

# PROFILE PUBLICATIONS

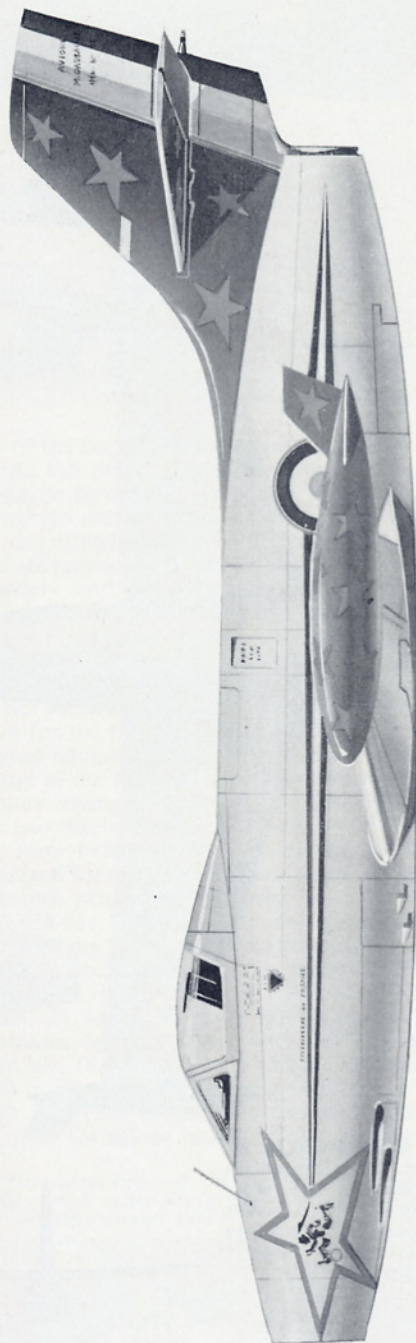
## The Dassault M.D. 450 Ouragan

**NUMBER 143**

RETAIL PRICE

UNITED KINGDOM TWO SHILLINGS

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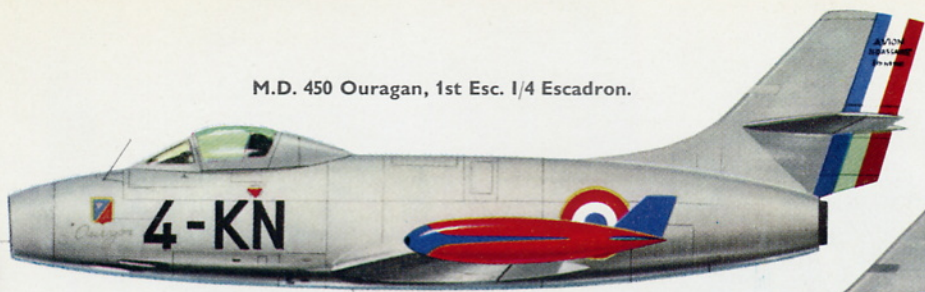


M.D. 450 OURAGAN of  
2<sup>e</sup> Escadrille, III/4 Escadron  
"Flandre", Armée de l'Air,  
based at Bremgarten; aircraft  
illustrated here in markings  
of the "Patrouille de France"  
aerobatic team

2<sup>e</sup> Esc., III/4

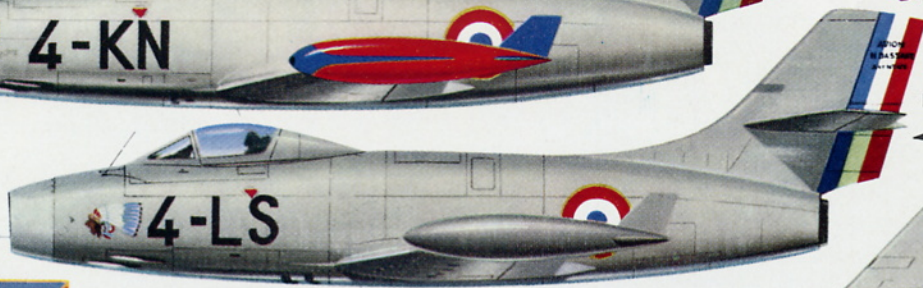


M.D. 450 Ouragan, 1st Esc. I/4 Escadron.



1st Esc. II/4 Esc.

M.D. 450 Ouragan, 1st Esc. II/4 Escadron "Lafayette".



1st/2nd Esc. I/4 Esc.



M.D. 450 Ouragan, 1st Esc. III/4 Escadron "Flandre".



M.D. 450 Ouragan, 1st Esc. I/12 Escadron.

M.D. 450 Ouragan, 1st Esc. II/4 Escadron "Lafayette" Patrouille de France, 1956.



1st Esc. III/4 Esc.



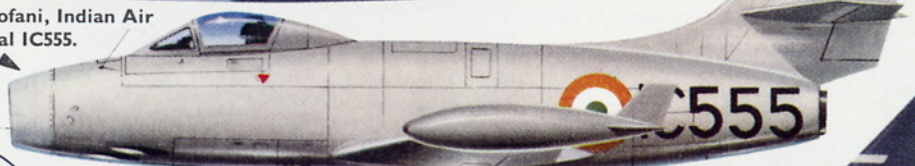
1st Esc. I/12 Esc.



M.D. 450 Toofani, Indian Air Force. Serial IC555.



India.



M.D. 450 Ouragan, Israeli Defence Force Air Force.

