



## Rivals from the same team



## Mirage 2000 vs MiG-29

**A**lmost exactly 20 years ago in *Vayu's* Issue III/1989 was a special article on the Mirage 2000 and MiG-29 in service with the Indian Air Force at that time. With the political and strategic scenario obtaining then, it was well nigh hard to even imagine that within a year, the Soviet Union would disintegrate, the United States would 'abandon' Afghanistan to the Mujahideen, Pakistan would assume virtual 'overlordship' of south-eastern Afghanistan as its 'strategic depth', and India's traditional 'dependence' for the bulk of its aircraft and heavy weaponry from Russia would face turbulence.

A year earlier, in mid-1988 Air Headquarters had directed that an exercise be conducted, verily a direct face off between the principal new air superiority fighters recently inducted by the IAF: the Dassault Mirage 2000 and MiG-29 (coded 'Fulcrum' by NATO). Excerpts from that article:

*The Mirage 2000 and MiG-29 are bidding fair to repeat the operational advantages (and export successes) of the first generation Mach 2-class fighters of the French and Soviet aircraft industries, natural successors of the Mirage III and MiG-21 fighters, types which has been the backbone of scores of Air Forces throughout the world for over two decades, apart from being the most numerous type in service with the French and Soviet air arms themselves.*

*The background and compulsions that led to the selection and induction of the Mirage 2000 into Indian Air Force service are well documented (see *Vayu Aerospace Review* Nos. III and IV of 1988) and certainly were directly related to the acquisition of F-16s by the Pakistan Air Force. Both air arms today have similar numbers of F-16s and Mirage 2000s in their front line inventory but whereas the Pakistani resolution on expansion of their F-16 force is made abundantly clear, the Indian planning for any such expansion of the Mirage 2000 force is governed by twin factors of resource-constraint and the alternative route of going in for a larger MiG-29 force.*

*Indian interest in the Mikoyan-bureau's latest fighter type was fuelled after two IAF test pilots flew the advanced Soviet aircraft on an evaluation visit in February 1984. The enigmatic fighter flew brilliantly and its remarkable handling qualities, first recorded by the IAF, were some years later to be publicly demonstrated at the Farnborough Air Show debut in September 1988. An initial batch of 50-odd MiG-29Bs and UBs was contracted for even as the first lot of 40 (augmented by another 9) Mirage 2000s, for the IAF was being readied for delivery in France.*

*Thus the grounds (or skies ?) were being cleared for the two contemporary, rival, fighter aircraft-types to serve with the same air arm, the IAF's Nos. 1 and 7 Squadrons equipped with the Mirage 2000H, while Nos. 28 and 47 Squadrons equipped*



Mirage 2000 (photo: Wg Cdr RS Chauhan)

with the MiG-29B between the years 1985-87. The Mirage 2000 has air defence as its primary function with a useful, secondary, ground attack role while the MiG-29 is deployed almost exclusively for air defence, with somewhat limited ground-attack attributes. It must however, be recorded that, following the evolutionary pattern of earlier Soviet fighter aircraft designs exemplified by the MiG-21, it is most likely that the Mikoyan OKB team will most certainly have active development plans to exploit the advantages of the basic MiG-29 design, making the type a more versatile weapons-system.

The Indian Air Force must, perforce, select one of these two superb combat aircraft types to be its mainstay of the future. Some twenty-odd squadrons of MiG-21s are to be re-equipped in the decade of the 1990s and even as the indigenous Light Combat Aircraft (LCA) programme is progressed, a substantial increase in either the Mirage 2000 or MiG-29 force is foreseen, not just to bridge the gap when early-model MiG-21s are replaced but to cater for the contingency of extended delays in squadron deliveries of the LCA.

In the event, neither the Mirage 2000 nor MiG-29 were to be ordered in quantity for the IAF. In 1994, the much heavier Sukhoi Su-30 was vigorously and politically promoted by the new regime in Moscow and was soon enough to adorn IAF roundels in June 1997 (see *Vayu* Issue IV/1997). In steady incrementals, this type is being received by the IAF in large numbers, with 230 ordered.

