C-17: Enhancing India's Strategic Airlift Capability

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The security challenges that a resurgent India will face in the 21st century are diverse. Alongwith the conventional threat from Pakistan, a rising and assertive China's emergence and its power projection in its immediate neighbourhood calls for augmenting defences on the eastern borders. India now is the only country in the world with nuclear powered neighbours on both flanks, having had skirmishes with both of them in the past. It also faces internal security problems wherein intermittent spurts of violence require quick deployment/ reallocation of forces within the country at short notice.

The contemporary definition of 'national security' has expanded beyond protection of borders to include socio economic factors that influence the well being of the nation and its citizens. This also includes timely relief efforts in case of natural and manmade disasters to minimize the adverse effects of the calamity as also towards rehabilitation. Energy security requirements dictate that India's strategic calculus encompass the Indian Ocean Region (IOR), from the Gulf of Aden to the Straits of Malacca, where it needs to work with the international community for protecting and securing the Sea Lanes of Communications.

Globalisation necessitates India to protect its interlinked interests with its regional partners. Also, India has emerged as a capable and responsible regional power that may be called upon to play a significant role in responding to existing and emerging challenges for the stability of IOR and the South Asian region. These may include power projection, as it did in the case of Maldives (Op CACTUS), and providing relief and assistance in case of humanitarian crisis. Not only will this

require swift response, it may also entail logistic support to sustain forces for significant length of time. With a large number of expatriates spread across the globe, India has to be prepared to evacuate its citizens from global hot spots, if necessary, as it has successfully done in the past.

Catering to such a vast area on a regular scale is near impossible economically, if not humanly. Strategic airlift thus is going to be an important facet in support of India's national objectives. The role has been ably handled by the Indian Air Force (IAF) workhorse, the IL -76 in the past. However, in view of the enhancing applicability of strategic airlift in the contemporary scenario, a need was felt to augment airlift capability by increasing the fleet strength. The decision was also spurred by the serviceability issues affecting the ageing IL-76 fleet as also by the requirement of a technologically advanced and easier to maintain aircraft that could even operate from smaller airfields in all weather conditions.

The high-wing, four-engine, T-tailed military-transport aircraft with a rear-loading ramp is a wide bodied aircraft capable of carrying about 75 tonnes of payload and taking off from an airfield 7600 ft long (a normal airfield length being approx 9000ft) and flying 2400 nautical miles (almost 4,500 kilometers) without refuelling.

The deal for 10 C-17s through the Foreign Military Sales (FMS) mode was finalised in June 2012. India is likely to go in for another six C-17s after the first 10 as a follow-on contract, once the aircraft's operational performance has been evaluated over a period of time in India. The first aircraft was delivered to India in January which was followed by a flight test programme at Edwards Air Force Base in California subsequent to which the first of the C-17s landed in India on 18 Jun 13. Four more aircraft are expected to be delivered by Boeing to IAF this year and the remaining five by end 2014. India became the eighth operator of the type and on delivery of all aircraft will become the second largest operator of the aircraft outside the U.S.

The C-17 has proven itself as the mainstay of U.S. forces worldwide since 1995, supporting its operations in Iraq and Afghanistan as also for carrying relief to all corners of the world. Around 250 C-17 in service worldwide have exceeded 2.5 million flight hours, a no mean achievement. The high-wing, four-engine, T-tailed military-transport aircraft with a rear-loading ramp is a wide bodied aircraft capable of carrying about 75 tonnes of payload and taking off from an airfield 7600 ft long (a normal airfield length being approx 9000ft) and flying 2400 nautical miles (almost 4,500 kilometers) without refuelling. In a different

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configuration, it can carry a lesser weight of 45 tons a larger distance of 4,000 nautical miles (7,400 kilometers). With a maximum fuel capacity of about 109 tons, it can stay aloft for around 12 hours. These can be increased further as the aircraft is capable of in flight refuelling. The cruise speed is between 0.74 and 0.77 Mach. This gives the IAF the ability to cover larger distances globally, providing it nonstop coverage of its entire area of interest.

The C-17 is equipped with an externally blown flap system (the engine exhaust is directed onto large flaps, which extend into the exhaust stream, to generate additional lift) that allows a steep, low-speed final approach and low-landing speeds enabling the aircraft to land on an airfield as short as 3,000 feet and only 90 feet wide. On congested areas and narrow taxiways, it can carry out sharp ground manoeuvres (can complete a 180° star turn in 80ft). A fully loaded aircraft using directed flow thrust reversers can taxi backwards up a maximum of 2 percent gradient slope, providing it the ability to back up and park under its own power. Its engines can operate safely even on unpaved surfaces as they have systems to prevent ingestion of dust and debris. Once on ground, it requires little time for loading and offloading because of advanced cargo systems, as also for turnaround servicing, thus ensuring that the aircraft spends more time in air than on ground. This ability of the aircraft will be crucial for operations from the Advanced Landing Grounds (ALGs) along the Himalayan borders.

