



France's Nuclear Deterrent

Three production Mirage IVAs outside the Dassault factory at Bordeaux-Mérignac, awaiting delivery to a French Air Force base. Each aircraft is carrying an aerodynamic replica of a nuclear free-fall bomb; the "genuine" bomb will be of 60 kilotons capacity, but few other details have been released

While certain factions in Britain still question the need for an independent nuclear deterrent—although this country has had an effective force in existence for some years—France is in no doubt whatsoever and is now making great efforts to create her own deterrent. It will consist initially of fifty Mirage IV bombers. How the French Air Force is building up its "Force Aérienne Stratégique" is described here.

AT MONT DE MARSAN, Landes, is the French Centre d'Expériences Aériennes Militaires (CEAM) whose role is to test new equipment under service conditions, to develop appropriate techniques for its use, and to provide initial training and technical supervision when front-line units begin to use it. For this reason the first Escadrons of the French strategic bomber force are now being formed at Mont de Marsan.

This force is being built up around the already well-known Dassault Mirage IVA*, and each Escadre (Wing would be the U.K. equivalent) will comprise three Escadrons of these aircraft, together with one Escadron of Boeing KC-135F tankers for in-flight refuelling, and one Headquarters Escadron, providing the command and administrative functions for the Escadre. Escadron may therefore be regarded as the U.K. equivalent of a squadron.

The total force will comprise fifty Mirage IVAs, and twelve KC-135F tankers, and is expected to be complete and fully operational by mid-1966.

Components of the force

The principal components of the force, and its operational organisation, reflect the special requirements of a nuclear deterrent. The components are: the weapon, the

delivery system, the command system, the ground organisation, and most important of all, the men to make the whole thing work.

France's current nuclear weapon is a free-fall plutonium bomb of approximately 60 kilotons capacity. (By way of comparison the Hiroshima bomb approximated to 20 kilotons.) This weapon has already been tested. Future development will be an H-bomb expected to be available by 1970, dependent upon material from the plant at Pierrelatte which is intended to start production in 1967.

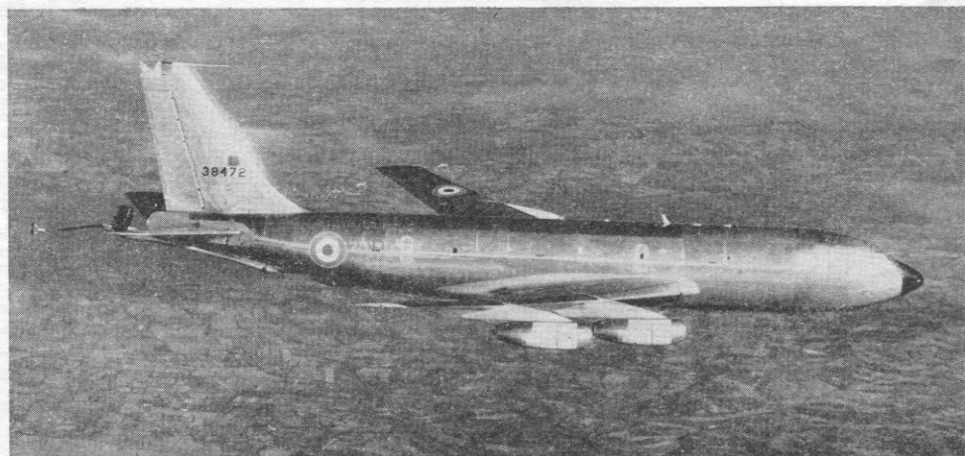
Delivery system

The current delivery system is the Mirage IVA. There has been much talk of a powered bomb suitable for delivery by the Mirage, and it is obvious that the French must have done a good deal of work on such a project. Despite many rumours, few facts have been made public. In a recent statement in *Aviation Maga-*

zine, General Martin, Chief of the French Air Staff, said that: "Au cours des cinq prochaines années, cette génération "pilotee" de la F.N.S. [Force Nationale Stratégique] sera progressivement complétée par des engins Sol-Sol Balistiques Stratégiques, également servis par l'Armée de l'Air." The wording is important; for although it is sometimes supposed that the ballistic missiles will supersede the Mirage IV, this is certainly not what General Martin said. On the contrary, the ballistic missiles, with nuclear warheads, a range of 1,300 miles, and each contained in a protected underground chamber, will become an important addition to the Mirage IV delivery system now coming into being.

It is not until the entry into service of the French missile submarines that the General foresees a change in Service responsibility for the delivery of strategic nuclear weapons; and clearly this will be gradual, since the first French missile submarine is not expected at sea until 1968,

Radius of action of the Mirage IV force will be considerably extended by flight-refuelling from Boeing KC-135F tankers (63-8472 illustrated)



* See June 1963 issue, pp. 176-7.