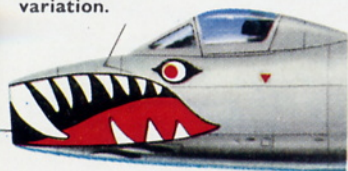


Israel.

IDFAF "Sharkmouth" variation.



M.D. 450 Ouragan, Israeli Defence Force Air Force.





Aircraft for the 1956 Patrouille de France were drawn from the 12e Escadre at Cambrai.

(Photo: Service Cinéma des Armées)

In March 1945 Marcel Bloch, as he then was, returned to France, a survivor of the infamous Buchenwald concentration camp. He re-entered the aviation industry early in 1946, adopting for himself and his new company the *nom de guerre* "Dassault" by which he had been known in the Resistance. Little over a year later, with his plant and his equipment barely re-established, he embarked—on his own initiative—on the design of the first all-French jet aeroplane, and within 15 more months had built and flown it.

Dassault, firmly convinced that the French industry could, and should, produce its own jet fighter, set down his ideas for such a design during 1947. They were based on American rather than British lines, following a basic configuration like the Republic F-84 and using a very thin wing after the fashion of the Lockheed F-80. The new interceptor laid particular emphasis on a fast rate of climb, and was also capable of a secondary ground attack rôle with rocket projectiles. It was to be powered by the Rolls-Royce Nene centrifugal turbojet, already being licence-built in France by Hispano Suiza for the SNCASE Mistral.

Talks with the *Bureau d'Etudes et Plans d'Etat-Major* in September 1947, while achieving verbal support for Dassault's ideas, did not produce any firm order to proceed with the new fighter. Dassault decided to go ahead with it as a private venture—a bold step for a scarcely re-established independent in a largely nationalised industry—and detailed design work started in December 1947. The project was allocated the design number M.D.450, and on 7th April 1948 construction of a prototype commenced at the St. Cloud factory. On 29th June Dassault's decision to continue was vindicated by contract No. 2223/48 from the *Service Technique Aéronautique* of the *Ministère des Armées "Air"* for three prototypes. The first machine, the M.D.450-01, was rolled out at Melun-Villaroche on 22nd January 1949, and Dassault's new chief test pilot, ex-*Armée de l'Air* Colonel Constantin Rozanoff (killed later flying the Super Mystère), took it up for its maiden flight on 28th February.

As first flown, the M.D.450-01 was unarmed, had an unpressurised cabin, and was minus the wingtip fuel tanks that later became a standard feature; the powerplant was a 4,982 lb.s.t. Hispano Suiza Nene 102. The basic layout of the Ouragan (Hurricane) was essentially straightforward, with a single divided duct in the nose carrying the intake flow past either

# The Dassault M.D. 450 Ouragan



by Kenneth G. Munson

side of the cockpit to the engine situated immediately behind the pilot. Dassault's objective had been to design an aeroplane that could be developed quickly enough to corner the market with enough orders to get the French aircraft industry on its feet again after six years of war. At the same time, his engineering ingenuity and far-sightedness were evident in the Ouragan's sweptback tailplane and its thin-section wing with all taper on the leading edge, for these were clearly the first steps towards the evolution of a fully-swept fighter in years to come.

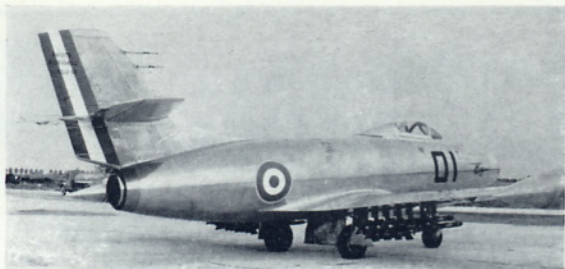
The M.D.450-02, completed at Boulogne, was flown for the first time in May 1949. This had more internal equipment and a pressurised cockpit. Completion of the third aircraft was delayed in order to embody changes suggested by experience with the first two, the -03 eventually making its first flight on 2nd June 1950, powered by the Nene 104B engine envisaged for the production aircraft. A diary of the prototype programme follows:

**M.D.450-01:** Delivered to the *Centre d'Essais en Vol*, Brétigny-sur-Orge, for service trials in April 1949. By July had attained level speed of 980 km/hr. (609 m.p.h.) and climb to 9,000 m. (29,530 ft.) in 6 min. 21 sec. Climb to 12,000 m. (39,370 ft.) in 9 minutes by November, with initial climb rate of 43 m/sec. (8,465 ft./min.). Twin 450-litre tip-tanks fitted in December, increasing ferry range to approx. 1,370 km. (850 miles). Returned to manufacturer late 1949 for minor modifications; damaged in belly

Col. Constantin Rozanoff, chief test pilot of Dassault, standing in the cockpit of the first prototype Ouragan after its maiden flight on 28th February 1949. (Photo: GAM Dassault)





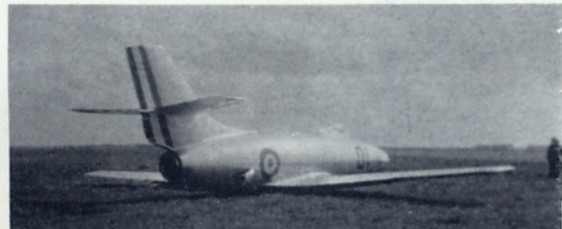


A later photograph of the M.D.450-01 armed with underwing R.P.s; the tip-tanks are as yet without fins. The emblem of SPA.167 just in front of the serial denotes test pilot Paul Boudier. (Photo: GAM Dassault)



Leader of the Escadrille Lafayette during World War 2, Rozanoff had the famous Sioux chieftain's head painted on the -02 during its test programme.

