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In My View

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Arun Prakash

IN MY VIEW . . .

Some Further Thoughts on the Indian Carrier Program

Sir,

India's new aircraft carrier program is more advanced than Captain Arun Prakash implied in his recent article ("A Carrier Force for the Indian Navy," Autumn 1990). Captain Prakash devotes considerable space to analyzing the relative merits of a 35,000 to 40,000-ton carrier equipped with catapults to operate conventional takeoff and landing (CTOL) aircraft and a smaller 20,000-ton vertical and short takeoff and landing (V/STOL) carrier. The fact is that India had already chosen its new carrier.

In December 1988 India entered into a consulting contract with France's Direction des Constructions Navales (DCN) for assistance in designing what is essentially a slightly smaller and faster version of France's new *Charles de Gaulle* nuclear-powered CTOL carrier; the new carrier is expected to be in service by 1997 or 1998. Up to five ships of the class could be built at Cochin in southern India. The decision to hire DCN for help with a design based on the *Charles de Gaulle* was taken after the Indian Navy had visited Ingalls Shipyard in the United States, Swan Hunter in England, and Bazan in Spain to evaluate various V/STOL carrier designs. Power will probably be supplied by four GE LM-2500 gas turbines (currently being built under licence to power India's new Project 15 frigates), although diesel and nuclear power have been mentioned as alternatives. India has an SSN reactor under development which could be adapted to power the new carrier.

The air group for the new carrier is considerably less certain. The Indian Navy's choice of a carrier of approximately 28,000 tons does not determine

whether the new carrier will carry a CTOL or V/STOL air group. Studies by the U.S. Navy in the 1970s in connection with the VSS proposals showed that, just as do other carriers, larger V/STOL carriers benefit from economies of scale, particularly in their ability to support "overhead" aircraft such as airborne early warning (AEW) planes.

One factor that is often forgotten is that the *Charles de Gaulle* will be fitted with U.S. C-13 steam catapults. This raises two potential problems for the Indians. First, the U.S. may not permit the release of its catapult technology to the Indians. An attempt to develop steam catapults or alternative catapult types would be difficult. Second, a steam catapult would require a separate steam generation system in a gas turbine or diesel-powered ship.

Contrary to Captain Prakash's belief, a catapult is not necessary to operate CTOL aircraft at full gross weight from a carrier. U.S. Navy tests showed that except for the S-3A Viking all U.S. carrier aircraft, including E-2 Hawkeye AEW aircraft, could operate safely from a carrier with a six-degree ski-jump and a twenty-knot wind over the deck. Steeper ski-jumps offered substantial reductions in the takeoff run. The ability of the Soviet Sukhoi Su-27 Flanker-D to operate at maximum gross weight from the *Fleet Admiral of the Soviet Union Kuznetsov* has led Sukhoi designers to question the need for catapults on the follow-on *Ul'yanovsk* class.

In light of these tests, it is clear that Captain Prakash was too quick to dismiss the possibilities of the Soviet carrier aircraft for use on the new Indian carrier. Both the Sukhoi Su-27 Flanker-D and the Mikoyan MiG-29 Fulcrum-D are very capable CTOL air superiority fighters which operate from the ski-jump equipped *Kuznetsov*. Flanker-D is likely to be a major component of the *Kuznetsov*'s air group. Fulcrum-D is experiencing development difficulties but offers commonality with India's land-based Fulcrums.

Captain Prakash criticizes the Soviet fighters for their alleged inability to conduct simultaneous takeoffs and landings from the *Kuznetsov*. This is not correct. The *Kuznetsov* can simultaneously conduct takeoffs and landings (using the shorter starboard takeoff run) while the *Charles de Gaulle* will not be able to conduct simultaneous operations due to the position of its catapults.

The Yakovlev Yak-141 is a substantially more capable supersonic V/STOL successor to the Yak-38 Forger described by Captain Prakash and has recently set several records. It is fitted with the same radar as the Fulcrum (with a slightly smaller antenna) and is very close to the Fulcrum in performance.

The Indians are considering the possible purchase of Flanker-D, reportedly to counter Pakistani purchases of Orion patrol aircraft. The Soviet government has stopped funding development of the Yak-141. Yakovlev is very interested in getting Indian help, especially financial, in completing development of the Yak-141 and is preparing to approach the Indians a second time. Usually, Soviet prices have been substantially less than Western prices. This is changing as the

Soviets move to a more market-driven economy, although cutbacks in defense spending may encourage the Soviets to offer good prices in order to keep the production lines open.

Captain Prakash's suggestion that the carrier version of the new Indian Light Combat Aircraft (or LCA) could supplement or replace the Rafale-M is impractical. The Indian Navy would incur substantial costs in buying and supporting two aircraft, and the LCA is generally inferior to the Rafale-M.

Rafale-M will be an excellent strike fighter with performance similar to that of the F/A-18 Hornet. The French government has recently estimated the unit cost of Rafale to be 250 million French francs ($40 million). The French Navy is desperate for Rafale-M to replace its aging Crusaders and it must receive the first production aircraft. The combination of high price and possibly late deliveries may make Rafale-M unattractive to the Indians.

The LCA would not be a suitable replacement for Rafale-M for two reasons. First, the LCA has roughly half the thrust of the Rafale and a commensurate reduction in capability. Second, the LCA's development has been slow and expensive. Development of an indigenous fighter is difficult, as India learned with the ill-fated Marut, and development of a suitable carrier fighter is more difficult.