However, harking back to the professional exercise pitting the Mirage 2000 against the MiG-29 in 1988 is the following fascinating account by Air Marshal (Retd) Harish Masand, then Wing Commander and CO of No.28 Squadron ('First Supersonics') who led his team against the rivals, No.1 Squadron ('Tigers') led by Wing Commander Padamjit Singh Ahluwalia (later Air Marshal, now retired):

Running through my papers in an attempt to organise my retired life, which now essentially revolves around the golf course or the study room so that I could start punching the keyboard instead of the buttons in the cockpit, I came across my log books the other day. As any die-hard fighter pilot would vouch for, log books can't just be put down without at least a bit of reminiscing on the good old times, remembering the freedom of the skies and chasing dream-clouds, not just like a breath of fresh air but 100 per cent oxygen. What caught my eye that day was the entry starting 30 March 1988 of Exercise *Lightning*. Even after two decades, the memory of those two weeks, till the middle of April, when we fooled around with the Mirage 2000s with our mint-fresh MiG-29s, is still vivid in my mind and took me back nostalgically to those days with the smell of jet fuel instead of cologne, the sweat on your overalls, even if you changed one everyday and wore a fresh one, and of course the quiet roar of the jets despite the air-conditioning and sealing of the 29 cockpit muffling the sound of the powerful R-33Ds.



MiG-29 (photo: Wg Cdr RS Chauhan)

The exercise was conducted to evaluate the new MiG-29s, received in Poona in June 1987 but formally inducted in the IAF in December, against the Mirage 2000s, the best that the IAF had till then for over four years. While most of the 29 jockeys barely had a 100 hours on type, one could not but feel the excitement of testing the machine, the individual skills and the newly developed tactics against the veterans on the Mirages. I could feel this excitement amongst even the youngest and inexperienced pilots even though they were going to face the far more experienced Mirage pilots, all of them handpicked for the first and many subsequent lots, most of them on the fleet for over 4 years and most with 500 hours plus on the type. Of course, one had also heard of how the Mirages had conducted a similar exercise against the MiG-23MFs earlier in Adampur soon after the induction of the Mirages, whipped the veterans on the 23s and come home with a lot of gunshots against the ill-matched swing-wings. All the same, although we were relatively inexperienced, we were looking forward to the exciting and interesting two weeks ahead of us. In addition, in a couple of weeks after that exercise, our No. 28 Squadron was celebrating its silver jubilee as the 'First Supersonics' and some of our attention had to go towards organisation of the events and preparations to tap into some professional and personal memories of the old-timers who were attending the function, including the then Chief, Polly Mehra, retired Air Marshal Mally Wollen and many other ex-COs and members of the 'First Supersonics'. As it happened, after Exercise Lightning, we had our own tales to tell too.

Before I describe the events, I think it would be essential to put down the background in little more in detail to set the

narrative in perspective. The trials were to be conducted in a Top Secret manner under the overall control and supervision of then Group Captain Jeff D'Souza, who was the Chief Operations Officer or COO of Air Force Station, Poona at that time. Jeff was a very qualified and capable officer having been on the staff of TACDE after winning the sword of honour in the tenth FCL course. On top of his impressive professional credentials, he was soft-spoken, mature and a truly likeable gentleman without any airs due to which reasons, as I remember, he commanded tremendous respect from all of us in the base as well as within the entire Air Force. The AOC, Air Commodore IS Bindra, had left the whole exercise to Jeff totally and was hardly ever seen for the brief/debriefs for the exercise. Jeff had made it quite clear at the start itself that ego and one-upmanship were taboo for the exercise and, while each specifically designed missions would be flown realistically to the limits of the aircraft, the rules of engagement and flight safety considerations were not to be violated. Also, considering the sensitive nature of the exercise and the information gathered, single copies of the mission reports after debrief would be generated by the nominated agency from either side, to be collated and forwarded to HQ personally by him. As a result, no performance figures or reports on the tactics were retained by the squadrons, at least on the MiG-29 side. Due to this reason, as well as the fact that the information may still be sensitive, I hope the reader will understand the lack of any data or solid figures in this article. I only want to highlight the experience, some of the good times we had and the fun side of things in these two weeks.

