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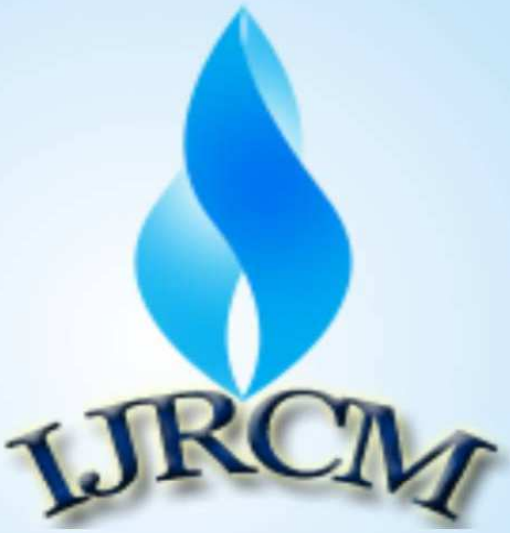

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RESEARCH METHODOLOGY

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FINDINGS

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- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

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- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

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WEBSITES

- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

M-MRCA FIGHTER COMPETITION: INDIA'S ROAD IN SELECTING THE BEST IN ITS DEFENCE BUSINESS

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DEPARTMENT OF STUDIES IN MANAGEMENT
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CHAMARAJANAGAR

ABSTRACT

Eagle in the sky hunt the creatures of the ground, likewise aerial strikes in the battle field is the modern type of war fare the world witnessed in the recent era. The capacity of the aerial strikes makes the nation more powerful and helps the ground forces and the naval forces protect from the enemy attack, but the capacity of building the air ships are the toughest job. Hence procurement of the air ships may ease them; hence India has also put its step forward to purchase the air ships in a large quantity in the name of "Mother of all Defence Deal", the deal which has not yet done by any other nation.

KEYWORDS
M-MRCA, defence business.

INTRODUCTION

The air superiority in the war fare is the most important in any battle and importantly no one can touch you at the time of fight except by hostile interceptor fighter jet. Hence the roles of the fighter jet are extremely important. Even we can recollect the memory of the incident of the battle of longewalla when an Indian fighter jets attached the Pakistani armoured vehicle and tanks and destroyed them in mass. Every stronger nation has this tactics of having the fighter jets but few can produce these fighter jets and sell it according to the diplomatic relation which the nation possess with the other nation. India is also one of the nations with other nation which had maintained the fighter aircraft for its defence. But the biggest problem of our air defence is that still we have not successfully built a multirole fighter jets. But having a good diplomatic bilateral relationship with Russia we have engaged in purchasing the fighter jets so far. At present Most of the IAF's 797 fighter jets are of soviet/Russian origin. These include the Mikoyan-gurevich MiG -21, MiG-27, MiG-29 as well as the Sukhoi Su-30MKI. Added to these, the Indian indigenous HAL Tejas (LCA), Anglo-French SEPECAT Jaguar and French Mirage 2000 aircraft, produced under license. But since the fighter jets has a life cycle of specific period it has to be decommission from the role which it had played and an upgraded modern fighter jet has to take place of the previous one. Hence now India is looking for the purchase of the aircrafts.

The Defence Ministry has allocated ₹ 62,000 crores for the purchase of these aircraft, making it India's single largest defence deal. This MRCA was greatly called as the "mother of all defence deal" in world. The MRCA tender was floated with the idea of filling the gap between its future Light Combat Aircraft and its in-service Su-30MKIs air superiority fighter. The contest featured six fighter aircraft: Boeing F/A-18E/F Super Hornet, Dassault Rafale, Eurofighter Typhoon, Lockheed Martin F-16 Fighting Falcon, Mikoyan MiG-35, and Saab JAS 39 Gripen.

REASONS FOR CALLING THIS BIGGEST DEAL

1. REPLACE THE AGING MIG 21

In 1961, the Indian Air Force (IAF) opted to purchase the MiG-21 over several other Western competitors because the Soviet Union offered India full transfer of technology and rights for local assembly. In 1964, the MiG-21 became the first supersonic fighter jet to enter service with the IAF. Due to limited induction numbers and lack of pilot training, the IAF MiG-21 played a limited role in the Indo-Pakistani War of 1965. However, the IAF gained valuable experience while operating the MiG-21 for defensive sorties during the war. The positive feedback from IAF pilots during the 1965 war prompted India to place more orders for the fighter jet and also invest heavily in building the MiG-21's maintenance infrastructure and pilot training programs. By 1969, India had acquired more than 120 MiG-21s from the Soviet Union. On 29 February 2012 it was reported that India will phase out MIG-21s from 2014. Hence the decision of decommission of the MiG-21 has brought a gap in the run way of the air defence to determine which fighter jets would take place.