(Photo: Ministère des Armées "Air")



The M.D.450-01 after its wheels-up landing at Melun-Villaroche on 2nd May 1950. (Photo: via Cdt. Paul Boudier)



Boudier landing the -01 after a test flight. (Photo: via Cdt. Paul Boudier)

landing at Villaroche 2.5.50 (pilot Boudier); delivered after repair to mechanics' school at Rochefort as instructional airframe.

**M.D.450-02:** To CEV Marignane November 1949 for manoeuvrability trials; altitudes up to 15,000 m. (49,210 ft.) attained. Damaged on landing 1.2.50 (pilot Monier) following malfunction of nose wheel doors.

**M.D.450-03:** Cannon and R.P. trials at CEV Cazaux from July 1950, initially with four 15 mm. guns, later with four 20 mm.

In July 1949, Avions Marcel Dassault received an order for 15 pre-series Ouragans for various aspects of the test programme. This order was subsequently reduced to 12 aircraft, details of which are as follows:

Line-up of the three Ouragan prototypes. Completing the trio of "personal" insignia, the -03 carries beneath the cockpit the emblem of the Normandie-Niemen squadron, in which test pilot Monier served during World War 2. (Photo: GAM Dassault)



**M.D.450-1:** First flight 30.11.50, delivered to CEV Brétigny 9.2.51 and to Cazaux later the same day. **M.D.450-2:** To Brétigny 15.2.51. (In later years this aircraft was transferred by rail and displayed, minus landing gear, outside Chambéry air base.) **M.D.450-3:** To Brétigny 23.2.51. Development aircraft for Hispano Suiza HS403 afterburner for the Nene engine, increasing thrust to approx. 6,800 lb. First flight with afterburner late 1953. **M.D.450-4:** Believed used for static airframe testing. **M.D.450-5:** First flight 28.4.51, to Brétigny 11.6.51. Air firing programme from November 1951 to January 1952, including development of the Matra 101bis launching gear for the Brandt 55-rocket pack proposed for the Mystère IVA. **M.D.450-6:** First aircraft equipped with electrically-operated trim tabs in the elevator and rudder. **M.D.450-7:** First flight 4.8.51, to Brétigny 3.10.51. **M.D.450-8:** First flight 12.9.51. Also known as M.D.450R (= reconnaissance), was equipped with only two 20 mm. cannon, remaining space being occupied by a camera pack. Underwing drop-tanks as well as standard wingtip tanks. **M.D.450-9:** First flight 16.11.51. Evaluation of performance with underwing ordnance, including R.P.s., napalm, or two 200 kg., 500 lb. or 1,000 lb. bombs. **M.D.450-10:** First flight 5.12.51. Believed to be the first of two testbeds for SNECMA Atar 101B axial turbojet; first flight with Atar, 2.2.52. Nose serial appeared as "01", fin distinguished by "A" (for Atar) above the tailplane, and "V" on rear fuselage aft of the roundel. **M.D.450-11:** First flight 21.1.52. Also known as M.D.450-30L, signifying twin 30 mm. DEFA cannon in place of the standard armament, and lateral engine air intakes. Built as single-seat development aircraft, with standard Nene engine, for the projected Tay-engined M.D.451 Aladin two-seat night fighter. (The Aladin project was successively re-designated M.D.453 Harmattan, then Mystère III, and finally Mystère de Nuit, before its development was





A fine aerial study of the third pre-series Ouragan: the tip-tanks still carry no fins. This aircraft was later the testbed for the HS403 afterburner developed for the Nene 104B. (Photo: Ministère des Armées "Air")



A previously unpublished photograph of the M.D.450-9 used to evaluate performance with various underwing loads. Note recording camera bulge immediately behind the nose wheel doors. (Photo: Cdt. Paul Boudier)

abandoned.) **M.D.450-12:** First flight 10.5.52. Probably the second Atar testbed, distinguished by "02" on nose and "A" on fin.

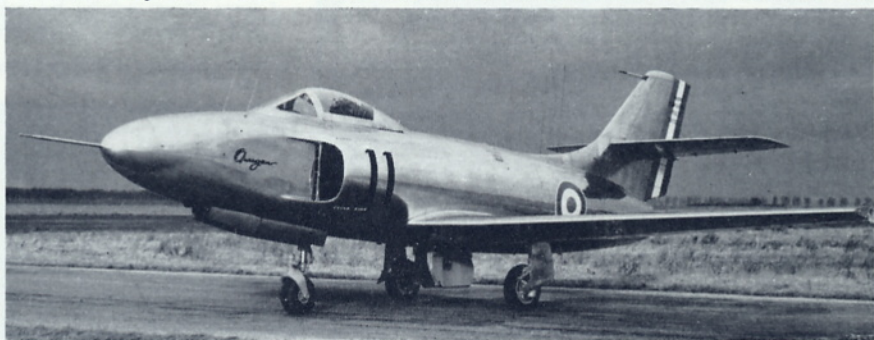
At the time of the pre-series order, the French government was debating a five-year plan for rebuilding the French air forces which envisaged no fewer than 850 Ouragans, together with 300 Vampires, for the interception and ground attack rôle. But the initial *Armée de l'Air* contract, when announced on 31st August 1950, was fixed at 150 aircraft, and it was to be another three years before the first foreign order materialised. Nevertheless, the home order still represented a substantial contract, which was followed by three further orders each for 100 aircraft (though the final one was cancelled in January 1952 in favour of the *Mystère IIC*). The Dassault plant could not accomplish this unaided: not entirely from a lack of facilities, but because the speed of the Ouragan's development had left little time for such refinements as full "productionisation" of the design. Hence the completion of front fuselages was delegated to SNCASE at Toulouse, who eventually built 350 units; while the SNCASO factories at Saint-Nazaire and Bouguenais completed 365 rear fuselages and 373 wing units respectively. Dassault factories at