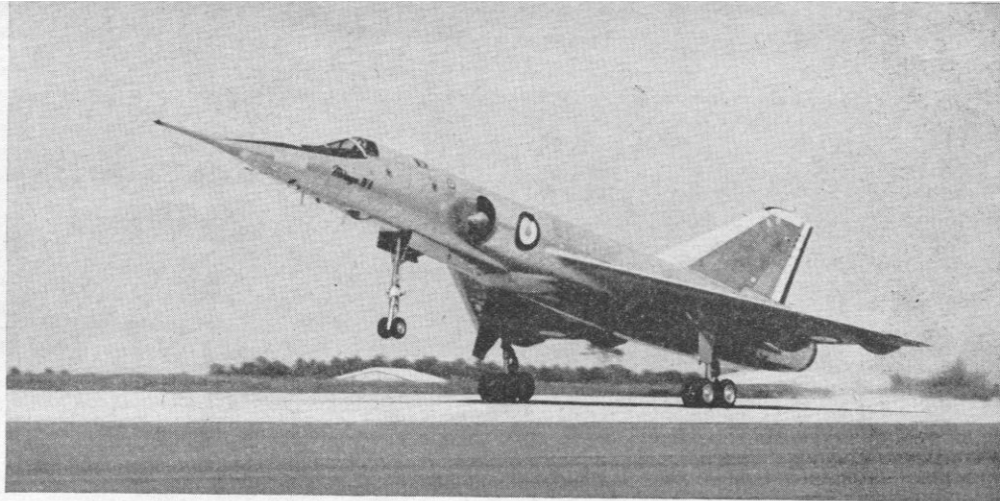
and thereafter their numbers will increase only at the rate of one every two years.

In the immediate future therefore, and probably for the next ten years, the Mirage IV must retain its place in the system. This no doubt accounts for the fact that it continues to be developed, and that over and above the original fifty, a further twelve are reported to have been ordered, powered either by the SNECMA TF-106 engine or the Pratt & Whitney TF-30, similar to the engine intended for the American General Dynamics F-111. This would produce a significant increase in performance and, if combined with the ability to launch a powered missile from low level, would put this so-called "Super-Mirage" in a performance category (excepting range) approaching that of the BAC TSR-2, and so justify its retention in service for the period evidently envisaged by General Martin.

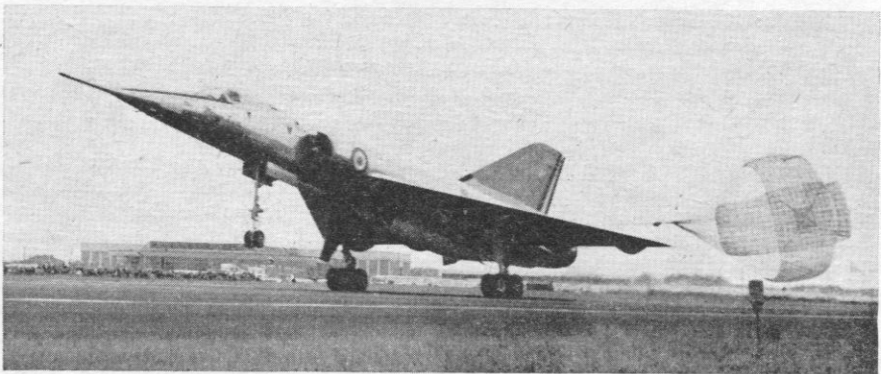
Command system and ground organisation

Two paramount factors are speed of reaction, and security against destruction on the ground; these factors are interdependent. The French plan for the operation of the Mirage IV force is that, at any moment round the clock, twelve aircraft will be airborne alert; twelve will be at 4 minutes stand-by; twelve at 45 minutes notice; and the remaining fourteen aircraft on maintenance.

It is worth examining this plan to see what is involved, for example, for the aircrew concerned. Four minutes notice means that crews must be either in or very close to the cockpit; 45 minutes notice means that crews must be in crew-rooms on the airfield. Quite obviously, when proper allowances are made for leave, sickness and training—to say nothing of more ordinary things like a full night in bed—a plan of this kind cannot possibly operate unless there are a number of crews for each aircraft. The probability is that the French will have planned for at least two and a half, and more likely three complete crews per aircraft. This means that they



Take-off (ABOVE) and landing attitudes of the Mirage IV. The aircraft below is one of the three pre-production machines that followed the prototype Mirage IV-01; it also carries a replica of the bomb



must train, and keep in practice, between 125 and 150 crews for the force, which in itself is no small task. Similar considerations apply to ground crew.