2. TEJAS DELAYED

The IAF planned to replace the MiG-21 fleet with the indigenously-built HAL Tejas (LCA) aircraft. Planned dates for the Tejas to enter service could not be met due to developmental delays and U.S. sanctions following the Pokhran II nuclear tests; these blocked the development of the FBW Flight Control System and the delivery of GE F404 engines — both crucial components of the aircraft. This meant that the IAF would have to take other steps to stem the decline in numbers. The Tejas first flew on 4 January 2001. Final tests were done in January 2011 and it is to enter operational service by 2013.

Hence to fill these gaps IAF projected a requirement for about 126 aircraft in 2001. Since there is a fall down in the strength of the Indian squadron from 45 to 39. There is an option for an additional 74 aircraft. Initial requirements appeared to be for a 20-ton class fighter aircraft with the Mirage 2000 as the strongest contender. However, the 20-ton MTOW limit requirement has reportedly been removed. Also, considering the delays in the bidding, it is very likely that the LCA would be ready for induction by then. The IAF then would require replacements for its frontline strike aircraft like the MiG-27 and Jaguar, which would be retiring by 2015.

India's future 5th –generation aircraft, namely, the Russo-Indian Sukhoi/HALFGFA and the indigenous Medium Combat Aircraft will not be ready before 2015. Thus, the MRCA tender is more likely to be a medium-weight aircraft (MTOW of 24 tons). This has led to a renaming of the competition as the Medium Multi-Role Combat Aircraft (MMRCA) tender.

CONTENDERS FOR THE MRCA

Six aircraft were bid for the order – the Swedish Saab Gripen, Eurofighter Typhoon, French Dassault Rafale, Russian Mikoyan MiG-35, and the American F-16IN and F/A-18IN Super Hornet ("IN" are the proposed Indian versions). Previously, Mikoyan and Dassault have been regular suppliers of aircraft for the Indian Air Force and in terms of transfers of technology, licensed production in India, personnel training, supply of spare parts, maintenance and upgrading. IAF pilots and technicians are familiar with earlier aircraft from those two aircraft manufacturers, and would need minimal retraining. Infrastructural and logistical support for maintenance and spares would also be easier for these aircraft compared to the unfamiliar Gripen, Typhoon, F-16 and F/A-18.

1. **EUROFIGHTER TYPHOON**

The Eurofighter Typhoon is a twin-engine multi-role canard-delta air superiority fighter Aircraft, designed and built by a consortium of European aerospace manufacturers through Eurofighter GmbH. Eurofighter is offering the Tranche-3 Typhoon for the Indian requirement, equipped with the CAESAR AESA radar. EADS has invited India to become a partner of the Eurofighter Typhoon programme if the Typhoon wins the contract, and will be given technological and development participation in future tranches of the Typhoon. Bernhard Gerwert, CEO of EADS Defence Department, elaborated that if India becomes the fifth partner of the Eurofighter programme, it will be able to manufacture assemblies for new Eurofighters.

In January 2010, EADS offered to include thrust vectoring nozzles (TVNs) with the Typhoon's Ej200 engines for India. Thrust vectoring will improve operational capabilities, and reduce fuel burn by up to 5% and increase thrust while supersonic cruising by 7%.