Bordeaux-Mérignac and Argenteuil assumed the responsibility for centre fuselage and tail units, and the final assembly and flight testing was carried out at Mérignac.

The first production Ouragan, numbered 101, was flown for the first time on 5th December 1951. By the end of 1952, 39 production Ouragans had been completed; a further 193 were built in 1953, and the remaining 118 by midsummer 1954. The only major modification required was to the doors enclosing the nose wheel landing leg. Originally in four sections, these had, in addition to causing accidents to the first two prototypes, proved susceptible to damage when the guns were fired, and were replaced on the 51st and subsequent machines by a larger, two-piece door. The cockpit was equipped with a Martin-Baker ejection seat on the prototypes, pre-series and the first dozen or so production aircraft, but thereafter with the SNCASO Type E.86 seat.

#### THE OURAGAN IN SERVICE

When it began to replace the Vampire in squadron service in 1952, the Ouragan's full service test programme had not been completed. As a result, service pilots found themselves performing a few involuntary manoeuvres when they put the fighter through its paces. In particular, a tendency was noted for the Ouragan to snap around rather sharply during a hard turn, especially when the aircraft was flown without tip-tanks. This could—and sometimes did—lead an unwary pilot into a quite unrehearsed spin. On the whole, however, French pilots found the Ouragan a pleasant aircraft to fly, with no serious vices, and they were particularly pleased with its excellent stability as a gun and rocket firing platform. That it was selected for two years in succession as the mount for the *Patrouille de France* aerobatic team



The so-called "Type 30L" (actually the M.D.450-11), with the lateral intakes later used for the proposed *Mystère de Nuit* radar-equipped night fighter.

(Photo: GAM Dassault)





The first Atar testbed, M.D.450-10, proclaimed by the large "A" on the fin and nose serial "01". (Photo: SNÉCMA)



This picture of the first "Barougan" in flight illustrates an early type of main wheel fairing, into which the wheels retracted but were not enclosed. (Photo: via Cdt. Paul Boudier)

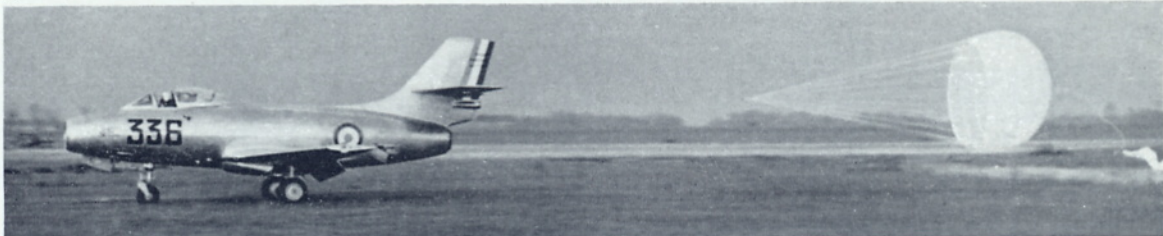


The twin-wheel "diabolo" gear of the "Barougan" and ventral "speedpack"—one of several wheel housings evaluated on these aircraft. (Photo: Messier)

was further tribute to its handling qualities.

Ouragans of the *Armée de l'Air* equipped two French fighter groups (*Escadres de Chasse*) of the 1<sup>er</sup> *Commandement Aérienne Tactique* as a component of NATO's 4th Allied Tactical Air Force: the 2<sup>e</sup> *Escadre* at Base *Aérienne* 102, Dijon, and the 4<sup>e</sup> *Escadre* at Bremgarten; and one group of the *Défense Aérienne du Territoire*, the 12<sup>e</sup> *Escadre* at B.A.103, Cambrai. Each *Escadre* consisted of three *Escadrons* (wings), and each wing of two *Escadrilles* (squadrons). An *Escadron* normally comprised 25 aircraft plus two reserves. Thirteen of the eighteen *Escadrons* adopted as their emblem the badge of a SPAD- or Nieuport-equipped squadron of World War 1. Units flying the Ouragan are listed below; aircraft call signs in each case being completed by an individual aircraft letter (e.g., 2-EE).