I was leading the team from the 29s while 'Pudding' Ahluwalia, then commanding No.1 Squadron, 'The Tigers', brought and led the Mirage Team from Gwalior. The first thing that struck anyone that saw the MiG-29 and Mirage 2000 parked side by side in Poona was the finish and polish, as it had struck me in October 1987 when Joe Bakshi's Mirages and our 29s were parked together in Hindon for the Air Force Day display over Palam. More than the sheer difference in size between the two aircraft were the clean lines and finish of the 2000 compared to the brutish rough finish and slightly wavy surfaces of the 29. While the finish on the 29 was much better than the earlier MiG-23 or MiG-21, it was still nowhere close to the aerodynamically and aesthetically soothing finish of the 2000. Right from the first day of the exercise, therefore, I had started calling this a fight between the beauty and the beast and called the Mirage 2000 and their pilots 'Delicate Darlings', or DDs for short, a name that I had coined earlier in Hindon. The size difference between Pudding and me was exactly the reverse of the aircraft and I do not think Pudding ever appreciated being called a DD, particularly by me. When I had earlier used the term on Joe in jest at Hindon, he had merely laughed at it and, being the sport he was, even stood me a beer for thinking of such a term on a relatively quiet evening.

Air HQ had also detailed three umpires from TACDE and accordingly, 'Vicky' Chopra, 'Damu' Damodran and 'Joe' Bakshi from that hallowed institution were with us for the entire duration, flying with us in the rear cockpits of trainer aircraft from both sides to ensure there was no fudging or exceeding the limits of the aircraft as well as safety of the missions while also making for some lighter moments in the debriefs and for the entire duration of the exercise. Joe was known for his limericks and jokes, apart from his flying skills, and mid-way through the exercise, he coined a poem on the whole scene in a lighter vein and another at the end, scribbling away in the last row, as I saw him in the debriefs. I found these two poems to be quite funny and put the originals

in the No.28 Squadron Diary. To make for a better perspective, I have placed the transcripts of these two poems at the end of this rumination.

The first few trips were planned as individual performance trials with one trainer from each side flying together and synchronously carrying out the briefed manoeuvres starting at low-levels to check the timings and compare the performance. I had 'Doc' Vaidya, then commanding No.7 Squadron on Mirages,

### COUNT DOWN AT LOHEGAON

We are back to the days of the great Wild West.  
A quick draw between the Vajra and the Baaz as to the best.  
Hired hands, gunfighters of the opposing forces, met at the bar.  
And after two large, started shooting shit lagataar.  
Baaz sheriff Harry was all dressed in black,  
Vajra counterpart was heard saying; see you in the air mac,  
The rest of the boys were ready to slap leather,  
Boothill is gonna be full if there is good weather.  
AHQ marshals have come to stage this fight,  
Joe, Vicky and Damo have said no bushwacking at night.  
Stick to rules of the game if you figure to pass,  
If caught breaking them, Governor (COO) will take your ass.  
Four lancers are taking part in this caper,  
With typists warming fingers to get reports on papers,  
Boys from Archer and Supersonic bunch will fight side by side (for a change),  
Against Battle Axes and Tiger bunch to get on each others hide.  
So boys enjoy yourselves have a good time on town,  
No chasing sleeping pussies identified in night gowns,  
Briefing, debriefing to be done bit by bit,  
Or rest assumed, you'd land yourselves in shit.  
PS. Escorts listen to Baaz ki awaaz.  
**Old jungle saying, Uncle ( Joe) Walker, alias Phantom.**



flying with me for the first trip in the rear seat even though he was from the rival camp since the idea was also to familiarise each side with the handling qualities of the other aircraft. 'Pudding' had asked me earlier, right at the start if he could send a young pilot and an engineer to my squadron to study the manuals and the aircraft in greater detail, also by interacting with our people. Perhaps, his idea was to find some way of countering our tactics by understanding our systems better. Later, I was told that he was collecting performance figures for his own private report to his C-in-C or Air HQ. Whatever may have been the purpose, we did not dwell or worry about it since we were still from the same Air Force and the idea was to mutually learn and improve each other's tactics and skills! That is also the reason why 'Doc' Vaidya, who became a dear friend over the years, found a place in the rear-seat of my 29 on the very first trip. I do not quite recall what he felt about the experience except for the words "wonderful" and "thank you". Perhaps, 'Doc' would write about the experience himself someday.