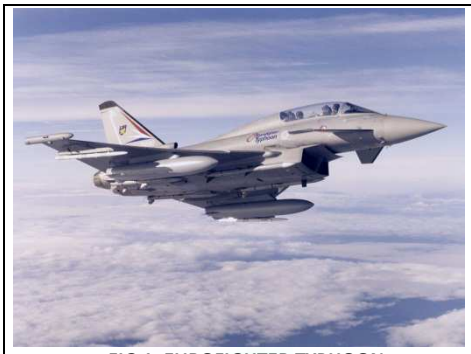

FIG 1: EUROFIGHTER TYPHOON

2. **DASSAULT RAFALE**

The Dassault Rafale is a French twin-engine delta-wing agile multi-role fighter aircraft designed and built by Dassault Aviation. The Rafale was brought in as the replacement for the Mirage 2000-5 that was originally a competitor for the tender, after the production lines for the Mirage closed down, as well as the entry of much more advanced aircraft into the competition. The Rafale has the advantage of being logistically and operationally similar to the Mirage 2000, which the IAF already operates and used with great success during the Kargil War. This would require fewer changes in the existing infrastructure of the IAF, which in turn will reduce cost. Moreover, being 100% French also provided Dassault a distinct edge over its competitors on the issue of technology transfer. Dassault claims that the Rafale has an advantage over many of the competitors because it is not subject to International Traffic in Arms Regulation (ITAR) restrictions.

While not included in the MRCA requirement, the French fighter has more configurations of potential interest for the IAF: a carrier-based version (the Rafale M) and a capability for nuclear strategic strike. Both of these particular versions are in use in the French Armed Forces. The French government has cleared full technology transfer of the Rafale to India, including that of the RBE-AA AESA radar which will be integrated into the Rafale by 2010 and also the transfer of software source code, which will allow Indian scientists to re-programme radar or any sensitive equipment if needed. Without the software source code, the IAF would have to specify mission parameters to foreign manufacturers to enable configuration of their radar, seriously compromising security in the process. Dassault has also offered to fit the GTX-35VS Kaveri engine into the Rafale, which if chosen, would greatly improve commonality with the HAL Tejas that will enter service into the IAF by 2010. On 31 January 2012 Rafale was declared the winner of the MMRCA competition, beating Eurofighter Typhoon on cost.

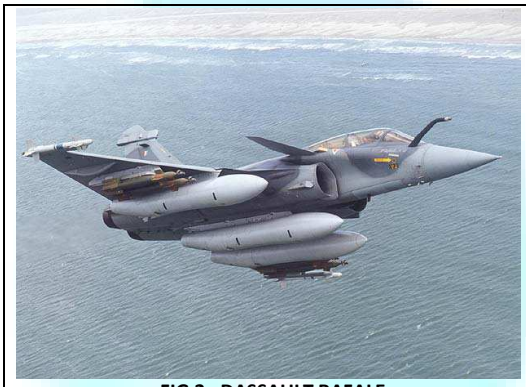

FIG 2: DASSAULT RAFALE

3. **BOEING F/A-18E/F SUPER HORNET**

The Boeing F/A-18E/F Super Hornet is a twin engine carrier based multirole fighter aircraft. The MMRCA contract represents a prime opportunity for U.S. defence companies to gain a foothold in the Indian defence market, which is estimated to be about US$100 billion in the next 10 years. Initially, the Request for Information (RFI) was not issued to Boeing, which decided to field the Super Hornet. The U.S. Government allowed Boeing to participate in the RFI, and later gave permission for RFP (Request for Proposal) as well. However, any sale of aircraft would have to be approved by the U.S. congress. Initial reactions within the IAF were enthusiastic, although there were apprehensions of support issues in case of future sanctions. The US stated that there would have been some restrictions and pre-conditions for the purchase of the aircraft.

On 24 April 2008, Boeing (through the U.S. Embassy in New Delhi) submitted their 7000-page proposal to the Ministry of Defence, before the 28 April deadline for the submission for proposals. The Super Hornet variant being offered to India, the F/A-18IN, is based on the F/A-18E/F model flown by the U.S. Navy and currently being built for the Royal Australian Air Force (RAAF). Raytheon's APG-79 AESA radar was offered on the aircraft. There would have been limited Transfer of Technology on the radar, up to the level approved by the US Government. However, Raytheon stated that the level of TOT offered would be compliant with the RFP requirements. Delivery of the first F/A-18IN Super Hornets could have begun approximately 36 months after contract award.

Boeing proposed joint manufacture of the jets with Indian partners. It also planned to offset the cost by setting up a US$100 million maintenance and training hub in Nagpur. This is the first time the Super Hornet has been offered for production in a foreign country. On 14 February 2008, Boeing and Tata Industries agreed to form a joint-venture company. The new entity formed in February 2008, will supply components for Boeing military aircraft, including the Super Hornet. In order to satisfy its offset requirements, Boeing has signed long-term partnership agreements with Hindustan Aeronautics Limited (HAL), Tata industries, and Larsen and toubro.