The second "Barougan" making a grass landing. The position of the brake parachute housing varied from tailplane level to the base of the rudder: here it is in an intermediate position. (Photo: via Cdt. Paul Boudier)



Escadre	Escadron	Escadrille	W.W.1 Insignia	Call sign	Re-equipped with
2e (Dijon)	I/2 Cigognes	1e	SPA.3	2-E	Mystère IVA from late 1955
		2e	SPA.103		
	II/2 Côte d'Or	1e	SPA.65	2-F	
		2e	SPA.57		
	III/2 Alsace	1e	None	2-S	
		2e	None		
4e (Bremgarten)	I/4 Dauphiné	1e	SPA.37	4-K	Republic F-84F from Oct. 1955
		2e	SPA.81		
	II/4 Lafayette	1e	N.124	4-L	
		2e	SPA.167		
	III/4 Flandre	1e	SPA.160	4-U	
		2e	N.155		
12e (Cambrai)	I/12 Cambraisais	1e	SPA.89	12-Y	Mystère IVA from May 1955
		2e	None		
	II/12 Picardie	1e	SPA.173	12-X	
		2e	SPA.172		
	III/12 Cornouaille	1e	None	12-Z	
		2e	None		

#### Representative aircraft:

I/2: 2-EC, 2-EE\* (No. 385).

II/2: 2-FB, 2-FC (No. 202), 2-FD (No. 214), 2-FG (No. 152), 2-FH (No. 220), 2-FL\* (No. 308), 2-FX.

I/4: 4-KI\* (No. 323), 4-KJ (No. 325), 4-KL (No. 350), 4-KM (No. 126), 4-KO.

II/4: 4-LG, 4-LH, 4-LI, 4-LS, 4-LU, 4-LZ (No. 238).

III/4: 4-UF, 4-UI, 4-UL (No. 113), 4-UO, 4-UP.

I/12: 12-YB\*\* (No. 373), 12-YF\* (No. 377), 12-YH\*\*, 12-YM, 12-YQ\* (No. 389), 12-YU\*.

III/12: 12-ZL (No. 413), 12-ZO, 12-ZQ\*\*, 12-ZS\*, 12-ZZ\*\*.

Other unit call signs included NA and NF (CEV Cazaux), RA and TU (*Ecole de Chasse*, B.E.708, Meknes, Morocco), UA and TP (*Ecole de Chasse* after transfer to B.E.705, Tours, ca. 1960), and UI (*Ecole de l'Air*, Salon-de-Provence).

The Ouragans' front-line service life was comparatively short—they began to be replaced by the Mystère IVA in May 1955—but the last did not leave operational units until 1961, and many served a valuable secondary life as advanced tactical and gunnery trainers, a small number still remaining in this rôle in the mid-1960s. Numbers in service up to January 1964 are given in the table on the facing page.

#### THE "BAROUGAN"

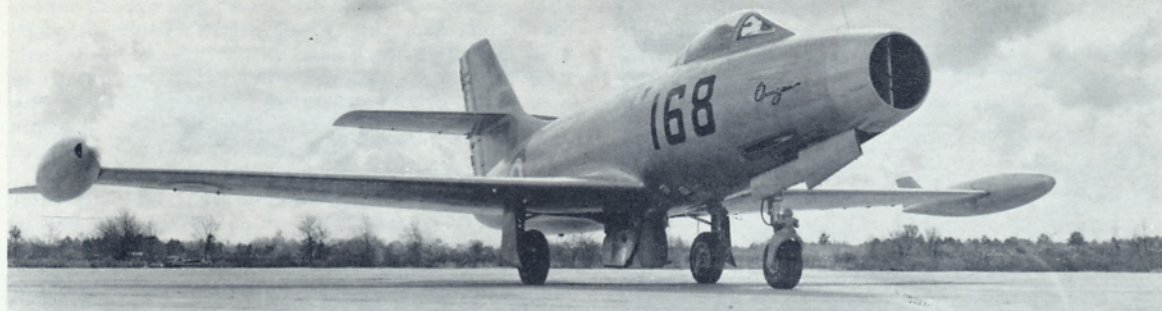
This was the nickname given to a small number of Ouragans fitted with an experimental "diabolo" undercarriage and a tail braking parachute. The name was a fusion of Ouragan with *baroud*, an Arab word meaning battle, and signified the intention of adapting the Ouragan for use from unprepared airstrips in Algeria.

Each leg of the main landing gear was fitted with a twin-wheel unit with low-pressure tyres, retracting

\* Seven aircraft including two reserves of the 1955 Patrouille de France.

\*\*Four aircraft of the 1956 Patrouille de France.





The 68th production Ouragan, displaying the new two-section nose wheel door introduced from the 51st aircraft onwards.

(Photo: GAM Dassault)

Date	With Operational Units	Schools & Training Units	In Reserve	Maintenance or Modification	Total
1.3.53	40	—	15	2	57
1.3.54	84	—	93	33	210
1.3.55	179	—	31	44	254
1.2.56	159	—	22	32	213
1.1.57	90	12	62	39	203
1.1.58	44	43	84	8	179
1.1.59	12	22	140	1	175
1.1.60	10	82	16	25	133
1.1.61	6	80	22	20	128
1.1.62	—	41	72	—	113
1.1.63	23*	12	67	—	102
1.1.64	19	12	25	—	56

\* 20 of these at the Centre de Tir et de Bombardement at Cazaux.

into a ventral fairing. The first Ouragan modified was No. 140, first flown with the new, Messier-designed gear at Melun-Villaroche on 24th February 1954. It made its first take-off from grass on 22nd March, and its first grass landing three days later. Successful landings were subsequently accomplished in distances from 820–1,148 feet (250–350 metres) and take-offs from 1,870–2,525 feet (570–770 metres), at varying all-up weights, before the aircraft was delivered to Brétigny on 5th May for continued evaluation. On 23rd October 1954 a second "Barougan", No. 336, was flown, and tests with these two aircraft were undertaken both in France and in

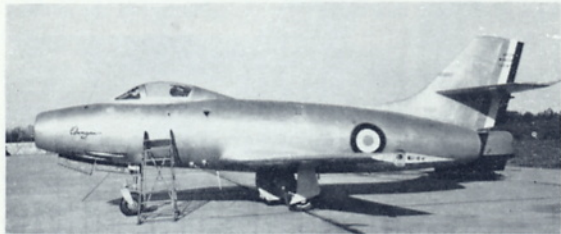


Ouragan No. 212 landing after a pre-delivery test flight. Destination was probably Dijon.