I only remember that the 29 outperformed the Mirage in every sphere from sustained rate of turn to climb and even in instantaneous rate of turn. This was as our side had expected, having earlier theoretically compared the performance figures for the two aircraft. The only doubt in our minds was about the performance of the fly-by-wire system which could reportedly produce optimum performance on the Mirage in any given set of conditions, albeit with an over-ride for the slightly enhanced performance for a short duration while we had to get the best out of the MiG-29 manually through conventional hydraulic controls. Due to this reason, I would have been quite content to see the initial instantaneous rate of turn on the Mirage to be better, at least for the first 90 to 180 degrees of the turn, till the induced drag of the delta platform and the lower thrust to weight ratio of the Mirage took over. However, I had been working on coordinated pressures on the control surfaces to generate even rapid manoeuvres, instead of large or even noticeable movements on the controls which had their own problems,

particularly at low-levels, for my displays on the 29 since August-September 1987 and, was very pleasantly surprised to see that this effort really paid off and even the instantaneous rate of turn was in our favor. In a turn towards the Mirage, I found we were crossing even 90 degrees before the Mirage. Also, I had noticed, while practicing for the displays, that the 29 accelerated even at 9g at low-levels if the power was ahead of the onset of g and, therefore, required a coordinated turn with power management to stay at the optimum speed and at the desired g. As a matter of fact, I used to brief (and show) my younger pilots that if you went up faster on the throttle than the onset of g, the aircraft would be on the higher side of the curve and would keep accelerating even at 9g. In that case, the options were only two, either reduce the power to get the speed back or pull more than 9g, the latter option being beyond the laid-down limits for the aircraft. The corollary was that, at the correct speed and with the correct technique, the 29 would keep turning at 9g at low-levels till either you conked off or till the gas ran out. I mean the gas had to run out either in you or the aircraft if you wanted to foolishly continue with such a manoeuvre for a prolonged duration. Such was the brute power of the two engines on the 29 and the thrust-weight ratio. Naturally, our rate of climb was also better. While range fuel consumptions were better for the Mirage due to the shape and the resultant profile drag apart from the weight and the single engine configuration, in combat situations, we ended up consuming almost the same fuel due to the fact that the 29 did not have to remain in the afterburner regime through out the engagement.

Pudding was naturally upset with this outcome and convinced Jeff to repeat the sortie. Jeff agreed since a couple of other parameters, particularly in initial and sustained rate of climb, had to be rechecked in any case. So next day in the green period, there we were, Pudding and I, with Vicky and Joe in the rear cockpits I think, to haul the aircraft around again and measure the figures. Quite naturally, the results were the same as before. During debrief, Pudding first started off with the proposition

that we were not comparing pilots but aircraft and, therefore, instead of me, somebody else should fly the 29. While I was quite happy to let even the youngest and most inexperienced pilot fly in other tactical exercises, such as 9g maneuvering and handling the aircraft to its limits at low-levels was something that one could not leave to a lesser qualified and less experienced pilot. I, therefore, opposed the suggestion and Jeff agreed with my view. In a "lighter" vein, I also made a counter-suggestion that, instead of Pudding, someone 40 kg lighter fly the Mirage which might improve its thrust-weight ratio and thus its performance! I am sure if Pudding had been wearing slippers at that time, I would have got them immediately but since he could not easily bend down and undo his flying boots, I got away with just glares. If only looks could kill! I also remarked that the Mirage could be flown by anybody since you merely demanded the best performance from the smart fly-by-wire system. Unfortunately, with a "dumb" flying control system in the 29, we needed rather smart pilots to fly it to its limits. Pudding let me off again, having known each other quite well since the early years of our flying in Hasimara/Bagdogra. Finally, it was decided by Jeff that we would do yet another trip for the instantaneous rate of turn, to be measured only through 90 degrees of turn. While we were leaving the briefing room, Joe just whispered "Dirty Harry getting dirty looks, Keep checking 6". As may be obvious from the foregoing, we were ahead even within 90 degrees while sustaining our speeds.

Later, we got into group combat and specific missions to try out the aircraft in their designated roles, where even the most inexperienced of our lot were given the opportunity to participate, some with less than 50 hours on type. From the tales I heard in and outside the briefing room, I know they all had a lot of fun while learning DACT with a capable and experienced adversary. While I do not wish to go into individual skills and claims in this area, it may not be difficult to guess these, being typical of die-hard fighter jocks. Suffice it to say that, in these exercises, our radar,IRST, HMSD and the voice information system really proved their worth and were put to good use.