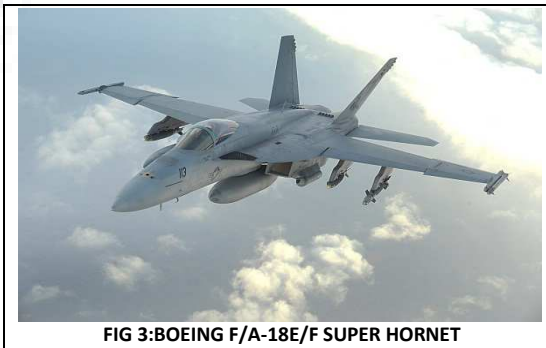

FIG 3:BOEING F/A-18E/F SUPER HORNET

4. **LOCKHEED MARTIN F-16IN SUPER VIPER (F-16 BLOCK 60)**

India initially sent the RFI for F-16C/D Block 52+ configuration aircraft. On 17 January 2008, Lockheed Martin offered a customized version of the F-16, the **F-16IN Super Viper** for the Indian MMRCA contract. The F-16IN, which is similar to the F-16 Block 60, will be a 4.5 generation aircraft. Lockheed Martin has stated that it will be the most advanced F-16 variant developed. It will be more advanced than the F-16 Block 52s that the Pakistan Air Force has acquired.

Lockheed Martin described the F-16IN as "the most advanced and capable F-16 ever." Based closely on the F-16E/F Block 60 as supplied to the UAE, the features on the F-16IN include:

- Conformal Fuel Tanks (CFTs) – This will give the F-16IN a combat range of 1700 km with 1500 kg weapons load.
- Northrop Grumman AN/APG-80 AESA (active electronically scanned array) radar. This is the same radar in service on the F-16 Block 60s in service in UAE.
- General Electric F110-132A engine with 143 kN full reheat thrust with FADEC Controls.
- Electronic warfare suites and infra-red searching.
- Advanced all-colour glass cockpit.
- Helmet-mounted cueing system.

Lockheed Martin offered to sell India the F-35 Lightning II aircraft in the future, as replacements, if the F-16 was chosen. The capabilities of the F-16 appear to be similar to the Mirage 2000s that the IAF currently operates. The F-16 is also more prone to pilot errors than the Mirage 2000H, which would also work against the F-16.

FIG 4: LOCKHEED MARTIN F-16IN SUPER VIPER

5. MIKOYAN MIG-35

The **Mikoyan MiG-35** is the production version of the latest MiG-29 and incorporates mature development of the MiG-29M/M2 and MiG-29K/KUB technology, such as glass cockpit and fly-by-wire technology. The IAF already operates MiG-29s, and the Navy has ordered MiG-29K/KUBs for its INS Vikramaditya (formerly Admiral Gorshkov) and INS vikrant-class aircraft carriers.

Since the IAF already has maintenance and upgrade facilities for the MiG-29, this would mean that the fighter could be brought into service with a minimum of expenditure on infrastructure. A major advantage of MiG-35 is that Russia is committed to transfer the plane's technology, including the new advanced Zhuk radar-AE Active Electronically scanned Array radar, to India. In the past, Russia has provided customised versions of military equipment such as the Su-30MKI and continued to provide support for equipment during international sanctions. However, Russian product support, especially for the MiG-29 fleet has been inadequate. Additionally, buying the MiG-35 would mean an almost total dependence on a single supplier for India's entire fighter fleet. Recent Russian demands for renegotiation of earlier contracts, the sale of RD-93 engines (a variant of the KLimov RD-33 that powers the Indian MiG-29s) to Pakistan for its JF-17 Thunder aircraft and concurrently supplying combact aircraft to China has also caused concern in New Delhi.