(Photo: Air-Britain via Charles W. Cain)

A standard production Ouragan photographed at Mérignac in 1955 during routine overhaul.

(Photo: Peter R. March)

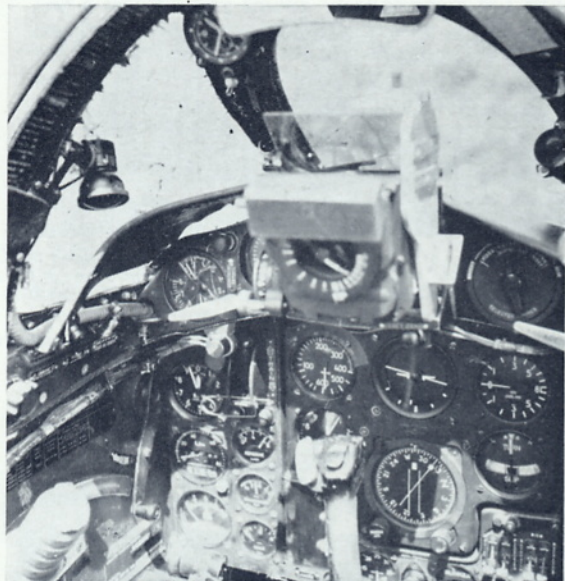


Algeria. In 1957 third and fourth "Barougans", Nos. 223 and 225, were delivered to Brétigny for a short period of tests, but were re-converted to standard Ouragans early in 1958 and further development of the "Barougan" was abandoned.

#### OURAGANS IN THE MIDDLE EAST

Never, since its creation on 14th May 1948, has Israel enjoyed peace with its Arab neighbours. Despite uneasy truces in 1948 with all except Iraq (with whom it is still technically at war), Israel has been under constant pressure of one kind or another, especially from Egypt. By mid-1955 the Egyptian government was openly admitting, indeed proclaiming, its "heroic" *fedayeen* (commando) raids against civilian targets across the Israeli border; and when, in October 1955, Egypt concluded an arms deal with Czechoslovakia for the supply of Russian-designed military equipment, the Israeli government was obliged to re-equip its own forces with more modern weapons. To augment the small force of assorted Meteors, which were then the IDF/AF's only jet aircraft, orders were placed for 24 Mystère IIC fighters and a similar number of CL-13B Sabre 6's. The Canadian government, however, vetoed the sale of any arms that might worsen the Middle East situation, and when Israel decided to await the superior Mystère IVA a stop-gap was clearly required.

Interior cockpit detail of the Ouragan. (Photo: via F. Rude)







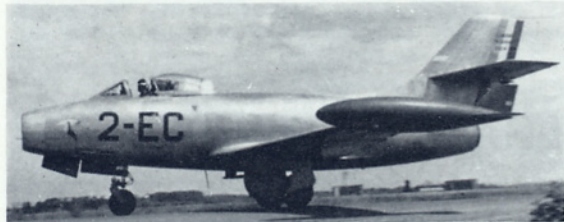
The redesigned two-piece nose wheel door fitted to all production Ouragans from No. 151 onwards.  
(Photo: Air-Britain via Charles W. Cain)

This was provided by the acquisition of sufficient Ouragans to equip five close support squadrons. Twenty-four were delivered direct from AMD at Mérignac, and at least 42 ex-Armée de l'Air machines were supplied to Israel. The final total received by the IDF/AF has never been confirmed officially, but is believed to be at least 75. The first Ouragans flown out to Israel bore radio call signs (commencing 4.X.FRA) for the journey, and on arrival were allocated IDF/AF serial numbers commencing at

5641; subsequently the first two digits were dropped, the aircraft displaying two-figure serials only, although more recently three-figure serials have been applied. Delivery was completed during 1955. In April 1956 a sustained *fedayeen* campaign was mounted by the Egyptians, and an IDF/AF Ouragan crew drew its first blood on 12th April, when an Egyptian Vampire was shot down over Israeli territory.

It was, however, during the Sinai campaign that the Ouragan gave proof of its operational worth. On 21st October a pro-Egyptian government was returned in Jordan; within three days both Egypt and Iraq had begun to station troops there, and Israel was surrounded by a strong, unified Arab army under an Egyptian commander. On 25th October Israel began to mobilise, and her Ambassador in Washington told the U.N. Security Council "we are not prepared to be the passive victims of regulated assault". On 28th October the Israeli cabinet decided to forestall the imminent Egyptian invasion by striking first; and within a week this hastily-mobilised and (by comparison) poorly-equipped force was in command of the entire Sinai peninsula. They were undoubtedly helped by the poor quality of Egyptian pilots who possessed, as *The Aeroplane* of 9th November 1956 put it, "an over-developed instinct for self-preservation", and were unable to grasp the advantage offered by their technically superior aircraft. Israeli pilots never encountered less than four MiG-15's at a time, and usually the Egyptians were in groups of six or eight: yet they were successfully opposed by IDF/AF Mystères and Ouragans flying in pairs. (The only IDF/AF machine lost in an aerial engagement was a Super Cub spotter, and even this successfully dodged its MiG attacker for ten minutes before being hit.)