Over the two weeks, I think we all had a great time and built a good bond between the two teams and the fleets, despite all the professional rivalry. In this regard, I particularly remember 'Fuzz' Moulik getting quite sentimental and emotional with his course-mates and friends from the other side, particularly 'Sexy' Saxena, I think, from the Mirage fleet. Those who know Fuzz will know what I am talking about. For those who do not know Fuzz well, Fuzz gets all emotional and sentimental over a couple of drinks with friends but, underlying it, one can see that he really means every word of affection and would do anything for a friend. Pudding and I remained friends, though rivals for a long time through our careers which took us on different routes. One of the young friends that I made from Mirages was Cheema, now flying for Jet Airways and we still play golf and share a drink whenever I am in Delhi and he is not on the roster for the next day. I got to know Cheema, then a Flt Lt, in very peculiar and rather funny circumstances that I must add as the concluding episode of *Ex Lightning*.

The exercise got over on 14 April and the next day the Mirages were to fly back to Gwalior. Having known Pudding for so long, I invited him along with Jeff and a few others

to dinner in the best place in town those days, the 'Blue Diamond'. The GM of Blue Diamond, Rajan Kelshikar and his wife Neelu, had become real close to Malini, my wife, and me through the induction days since they were taking care of the Russian Warranty Team and catered for most big events at the base and the VIPs visiting us. With Rajan being kind enough to include me for discounts in the hotel, I could afford to invite a fairly decent number to the hotel as their farewell dinner. After a few drinks, Pudding got a little sentimental and carried away affectionately calling me by the distorted pet name he had for me from Adampur days, 'Khappusky', a Russian variation of the pet name I had on Hunters in Hasimara, and said that he still could not accept that the Mirage did not out-perform the 29, at least in the instantaneous rate of turn. I tried to pacify him by saying things like that the Mirage was certainly a good-looking aircraft with some great qualities and systems and he should be happy that he got the beauty while I had the beast. Not being able to reconcile to going back in this manner, Pudding suggested that, before they ferried out the next morning, he and I should do a 1 vs 1 to prove who was the better pilot and which really was the better aircraft in front of all the people on the base right overhead. For this, we should take off in a spectacular manner; he would take off on Runway 10 while, simultaneously, I should take off reciprocal on 28, each in our lane on the same runway, do a roll of the top and from there engage in a 1 vs 1! Jeff was hearing this conversation with a wisp of a smile and winked at me to give me encouragement. I responded by asking Pudding which Air Force he was in and that, in any case, while he could maintain his lane on take-off on the 'DD' with its sophisticated inertial navigation system, I could barely keep the brute of a 29 on the entire runway with its two engines in full afterburner. In any case, they were supposed to ferry back quietly the next morning and the roar of three engines in full afterburner at one time would wake up even the dead and perhaps make the AOC, who was not particularly fond of me, wonder what on earth was going on, come out of his office and lynch me from the nearest tree. Why AOC Bindra was not fond of me and the good times we had together will make for another interesting story later perhaps. Pudding kept insisting on a fly-off before he left while I kept telling him to enjoy himself, his drinks and go home without such a shoot out. Jeff then told me to go ahead and take him on.

I then proposed that we take off with a break so that it sounds like two aircraft doing their own thing, perhaps an air test or something even like a take-off for ferry and time each aircraft from wheels roll. Each would then do a loop after take-off, a 360 degree turn and end with another loop, the whole sequence being timed from start to finish. The aircraft with the lesser timing would have proven its performance along with the skill of the pilots. A case of Black Label whisky was agreed as the prize. The time would be kept by Jeff with a time-keeper from each side. Flt Lt Cheema was nominated from the Mirage fleet while, I think, Late Rathan or/and young Sandeep Singh were sent from our side to the ATC.

Well, that is how I got to know Cheema well. I would not like to reveal the timings here but suffice it to say, the verdict

was clearly in favor of the 29. After the event, Pudding tried to argue that timing from wheels roll was unfair since we had two engines and he took off on a single one. Guess he wanted us to be foolhardy enough to fly the routine on a single engine to be even. Even from unstuck, the 29 was ahead by a vast margin for obvious reasons. AOC Bindra never found out, I guess, since he never asked me a question on this nor issued a warning. As far as I know, he did not question Jeff on this either. Pudding, before leaving, gave me the money for four bottles which we busted up in a fleet party on my birthday after a week on 23 April.

The Squadron is still waiting for the remaining eight bottles. I last reminded Pudding of the remaining debt a month before he retired as the AOC-in-C WAC. In the meantime, Cheema got into the bad books of Pudding as the messenger with bad timings.