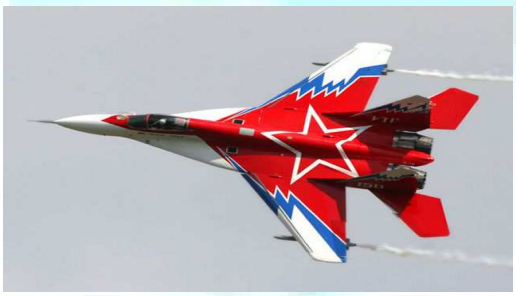

FIG 5: MIKOYAN MIG-35

6. SAAB GRIPEN NG

The **Saab JAS 39 Gripen** is a fighter aircraft manufactured by the Swedish aerospace company Saab. The aircraft is in service with the Swedish, Czech, Hungarian, and the South African air forces. The Royal Thai Air force has also received the aircraft. The Gripen was one of the aircraft that the IAF sent the Request for Information. The Gripen participated at Aero India 2007, where one JAS 39C (single seater) and two JAS 39D (two-seater) variants were brought. Gripen International offered the Gripen IN, a version of the Gripen NG (Next Generation) for India's competition. The Gripen NG has increased fuel capacity, more powerful powerplant, higher payload, upgraded avionics and other improvements.

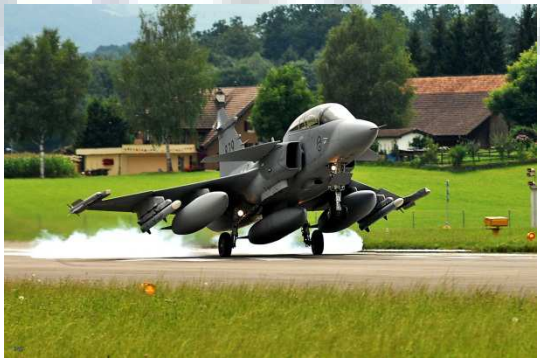

FIG 6: SAAB GRIPEN NG

COMPARISON OF THE AIRCRAFT

Aircraft:	Dassault Rafale	Eurofighter Typhoon	F-16 Super viper	F/A-18E/F super Hornet	JAS 39	MiG-35 Fulcrum
Country of origin:	**France**	**German, Italy, Spain, UK**	**United states**	**United states**	**Sweden**	**Russia**
Manufacturer:	**Dassault aviation**	**Eurofighter Gmbh**	**Lockheed Martin**	**Boeing Defence space and security**	**Saab**	**RAC-MiG**
Length:	15.27 m (50.1 ft)	15.96 m (52 ft 5 in)	15.03 m (49 ft 3 in)	18.31 m (60 ft 1¼ in)	14.1 m (46 ft 3 in)	17.3 m (56 ft 9 in)
Wingspan	10.80 m (35.4 ft)	10.95 m (35 ft 11 in)	10.0 m (32 ft 8 in)	13.62 m (44 ft 8½ in)	8.4 m (27 ft 7 in)	12 m (39 ft 4 in)
Height:	5.34 m (17.4 ft)	5.28 m (17 ft 4 in)	5.09 m (16 ft 7 in)	4.88 m (16 ft)	4.5 m (14 ft 9 in)	4.7 m (15 ft 5 in)
Wing area:	45.7 m² (492 ft²)	50.0 m² (538 ft²)	27.9 m² (300 ft²)	46.5 m² (500 ft²)	30.0 m² (323 ft²)	38.0 m² (409 ft²)
Empty weight:	9,500 kg (20,940 lb)	11,000 kg (24,250 lb)	9,979 kg (22,000 lb)	14,552 kg (32,081 lb)	7,100 kg (15,650 lb)	11,000 kg (24,280 lb)
Maximum payload:	9,500 kg (21,000 lb)	7,500 kg (16,500 lb)	7,800 kg (17,200 lb)	8,050 kg (17,750 lb)	5,300 kg (15,880 lb)	6,500 kg (15,400 lb)
Maximum Takeoff Weight (MTOW):	24,500 kg (54,000 lb)	23,500 kg (51,800 lb)	21,800 kg (48,000 lb)	29,937 kg (66,000 lb)	14,300 kg (36,400 lb)	29,000 kg (65,076 lb)
Powerplant:	2× SNECMA M88-2	2×EUROJET EJ200	1×GE F110-132	2×GE F414-400	1×GE F414G	2×KLIMOV RD-33MK
Thrust: • Dry thrust:	50 kN each (11,250 lbf)	60 kN each (13,500 lbf)	84 kN (19,000 lbf)	62kN each (14,000 lbf)	62.3 kN (14,000 lbf)	53 kN each (11,900 lbf)
• Afterburner thrust:	75 kN each (17,000 lbf)	90 kN each (20,250 lbf)	144 kN (32,500 lbf)	98 kN each (22,000 lbf)	98 kN (22,000 lbf)	88kN each (19,840 lbf)
Fuel: • Internal • External	4,700 kg 7,500 kg	4,996 kg	3,265 kg 5,880 kg	F/A-18E: 6,780 kg, 5 tanks, total 7,381 kg	3,360 kg 3,800 kg	4,800 kg
External stations:**	14 (5 'wet')	13 (3 'wet')	11 (3 'wet')	11 (5 'wet')	10 (4 'wet')	9 (3 'wet')
Maximum speed: • At sea level	Mach 1.8+ (Supercruise: Mach 1+)	Mach 2.0+ (Supercruise: Mach 1.2)	Mach 2.05 800 KCAS	Mach 1.8	Mach 2.0+ (Supercruise: Mach 1.2)	Mach 2.25 Mach 1.2
Ferry range: • Unrefueled: • Extl. tanks	3,700+ km	3,790 km	4,220 km	3,054 km	2,500 km 4,075 km	2,000 km 3,000 km with 3 drop tanks
Combat radius:	1,800 km	1,390 km on air defence with 10-min loiter	550 km on a hi-lo-hi mission with six 1,000 lb (450 kg) bombs	722 km	1300 km with six AAMs + drop tanks, and 30 min on station	1000 km
Service ceiling:	17,000 m (56,000 ft)	19,812 m (65,000 ft)	18,000 m (60,000 ft)	15,000 m (50,000 ft)	15,240 m (56,000 ft)	17,500 m (57,400 ft)
Rate of climb:	305 m/s (60,000 ft/min)	315 m/s (62,000 ft/min)	254 m/s (50,000 ft/min)	228 m/s (44,882 ft/min)	N/A	330 m/s (65,000 ft/min)
Thrust/weight:	1.13	1.18	1.1	0.93	1.18	1.1
Thrust vectoring:	None	Thrust Vector upgrade has been offered	None	None	None	May be fitted with thrust vectoring
Runway needed:	400 metres (1,300 ft)	700 metres (2,300 ft)				
Unit cost:	US$84.48 million €64 million	US$108 million €80 million as of 2009	US$50 million	US$55 million as of 2011	US$48 million	US$38.5 million