Either a Soviet aircraft (especially the Su-27 Flanker) or the Rafale will offer the Indian Navy a more capable aircraft than the LCA. Even if one of these aircraft is bought, however, the LCA is likely for political reasons to be part of the projected air group for the new carrier (even if it never becomes part of an operational air group) regardless of its performance or any development delays because the LCA is a high-prestige (and high-cost) project for India.

India's neighbors can be forgiven their fears that the Indian carrier program is only part of an ambitious effort to control the Indian Ocean region. The Sea Harrier, India's current carrier fighter, and the LCA, while lacking sufficient range for attacks on a well-equipped enemy such as Pakistan, could be used to great effect against countries with less sophisticated defenses such as Sri Lanka and could be helpful in blockading or interdicting trade routes. India has the third largest long-range heavy airlift capability in the world and is developing its air-to-air refueling capabilities. It is rapidly expanding the size of its airborne units and setting up a rapid deployment force. India has also developed an IRBM and has exploded a nuclear device.

India has shown increasing willingness to intervene in its neighbors' affairs. In 1987 India sent a peacekeeping force to Sri Lanka after the Tamils revolted and in 1988 landed troops to prevent a coup in the Maldives. Indian troops were rumored to be on alert to intervene in Mauritius if that country's prime minister were assassinated.

Naval War College Review, Vol. 45 [1992], No. 2, Art. 11

India's carrier program is based on a CTOL capable carrier and is advancing steadily. The new carriers will increase the capability of the Indian Navy both to defend India's sea lanes and to project power. It remains to be seen how India will use this new capability.

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The author replies:

Sir,

Mr. Fitzpatrick expresses some very interesting viewpoints in his critique of my article, even though a few of them are debatable in my opinion.

The article in question, written when I was a student at the Naval War College in 1989-90, was meant to be an academic exploration of the Indian Navy's (IN) options in the area of aircraft carrier design and acquisition. I was not then, nor am I now, privy to the IN ship construction plans, and therefore I yield to Mr. Fitzpatrick's erudite foray. However, with my feet now firmly on the flight deck of a carrier, I would venture to suggest that the writer could well be off the mark in his prognostications about India's choice of a new aircraft-carrying ship and its means of propulsion.

I neitber dismissed the possibility of Soviet aircraft for use on a new Indian carrier nor scoffed at the abilities of the Flanker and the Fulcrum 'per se.' I was merely expressing some reservations (in 1989) whether the IN would be wise to plump for the radically different and trail-blazing route in carrier aviation that the Soviets had selected for themselves (perhaps as a Hobson's Choice). My actual words, in fact, were, "If the operational deployment of the MiG-29 and Su-27 from a ski-jump ship becomes a proven and viable proposition, the acquisition of these aircraft could be considered for the IN. . . ."

Two years on, my scepticism has not vanished entirely because no matter how successful the *Kuznetsov* and her ilk, the ski-jump/CTOL combination will remain a compromise at best: it can surpass neither the catapult/CTOL combination in performance nor the ski-jump/VSTOL synergy in flexibility.

A VSTOL aircraft can get airborne on jet lift at any speed (from zero upward) and manoeuver using its reaction nozzles. A CTOL machine, on the other hand, gets airborne only when it attains flying speed and its aerodynamic controls can work effectively. All that a ski-jump does is induce the aircraft into a ballistic trajectory that gives it extra height (and reaction time) on exiting from the deck. Denied the impetus of a catapult, the CTOL machine must get adequate deck run to accelerate to flying speed, and a six-degree ski-jump is unlikely to reduce this significantly. *Jane's All the World's Aircraft (1986-87)* tells me that the minimum takeoff runs of the Hornet, Tomcat, Hawkeye, and Intruder are 1,400,

1,400, 2,000 and 3,890 feet respectively. While it may appear theoretically possible to launch all these aircraft at full gross weight from a carrier's deck (maximum available run under 1,000 feet), I do not expect to see any catapults being replaced by ski-jumps in the U.S.N. in a hurry. Any aircraft which uses up to half to two-thirds of the carrier's length for a deck launch is going to impose drastic constraints on many of the ship's other options for recovery, deck parking, and helicopter operations.

Apropos the LCA, one has to understand two hard facts that underpin India's defence planning and acquisitions. One is the endemic shortage of foreign exchange, which tends to discourage strongly the consideration of imported weapon systems. The other is a deep-rooted and historical urge to be autonomous and self-reliant in all fields of technology, especially those which are defence related. Should the LCA come to fruition, there will be inexorable pressure on the armed forces to accept this aircraft, to replace or even just supplement other machines in service. Apart from other considerations, the armed forces may find this an attractive proposition because of larger numbers available as well as better spares availability and product support. And who knows, the LCA may turn out a winner!

In conclusion, I wish Mr. Fitzpatrick had resisted the temptation (common to so many biased commentators) to impute sinister designs and ulterior motives where none exist. I refer to India's despatch of her armed forces to Sri Lanka and Maldives in response to specific requests by these nations. To use a familiar parable: our neighbour's houses were on fire and we lent them our large garden hose. The fires are out and the garden hose is back where it belongs. So why the consternation in Peoria?

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INS *Viraat*

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