I think it must be obvious that I enjoyed the 29 a lot, a little more than the Hunter on which also I have some very fond memories. With its superb aerodynamic qualities, light-n-easy control forces, the reserve of power and some great and rugged systems not seen in contemporary fighters, the 29 was like a multi-million dollar sports car which I enjoyed hauling around and exploring its limits. Certainly, the beast was a beauty to handle and never let me down. Nor should it let down anyone with a good head on his shoulders. Handled and serviced correctly, I think the 29 is one of the best fighting platforms in the world even today and should benefit by the upgrade in the IAF, if done right. I certainly wish the upgrade had come in my time, but better late than never.

*Air Marshal Harish Masand (Retd.)*

## ODE TO EXERCISE LIGHTNING

Ode to shooters & scooters or launcher & leavers  
Or fire and forget. Like the IAF you have a fire in  
your section and the fire section forget about it.  
All characters are fictitious & any resemblance  
to persons living or (dead, preferably) is highly  
(im)probable and the poet denies all knowledge of shit  
shooters.

"The days of airborne rambos are here,  
All defenders remember to kiss the ones dear,  
With 2 aces of Baaz, Vajra dying to kill,  
Now getting airborne is absolutely no thrill.

Wars are won mostly on paper,  
You can imagine the reports of this caper,  
With each force dying to grab some fame,  
Resulting in both sides making tall claims.

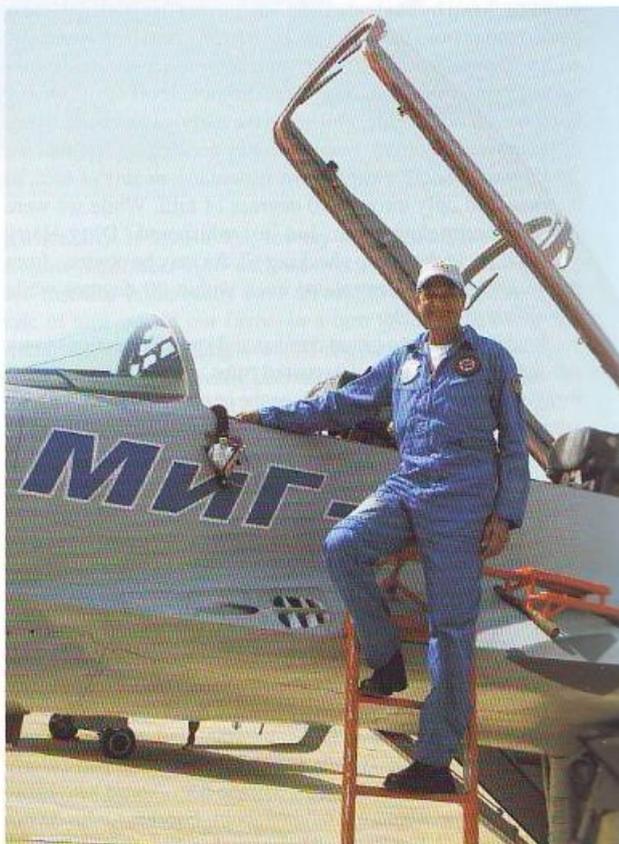
So listen you aces don't talk too big,  
Some aces from PAF will make you do a jig,  
It's for others the fleets to praise,  
Ain't you blokes ever heard of Modesty Blaise"?

**Joe Bakshi, April 1988**

## Deja Vu: IAF MiG-29 ace flies MiG-35

In 1987, then Wg Cdr Harish Masand took command of No. 28 Squadron 'First Supersonics', equipped with the early model MiG-29B. A brilliant career later, now retired Air Marshal Harish Masand was privileged to fly the new generation MiG-35D at Yelahanka on the opening day of Aero India 2009.

Air Marshal Masand crewed with RAC MiG test pilot Mikhail Belyaev for a 40 minute sortie which was obviously to



this 'Top Gun's' absolute delight. He said the MiG-35 "showed exceptional controllability and manoeuvrability conferred by the combination of advanced aerodynamics and digital fly-by-wire system".

He said that the MiG-35 handled better than he had imagined and was comfortable handling the aircraft in that very first flight at his age and despite the long break in fighter flying.

"One could only imagine what younger combat pilots of the IAF could do with the aircraft!"

*The MiG-35 and Dassault Rafale are presently competing for the M-MRCA requirement, 21 years after 'Exercise Lightning'.*