Source: http://en.wikipedia.org/wiki/Indian_MRCA_competition

SHORTLISTING AND SELECTION OF THE AIRCRAFT

Recently two aircraft was shortlisted, they are **Eurofighter Typhoon** and **Dassault Rafale.** But the mother of India's defence deals, the Rs 62,000-crore contract for the medium multi-role combat aircraft (MMRCA) Rafale that was won by the French company Dassault Aviation, may become a bag of woes for the UPA government. Rafale bagged the deal because its competitor, Eurofighter Typhoon, was more expensive. The French jet was declared as L-1, the lowest bid, after the evaluation of the commercial bids made by the different companies. But highly placed sources said two senior officials of the defence ministry have questioned the methods adopted by the contract negotiation committee which concluded that Rafale was the lowest bidder. The two officials - additional financial advisor and a joint secretary in the ministry Prem Kumar Kataria, and finance manager (air) R.K. Arora - are members of the negotiation committee that comprises senior ministry officials and Indian Air Force (IAF) officers. The two officials noted that certain assumptions had been made about Rafale's bid to declare it as the lowest bidder, but no one had validated it. The officials initially refused to sign the minutes of the committee. They later signed after making their reservations known.

The defence ministry announced a formal request for proposal in 2007. First, the submitted proposals were technically evaluated to check for compliance with IAF's operational requirements. Then extensive field trials were conducted. Finally, the shortlisted vendors' commercial proposals were examined and compared. According to sources, while evaluating the commercial bids, a new system was followed that not only took into account the unit prices but also calculated the 'life cycle costs' - which takes into account the cost of maintenance and spares for the period, estimated at 40 years, the aircraft would remain operational.

CONCLUSION

Where there is a threat there will be an inner born defence, even the smallest country like Israel which is surrounded by the hostile nation, has established its own powerful defence. Hence India is also surrounded by the hostile nations like Pakistan and china and it is very necessary to look for the greater defence for its survival in the future and hence India is developing in all fields of land, water and air. The air is the one which India is deficient in and it has been recorded that the decrease in the squadron. And when it cannot produce its own jets then it has to purchase from the other nation. Hence the concept of bidding was brought and proved at one end that it can attract the world towards it and also can avoid purchasing from only one vendor.

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