A further complication is the necessity to seek security by dispersal. Thus the Mirage IV element will be dispersed in units of not more than four aircraft over a number of scattered airfields, where they will be housed in blast-proof shelters. The tankers, because of their more exacting runway requirements, cannot be so dispersed. This involves a very tight programme for all the aircraft; obviously no

work can be done on the aircraft aloft, or at 4 minutes notice, and only very little on those at 45 minutes notice. The probability is, therefore, that each *Escadron* will have an extra aircraft on which longer maintenance jobs are possible, and the dispersal in groups of four suggests that the probable establishment for each *Escadron* would conveniently be five aircraft; that is fifteen Mirage IVAs to each *Escadre*, permitting five on major maintenance at any time besides the minor maintenance done in squadrons. Similar factors suggest that each tanker *Escadron*

EXAMPLE OF POSSIBLE AIRCRAFT STATE IN FORCE AERIENNE STRATEGIQUE (When fully operational)

Escadre	"A"				"B"				"C"				On Major Maintenance Overhaul
	1/A	2/A	3/A	4/A	1/B	2/B	3/B	4/B	1/C	2/C	3/C	4/C	
Equipment: KC-135F Mirage IVA	3	5	5	5	3	5	5	5	3	5	5	5	3 5
Airborne	2	2	2	2	1	2	2	2					
At 4 min.					1	2	2	2		2	2	2	
At 45 min.	1	2	2	2					2	2	2	2	
On Escadron but not at readiness		1	1	1	1	1	1	1	1	1	1	1	
Location: Base Aérienne No.	FAS/1	FAS/2	FAS/3	FAS/1	FAS/4	FAS/5	FAS/6	FAS/4	FAS/7	FAS/8	FAS/9	FAS/7	Air arsenal or factory



ABOVE: A Mirage IVA refuels from a Boeing KC-135F. Twelve KC-135Fs have been supplied to the French Air Force; when not engaged in flight-refuelling duties, they will be available for normal transport work. RIGHT: A close-up of the Boeing "flying-boom gear", which was developed from the British Flight-Refuelling Ltd. system



French deterrent . . .

might comprise three KC-135Fs, leaving three at any one time unserviceable on major work (see table on page 345).

As there must be at least nine airfields involved, and each one of these must be able to look after its own immediate needs, it is clear that not only must the maintenance and servicing organisation for both aircraft and weapons be very good, but that considerable attention must be paid both to operational communication links, and to the administrative links as well. Air transport of specialist technicians and aircraft spares are obvious necessities.

Speed of reaction means that all nine airfields, if that is the number, and the crews in cockpits, must be linked by direct speechline to the Command Headquarters. The Command H.Q. must, in turn, have instantaneous access to all defence information. This has been achieved by placing the Command H.Q. (which is at Taverny, near Paris) alongside the Air Defence H.Q. (*Commandement de la Défense Aérienne*) and in fact the two organisations work as one in this respect. In consequence the Commander of the *Force Aérienne Stratégique* has in front of him the same information as the Commander of the Air

Defences; his operational responsibility is direct to the Minister of the Armed Forces, and through him to the President of the Republic. Information, decision, and orders would therefore follow very short and direct links so that the French expect a reaction time from decision to take-off of something like six minutes.

Finally there are the men. This has already been mentioned in connection with the numbers of crews needed. Initial aircrew training has been proceeding for some time at Mont de Marsan, and crews have been using a variety of aircraft including the Vautour IIB and Mirage III. Total manpower requirement for the force is placed at 6,000 and the *Armée de l'Air* has indicated clearly that the needs of the *Force Aérienne Stratégique* will have priority over all else.

French deterrent philosophy

It is this last factor which illustrates the French attitude to their deterrent philosophy. Any question of whether France needs a deterrent or not is beside the point, for the French have long ago made this decision, and acted upon it. The question now is how effective can such a relatively small force be?

Richard Clayton Peet writing in *Air Force* (the magazine of the United States Air Force Association) has this to say: "... it must be clearly understood that the *Force de Dissuasion* is not intended, nor could it be used, as an instrument of aggression. Size does preclude that. But size does not preclude self defense even against the Soviet colossus . . . as long as the size of a thermonuclear force is proportional to the value of the stake it is defending, it can dissuade a potential aggressor. Thus while the U.S.S.R. might be willing to lose twenty million of its population and one-third of its industrial complex to annihilate the United States, it would hardly be willing to pay such a

penalty for the dispatch of France. From this stems a corollary principle, that the lesser the prize, the smaller the dissuasive force needed to defend it. This is the philosophic underpinning of the small force approach."

Granted this argument concerning size, the rest depends upon the efficiency and morale of the force. Some of the problems which affect efficiency have been indicated above. So far as morale is concerned, the French Air Force have made clear that the needs of the *Force Aérienne Stratégique* have priority over all else; and this means their best crews. In this connection, it is important to remember that the French Air Force has been almost constantly engaged in fighting since 1945, and that the fortitude and devotion of its air and ground crews have been proved over and over again. There could be no doubt whatever that, if the Mirage force were launched, the attack would be carried through regardless of opposition.

Thus an enemy of France (even assuming that France were without friends) would still have to consider very carefully before pushing her beyond endurance, whether he could be reasonably certain of inflicting 100 per cent casualties on the Mirage force before any of it reached its targets; even 90 per cent would be too little to make the game worth while for the penalty would be at least three disasters, each one of greater magnitude than Hiroshima.

Dassault Mirage IVA Specification

Span	39 ft. 4½ in.
Length	77 ft. 1 in.
Height	17 ft. 8½ in.
Weight empty	31,965 lb.
Max. take-off weight	69,665 lb.
Max. speed	Mach 2.2
Combat speed	Mach 1.8
Operational radius (unrefuelled)	over 1,000 miles