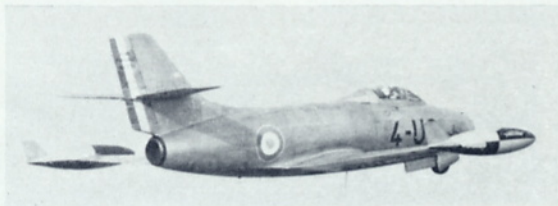
When the campaign opened on 29th October with airborne landings in the Mitla Pass area, thirty miles east of Suez, a constant Mystère patrol, with Ouragan and Meteor escort, was maintained, and in the early hours of the next morning two Ouragans shot down four enemy Vampire fighter-bombers. The IDF/AF's primary rôle was originally to have been that of defending home targets against the expected Egyptian air attack; but when no such attack materialised, all



Left: Ouragan of the 1e Escadrille of Escadron 1/2, bearing the Cigognes (stork) emblem of SPA.3 in front of the squadron call-sign. Ouragans of the 2e and 4e Escadres de Chasse formed part of the 1er Commandement Aérienne Tactique of the 4th ATAF in Europe. Right: A rocket-armed Ouragan (No. 214) of the 11/2 Escadron (2e Escadrille). (Photos: Air-Britain via Charles W. Cain)



Left: Ouragan 2-FX of the Cote d'Or Escadron, 11/2, bears traces of the fin cross marking worn during exercise "Carte Blanche" in June 1955. (Photo: Ministère des Armées "Air") Right: Ouragan of the 4e Escadre in flight. (Photo: via the author)







Apparently even the new nose wheel door was not entirely trouble-free. Left: An Ouragan of 11/4 with one half closed, one half open. Right: One of 111/4's aircraft after an unhappy landing. (Photos: via the author and F. Rude)



Ouragan of the 4e Escadre about to land. (Photo: via the author)



Ouragan of the 1e Escadrille, 1/12 Escadron, Cambrais. (Photo: via the author)

available aircraft were put to supporting ground forces, 25 per cent of all such missions being performed by Ouragans. These operations brought the only two aerial encounters between the Ouragan and the MiG-15, which both occurred on "D+2", 31st October.

In the first encounter, two IDF/AF Ouragans, hunting an armoured column east of Bir Hama, were attacked by eight MiG-15's, with four more MiG's giving top cover. One Ouragan was hit by two 37 mm. shells before the Egyptian aircraft were beaten off (and one shot down) by two Israeli Mystères, and the other was obliged to force-land after running out of fuel. Both aircraft were salvaged and back in operation the following day. The other engagement,

Aircraft in the temporary markings of "Operation Carte Blanche", a manoeuvre held in summer 1955. (Photo: R. Danel)



which was more successful for the Ouragans, involved another pair which had taken off at noon, armed with napalm, to strafe a tank column near Bir Gifgafa. The Israeli No. 2 soon had a MiG-15 on his tail, and both Ouragans broke left to jettison their bombs and wingtip tanks before engaging the Egyptian fighters. The following account of the action was given\* by the Israeli flight commander:

"What the MiG ought to have done was to make a pass and gain height and try again. But instead, he came into a turn with my Number Two. His radius of turn was much bigger than the Ouragan's, and when I followed him in his turn, I started to close. My Number Two couldn't release his wing-tanks, but in spite of this the MiG couldn't close the turn.

"I saw the MiG shooting in the turn and of course missing because of the very high angle-off (deflection) and because of the high "G". I made the same mistake myself—I fired one short burst in the turn and missed. I knew of course that there was another MiG somewhere above, but I couldn't see it. I was anxious about it. Anyway, I could see that the first MiG was closing the turn on my Number Two, and if he changed the bank it would save him, so I told him to do so. Then I saw some more MiGs up above.

"This change of direction brought me into a favourable position to fire on the first MiG, and I gave him a long burst and saw pieces fall off him. He immediately pulled up and straightened his wings. I shot at him again, hit him again and saw a big hole in his left wing and something burning and a lot of white smoke. I shot again but only one cannon fired, but it hit him near his jet pipe. Because my cannons were not working any more, I then came home".

Two other Ouragans were involved earlier on 31st October in the capture of the *Ibrahim-el-Awal*, the former British "Hunt" class destroyer H.M.S. *Cottesmore*. The target was pin-pointed by an IDF/AF C-47, after which the two Ouragans, each with a full battery of rocket projectiles, moved into the attack. In the words of one of the pilots:\*\*

"The weather was cloudy and we were flying at 5,000 ft. The wake of the ship showed that she had been turning from west to due east, but at the time of our attack she was on a course of 120 degrees (south-east). I attacked out of the sun and made my run along the ship from bow to stern.

"I dived and released all sixteen rockets, at about 500 yards from a height of 700 feet. I broke from the ship before I could see the hits, but I saw pieces of metal in the air. I broke high and to the left and saw my Number Two leaving the ship

\* In *One Hundred Hours to Suez*, by Robert Henriques (Collins, 1957), pp. 196-199.

