indian Space Research Organisation, a few minutes after the 7 p.m. launch. He said the spacecraft was stuck in the heat shield in the last and fourth stage; it did not release into space as planned.

A PSLV flight lasts 19 minutes. Normally the heat shield separates three minutes into launch but ISRO officials apparently waited through the entire flight period before conceding the failure.

“We could see the satellite circling along the orbit with the heat shield,” Mr. Kiran Kumar said at the Satish Dhawan Space Centre at Sriharikota, from where ISRO launches Indian and foreign commercial satellites.

The failure may somewhat dent the image that the PSLV commands in the global small-to-medium launchers market. It has been easily the most-sought-after vehicle for small satellites of up to 600-700 kg. It has launched 209 satellites of 28 countries since it went commercial in 1999. Antrix Corporation, ISRO's commercial arm, has firmed up many more client satellites and is in discussion with new potential customers, its chief had earlier said.



As ISRO launch fails, glitch in space waits for fix

By Johnson T A

The Indian Express explains what went wrong with the launch of IRNSS-1H, and what it was meant to do

Editorial

What went wrong in the launch of the IRNSS-1H satellite by ISRO Thursday?

ISRO declared the IRNSS-1H launch a failure after a heat shield failed to separate, preventing the satellite from being deployed in space by PSLV-C39, the launch vehicle. The performance of PSLV-C39 went to plan up to the point when the satellite had to be inserted in orbit. “During the operation the heat shield has not separated. Further analysis will be carried out subsequently,” said ISRO's range operation director at the Satish Dhawan Space Centre in Sriharikota.

What is a heat shield?

The heat shield is a protective cover provided around the satellite to help it withstand the adverse temperatures felt when a rocket is launched into space. Separation of the heat shield occurs mid-flight when the rocket leaves Earth's atmosphere.

What was IRNSS-1H supposed to do?

IRNSS-1H was the eighth in a series of IRNSS (Indian Regional Navigation Satellite Systems) satellites launched by ISRO since July 2013. This was to create a constellation to provide satellite-based navigation services over the Indian subcontinent on the lines of the global positioning system (GPS) created by the United States. The Indian navigation satellite constellation, called NavIC, essentially comprises seven satellites. IRNSS-1H was intended to replace IRNSS-1A, which developed problems last year. IRNSS-1H would have augmented “the existing seven satellites of NavIC constellation”. It was supposed to sit in a sub-Geosynchronous Transfer Orbit (sub-GTO).

What kind of problems made a replacement necessary?

ISRO stated last January that three Rubidium Atomic Frequency Standard (RAFS) clocks on IRNSS-1A, the first satellite launched on July 1, 2013, had developed problems, rendering the satellite ineffective for navigation services. “Three atomic clocks of IRNSS-1A have stopped working. But the rest of satellite components are functioning perfectly. In fact, we are using this satellite for messaging activity. The stopping of these atomic clocks has not affected the overall performance of our navigation system. We are planning to launch a replacement satellite,” ISRO chairman A S Kiran Kumar had said.

After the failed launch, what can ISRO do?

IRNSS-1H was among nine satellites (seven for the navigation service, two backup) indented at Rs 1,420 crore for IRNSS. ISRO has one more satellite in its kitty. A new satellite could be launched in the next few months to make up for the loss. ISRO chairman Kumar has also hinted in recent times that the constellation could go up to 11 satellites. In that case, more satellites could be built and launched.

How do these satellites work?

IRNSS is intended to provide two services — Standard Positioning Service for general users and a Restricted Service, which is an encrypted service only for authorised users like the defence forces. NavIC is designed to provide accurate position information services to users in India as well as the region, up to 1,500 km from the boundary. For NavIC to become ubiquitous in the subcontinent, ISRO will sell its capabilities to general positioning service providers like mobile phone manufacturers, vehicle manufacturers etc.

Couldn't existing satellite systems have provided such services?

One of the primary reasons for the development of the indigenous Indian system despite the existence of global systems — the American GPS, the Russian GLONASS, the European Galileo, the Chinese BeiDou — is the reliability that it offers when used for defence purposes. ISRO started work on the IRNSS programme in 1999 after the Kargil War, where Indian defence forces could not use American GPS in the conflict zone to locate its soldiers.

What is the payload on IRNSS-1H?

Like the previous satellites in the series, IRNSS-1H had a navigation payload and a ranging payload. The ranging payload of IRNSS satellites has a C-band transponder to determine the range of the satellite. The navigation payload is meant to transmit navigation service signals to users on earth while operating in the L5-band and S-band. Part of the navigation payload is high-accuracy RAFS clocks.

Why are these clocks important?

Atomic clocks are a key component in a navigation system. The ISRO satellites are equipped with three clocks each — one clock being the primary timekeeper and two acting as backup. On IRNSS-1A, all three clocks had failed. Accurate timekeeping lies at the heart of navigation systems since the determination of a person's position on earth is subject to the accurate calculation of delays in signal transmission from the satellite to earth. “The critical point of a satellite navigation system is the clocks on board. Because they are so important there is more than one clock on board. They are necessary because if you don't have the right clocks and even if you don't consider the relativity theory of Einstein the error would be more than 500 metres in one hour,” states the European Space Agency on its website.

What went wrong with the clocks?

The problems were similar to those reported last January by the European Space Agency. Three RAFS clocks supplied by a European manufacturer, Spectratime, which were used by the ESA for its Galileo satellite navigation system, developed problems. No satellite in the 18-satellite Galileo system, however, was lost by the ESA since backup clocks remained operational. “These failures seem to have a consistent signature, linked to probable short circuits, and possibly a particular test procedure performed on the ground,” ESA stated in January this year.

How has ISRO addressed the problems with the IRNSS clocks?

The atomic clocks in new satellites are modified versions of the original clocks provided by Spectratime under a 4-million-euro deal signed in 2008. ISRO has been carrying out modifications of clocks procured from Spectratime to overcome technical issues.

Who built IRNSS-1H?

A consortium led by Alpha Design Technologies, a defence equipment supplier from Bengaluru, built it over eight months. The Rs 400-crore company was tasked with making two satellites. The second is expected to be complete by April 2018. Alpha Designs was assisted by a team of 70 ISRO scientists.



Fri, 01 Sep, 2017

How universe was filled with light decoded

Scientists may have solved the mystery behind how our universe emerged from the cosmic dark ages to a clearer, light-filled state that we see today. Researchers at the University of Iowa (UI) in the US propose that black holes within galaxies produce winds strong enough to fling out matter that punctures holes in galaxies, allowing light to escape. Soon after the Big Bang, the universe went completely dark.

The intense, seminal event that created the cosmos churned up so much hot, thick gas that light was completely trapped. As many as one billion years after the Big Bang, the universe expanded, became more transparent, and eventually filled up with galaxies, planets, stars, and other objects that give off visible light. According to a new study, black holes that dwell in the centre of galaxies fling out matter so violently that the ejected material pierces its cloudy surroundings, allowing light to escape. The researchers arrived at their theory after observing a nearby galaxy from which ultraviolet light is escaping.

“The observations show the presence of very bright X-ray sources that are likely accreting black holes,” said Philip Kaaret, professor in the UI Department of Physics and Astronomy. “It is possible the black hole is creating winds that help the ionising radiation from the stars escape. Thus, black holes may have helped make the universe transparent,” said Kaaret, corresponding author of the study published in the journal *Monthly Notices of the Royal Astronomical Society*. The team focused on a galaxy called Tol 1247-232, located some 600 million light years from Earth, one of only three nearby galaxies from which ultraviolet light has been found to escape.