The C-17 is a wide bodied aircraft with a cargo compartment width of 5.49 mtrs as compared to 3.45mtrs of IL-76. This along with its higher weight carrying capacity of almost 74 tonnes makes it suitable to carry heavier and larger loads or alternatively carry more loads, including wheeled vehicles, in side by side rows. The ramp alone can carry around 18 tons providing additional space for voluminous loads. It can carry three armoured infantry vehicles or an M-1 tank. Accordingly, it can be deemed fit to carry an Arjun Mark II tank and APCs of the Army as also artillery guns, Unmanned Aerial Vehicle Detachments or Missile Systems. It has already proven itself in carrying one CH-47 Chinook or two Apache AH-64Ds helicopters for the U.S. forces, both of which are soon expected to join the Indian armed forces inventory. It can also carry three Advanced Light Helicopters, with tail rotor blades removed, in addition to 38 personnel. The

aircraft can airdrop 102 paratroopers or transport 188 seated passengers. In an aeromedical configuration, the aircraft can carry 102 ambulatory patients with nine onboard litters, with provision for installation of an additional 27 litters, if required. It can also be used to deploy field ambulances.

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The aircraft is powered by four Pratt and Whitney F-11-7-PW-100 turbofan engines, each producing 40,440 pounds of thrust. They have been proven under diverse conditions including extreme hot temperature and high altitude operations. One of the achievements that quantifies its ability is that in the summer month of Jun 2010, during trials at Leh airfield, it landed and took off with 30 tonnes on board. The IL-76's ability under such conditions had been considerably restricted and this capability of the C-17 is a boost for year round maintainability of forces in this sensitive area.

The aircraft has set records in terms of air dropping of loads. It can carry out a single load airdrop of almost 27 tonnes of load and sequential load airdrops totalling almost 50 tonnes. Its 'logistic rail system', (colloquially called rollers in India) can carry up to eighteen pallets (including 4 on ramp), each with a maximum volume of 463 L. Such ability provides large air maintenance capacity as well as flexibility in deployment and maintenance of ground troops.

In spite of its large size, the aircraft is much easier to operate and requires only a small crew of two pilots and a loadmaster (total three). This is because of its various powered-assisted systems that allow it to be flown by use of a simple joystick, advanced digital avionics system that reduce the cockpit workload for the crew and advanced cargo systems that enable more efficient loading/ offloading operations. It is capable of flying under all light and weather conditions and the ease of flying would allow it to operate safely in the restricted Himalayan terrain. The reduced manpower requirements mean lesser risk exposure and lower long-term operating costs. The aircraft is also equipped with Missile Warning Systems coupled with Countermeasures Dispensing Systems for its own protection against missiles.

History is full of examples of technologically superior machines with reliability issues and supply constraints and consequently aircraft availability has become the latest buzzword. As per the deal, Boeing will support the IAF C-17 fleet through the Globemaster III Integrated Sustainment Programme (GISP), a multi-national Performance-Based Logistics (PBL) programme that would ensure an agreed-to level of system readiness, as opposed to a traditional contract for specific spare parts

and support services. Through the GISP "virtual fleet" arrangement, the company provides customers access to an extensive support network for worldwide parts availability. Coupled with better forecasting and material management software tools, it also promises economies of scale when purchasing materials. Such a system is expected to ensure near perfect serviceability rates for the C-17.

The first IAF C-17 made its maiden flight to the Andaman and Nicobar Islands on 30 Jun 2013 to induct the rotational Infantry Battalion into the Andaman and Nicobar Islands. As is evident from an evaluation of its capabilities, the C-17s would provide the IAF a potent strategic airlift capability. India is seeking to further secure its eastern borders through additional deployments and raising of a new mountain strike corps (around 40,000 soldiers), apart from two "independent" infantry brigades and two "independent" armoured brigades. The C-17s would be the major workhorse for their deployments and sustenance and they would be supported in this task by the IL-76s, while the medium lift tactical ability would be supplemented by the 103 Russian AN-32 aircraft and the six C-130Js. Acquisition of additional numbers would further enhance this capacity, including airlift capacity of almost one Brigade strength of troops. The aircraft is expected to fulfil India's military and humanitarian airlift needs well into the 21st century and in the hands of some of the most competent aviators in the world would surely set standards as had been done with the employment of IL-76 in the past.

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