\*\* See *One Hundred Hours to Suez*, pp. 214-215.





*Ouragan of the Ecole de Chasse at Tours.*

(Photo: Stephen P. Peltz)

after releasing his rockets. After this attack by my Number Two, the ship was hidden in smoke. There were two kinds of smoke, some black and some very white”.

Its manoeuvrability at low level and stability as a firing platform made the Ouragan even more valuable for ground attack than in air-to-air combat, and the squadrons flying it accounted for a major proportion of the tanks and other military vehicles destroyed from the air. Only two Ouragans were lost during the five days' fighting, both to enemy small-arms fire, which was far more lethal than either the Egyptian fighters or anti-aircraft defences. As the IDF/AF commander-in-chief summed up later, “The Ouragan was a much better aeroplane than had been thought”. Since Sinai, the Ouragan has continued to give the

IDF/AF useful service, and at the time of writing, some ten years after that campaign, still partially equips two close support units and an operational training unit.

#### OURAGANS IN INDIA

On 25th June 1953 the Indian government ordered 71 Ouragans, basically similar to the standard production model but powered by 5,180 lb.s.t. Nene 105A engines. The first four aircraft, bearing serials IC553 to IC556, were flown to India from Istres by IAF pilots on 17th October 1953, arriving in Delhi eight days later; a further 35 left Toulon for Bombay on 30th October aboard the carrier *Dixmude*, and the remainder early in 1954. Subsequent orders for 20 and 13 Ouragans brought the overall total to 104. In service with Operational Command of the IAF, the Ouragan was given the Hindi equivalent of its French name—*Toofani*. Official IAF sources decline to say whether the *Toofani* has seen any combat service; but in view of the prevalence in IAF squadrons of the superior Mystère IVA (which began to replace it in 1957), and more recently the Gnat (now in large-scale production in India), this would seem unlikely—an opinion borne out by the Pakistan Air Force, who have no record of encountering it in the Kashmir or any other operations.

*An Ouragan of the Ecole de Chasse, Mèknes, Morocco.*  
(Photo: via R. Danel)



*M.D.450-378, the second aircraft for Israel, with temporary call-sign for ferrying and the first two digits of the IDF/AF serial (5642) obliterated for security purposes before the photograph was released.*

(Photo: Air-Britain via Charles W. Cain)





A more recent study of an IDF/AF Ouragan in desert camouflage of blue-grey and stone. Note the underwing attachment points for bombs and rockets. (Photo: Stephen P. Peltz)



The 300th production Ouragan, with IDF/AF insignia and serial, photographed pre-delivery in 1953. (Photo: Air-Britain via Charles W. Cain)

A late production Ouragan, No. 338 of the Centre d'Essais en Vol, Brétigny, displays a rather more stylistic design than usual in the nose serial. (Photo: via Stephen P. Peltz)



#### SPECIFICATION

**Powered by:** One 5,004 lb. (2,270 kg.) s.t. Hispano Suiza (Rolls-Royce) Nene 104B turbojet. Aircraft for Indian Air Force have 5,180 lb. (2,350 kg.) s.t. Hispano Suiza Nene 105A.

**Dimensions:** Wing span, 40 ft. 3½ in. (12.29 m.); span over tip-tanks, 43 ft. 2 in. (13.16 m.); length overall, 35 ft. 2½ in. (10.74 m.); height, 13 ft. 7 in. (4.14 m.); gross wing area, 256.18 sq. ft. (23.8 m.²); aspect ratio, 6; wing leading edge sweep, 20 deg.; dihedral angle (wings and tailplane), 5 deg.; main wheel track, 7 ft. 10 in. (2.39 m.).

**Weights:** Basic empty, 9,132 lb. (4,142 kg.). Loaded (interceptor, without tip-tanks), 13,646 lb. (6,190 kg.); escort (with two 137 Imp.gal. (625 litre) tip-tanks), 15,230 lb. (6,908 kg.); ground attack (with two 99 Imp.gal. (450 litre) tip-tanks and 16 R.P.s.), 16,323 lb. (7,404 kg.); maximum loaded (close support, with 450 litre tip-tanks and two 1,000 lb. bombs or napalm), 17,416 lb. (7,900 kg.).

**Armament:** Four fixed 20 mm. Hispano 404 Model 50 cannon (with 125 r.p.g.) in lower front fuselage. Sixteen 105 mm. Brandt T-10 rocket projectiles, or eight rockets and two 100 Imp.gal. (458 litre) napalm tanks or two 1,000 lb. (454 kg.) bombs.

**Performance (with Nene 104B):** Maximum speed, 584 m.p.h. (940 km/hr.) at sea level; 516 m.p.h. (830 km/hr.) at 39,370 ft. (12,000 m.) (M = 0.76); limiting Mach number = 0.83; cruising speed, 466 m.p.h. (750 km/hr.); landing speed, 115 m.p.h. (185 km/hr.); rate of climb (initial), 7,480 ft./min. (38 m/sec.); rate of climb at 29,530 ft. (9,000 m.), 1,968 ft./min. (10 m/sec.); time to 39,370 ft. (12,000 m.), 10 minutes; service ceiling, 42,650 ft. (13,000 m.); combat radius (interceptor, "clean"), 280 miles (450 km.); ferry range, approx. 570 miles (920 km.); take-off to clear 50 ft. (15 m.), 856 yd. (783 m.); landing from 50 ft., 990 yd. (910 m.).

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