The Dassault Mirage F1
in South African Air Force service

VOLUME 5

Mirage F1AZ external stores

Revision 1
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Revision 1

Revision 0 of this document was published in September 2024. Based on further investigation and comments received from others, this Revision 1 of Volume 5 contains additional and updated data to provide a more complete record.

South African Air Force Mirage F1 – Volume 5
F1AZ external stores configurations

Section 5.1 – stores and weapons carried by the AZ

The Mirage F1AZ could carry the following stores on the wing and fuselage hardpoints as indicated in the table below :

Port wingtip station	Port outboard wing Station 2	Port inboard wing Station 1	Centerline station	Starboard inboard wing Station 1	Starboard outboard wing Station 2	Starboard wingtip station
V3B						V3B
V3C						V3C
R550					-	R550
	V3S				V3S	
			AS30			
		RP35 1,200 liter tank	RP35 1,200 liter tank	RP35 1,200 liter tank		
	Matra 155 rocket pod	Matra 155 rocket pod		Matra 155 rocket pod	Matra 155 rocket pod	
	Mk.81/82 bomb	Mk.81/82 bomb	Mk.81/82 bombs	Mk.81/82 bomb	Mk.81/82 bomb	
	1,000lb (450kg) Mk.10 GP bomb	1,000lb (450kg) Mk.10 GP bomb	1,000lb (450kg) Mk.10 GP bomb	1,000lb (450kg) Mk.10 GP bomb	1,000lb (450kg) Mk.10 GP bomb	
			Mk-20 Rockeye CBU			
			H2 Glide Bomb			
			Griffin LGB			
		Practice bomb carrier		Practice bomb carrier		
	ACS pod				ACS pod	

R550 Infrared guided air to air missile developed by Matra Hautes Technologies. This missile was mainly reserved for the CZs and was rarely if ever carried by the AZ.

V3B Infrared guided air to air missile developed by Kentron. The successor to the V3A with improved sensitivity and view angle for the IR seeker and an upgraded motor in service from 1979. Primary missile used by the AZ for self-defense on missions.

V3C Infrared guided air to air missile developed by Kentron. The V3C was supposed to offer increased performance in all areas over the V3B. It shares the outer mould line of the R550, but is a totally different missile. Slow development meant it was only used by the AZs after the war and then only for operational testing and evaluation.

V3S Infrared guided air to air missile developed by Rafael. Due to poor performance of the R550 and V3B in air combat and with the slow development of the V3C, the Python 3 was acquired post-haste after Arthur Piercy's mishap where his aircraft was damaged by an Angolan MiG-23 in late 1987. It was named the V3S "Snake" in SAAF service. Integration started in early 1988.

AS30 Radio command air to ground missile developed by Nord Aviation.

Mk.81/82 125 kg and 250 kg bombs from the low drag Mk.80 series of aircraft bombs.

CBU Cluster Bomb Unit.

LGB Laser Guided Bomb. The SAAF acquired the Israeli LGB 745 Griffin smart bomb kit in late 80's.

H2 Glide bomb developed locally under Project Hanto with electro-optical guidance.

F4 155 Matra Hautes Technologies rocket pod - contains 18 SNEB 68mm rockets

ACS pod Active Countermeasures System pod. Modification of the Elettronica S.p.A ELT-555 jamming pod by Grintek Electronics. Available in both noise and deception jammer variants.

The table below provides the more typical AZ load combinations as evidenced through the images in this document – some were considered "operational" loads used during combat operations by the SAAF:

Port wingtip station	Port outboard wing Station 2	Port inboard wing Station 1	Centerline station	Starboard inboard wing Station 1	Starboard outboard wing Station 2	Starboard wingtip station
-	-	-	RP35 1,200 liter tank	-	-	-
-	-	RP35 1,200 liter tank	-	RP35 1,200 liter tank	-	-
-	-	Practice bomb carrier	RP35 1,200 liter tank	Practice bomb carrier	-	-
-	-	RP35 1,200 liter tank	Nord AS30	RP35 1,200 liter tank	-	-
V3B	-	-	RP35 1,200 liter tank	-	-	V3B
V3B	-	Matra 155 rocket pod	RP35 1,200 liter tank	Matra 155 rocket pod	-	V3B
V3B	Matra 155 rocket pod	Matra 155 rocket pod	RP35 1,200 liter tank	Matra 155 rocket pod	Matra 155 rocket pod	V3B
-	Matra 155 rocket pod	RP35 1,200 liter tank	-	RP35 1,200 liter tank	Matra 155 rocket pod	-
-	Matra 155 rocket pod	RP35 1,200 liter tank	RP35 1,200 liter tank	RP35 1,200 liter tank	Matra 155 rocket pod	-
V3B	-	RP35 1,200 liter tank	CLB4 with 4 x Mk.81/82 bombs	RP35 1,200 liter tank	-	V3B
V3B	1 x Mk.81/82 bomb	RP35 1,200 liter tank	CLB4 with 4 x Mk.81/82 bombs	RP35 1,200 liter tank	1 x Mk.81/82 bomb	V3B
V3B	1 x Mk.81/82 bomb	1 x Mk.81/82 bomb	CLB4 with 4 x Mk.81/82 bombs	1 x Mk.81/82 bomb	1 x Mk.81/82 bomb	V3B
V3B	1 x 450kg bomb	-	CLB4 with 4 x 450kg bombs	-	1 x 450kg bomb	V3B
V3B	ACS pod	RP35 1,200 liter tank	CLB4 with 4 x Mk.81 / 82 bombs	RP35 1,200 liter tank	-	V3B
V3B [1]	1 x Mk.81 bomb	CLB8/A26 with 4 x Mk 81 bombs	CLB4 with 4 x Mk.81 bombs	CLB8/A26 with 4 x Mk 81 bombs	1 x Mk.81 bomb	V3B
V3B [2]	ACS pod	CLB8/A26 with 4 x Mk 82 bombs	RP35 1,200 liter tank	CLB8/A26 with 4 x Mk 82 bombs	-	V3B
V3B	V3S	RP35 1,200 liter tank	CLB4 with 4 x Mk.81/82 bombs	RP35 1,200 liter tank	V3S	V3B
-	-	RP35 1,200 liter tank	CLB4 with 4 x Mk-20 CBU[3]	RP35 1,200 liter tank	-	-
V3C	V3S	RP35 1,200 liter tank	CLB4 with 4 x Mk.81/82 bombs	RP35 1,200 liter tank	V3S	V3C
-	ACS pod	RP35 1,200 liter tank	H2 bomb	RP35 1,200 liter tank	H2 bomb guidance pod	-
-	-	RP35 1,200 liter tank	Griffin LGB	RP35 1,200 liter tank	-	-

- CLB4 – 4 bomb carrier carried on the Mirage F1 fuselage station
- CLB8 – 4 bomb carrier carried on the inboard wing stations – always carried in pairs. SAAF designation was A26 bomb carrier.

The stores configurations presented in the grey cells in the table above represent those combat operational loads used by the AZs during the Border War as evidenced through available images.

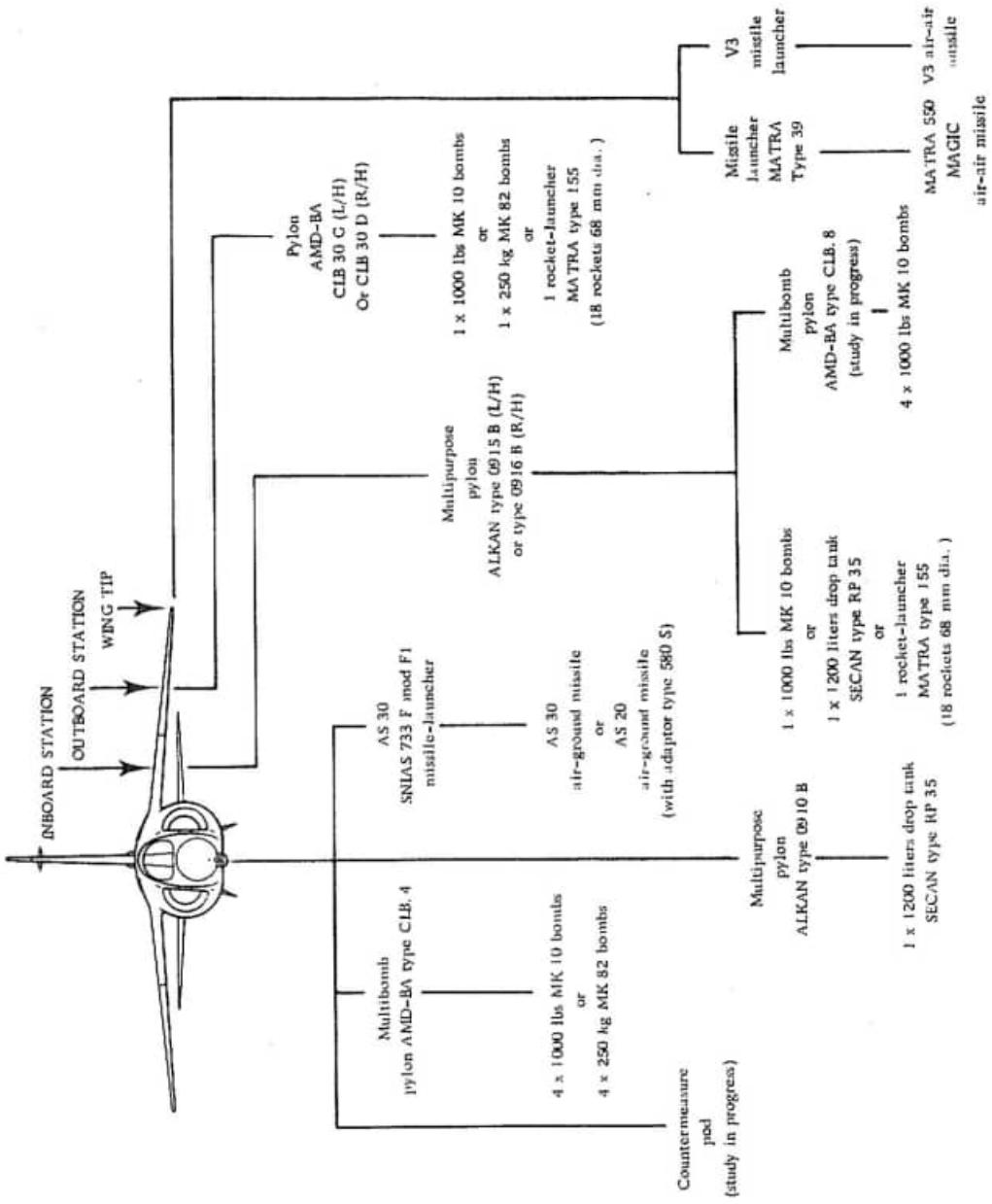
[1] This is the 14-bomb configuration which was developed for the AZ and first flown in 1991 (ref. Dick Lord's book "Vlamgat" page 218). Structural changes were required to strengthen the aircraft and undercarriage for the higher 16.2 ton all up weight.
[2] This is the 14-bomb configuration which was developed for the AZ and first flown in 1991 (ref. Dick Lord's book "Vlamgat" page 218). Structural changes were required to strengthen the aircraft and undercarriage for the higher 16.2 ton all up weight.
[3] In Dick Lord's book "Vlamgat", there is an image of an AZ painted in the final camouflage scheme dropping four CBUs from the CLB4 bomb rack. In the book xxxx, it is stated that the SAAF deployed CBUs filled with white phosphorous bomblets in combat operations during Operation Modular in 1987.

Note that there were two additional wing stations, designated “station 0” which were located between the inboard wing hardpoints and the fuselage. These were for carriage of the chaff/flare pods which were not used by AZs in combat operations.[4]

The AZ could also carry Condib runway cratering weapons and illuminating flares. It is assumed that these would be carried on the CLB4 and A26 multibomb pylons. These were not used in combat operations [5]

[4] The station “0” modification to carry the chaff/flare dispensers was implemented on the AZ fleet in 1991 – “Vlamgat” page 219 The system was first developed during the mid-1980s.

[5] Ref. Nick Scheltema. Nick confirmed that Mk-20 Rockeye CBU s were not used in combat operations contrary to reports in other publications on the Bush War. Nick further noted that the preferred weapons for F1 combat operations up to 1984 were the Matra 155 rocket pods and 1,000 (454kg) GP bombs. Thereafter the SAAF moved to the Mk.81/82 series of GP bombs for combat operations. The LGBs and retarded bomb developments of the Mk.81 were only introduced after 1988, too late to see combat operations.



EXTERNAL LOADS

This image, although dated 1975, is useful in providing reference to the Dassault designed stores pylon descriptions.

CZ #239 with a single RP35 1,200 liter external fuel tank on the fuselage centerline station. The RP35 is unpainted. The stabilizer fin can be seen at the rear of the RP35 on the AZ in the background. The RP35 was the standard external fuel tank used throughout the AZ's service with the SAAF.

AZ with two RP35 1,200 liter external fuel tanks located on the inboard pylons. The RP35 is camouflaged to match the aircraft.

Two images of AZs (#226 above) with RP35 external fuel tank and practice bomb dispensers on the inboard wing stations. Note the fins and endplates at the rear of the RP35. The practice bomb dispenser could carry 4 inert small bombs designed to have the same ballistic properties as a standard Mk.81/82 bomb. The configuration of the inboard and outboard pylons was the same for all external stores carried.

The AZ could carry a single AS30 command guided air-to-ground missile on the fuselage centerline station. Here we see an AS30 departing for its final destination.

Two images of an AZ carrying an AS30 missile and two RP35 external fuel tanks. Note that, although the AZ is painted in the hard-edge buff/dark green camouflage scheme, the tanks have soft edges between the camouflage colours. The configuration of the centerline pylon for the AS30 is very different to that used to carry the RP35 external fuel tank.

AZ carrying two RP35 external fuel tanks on the wing inboard stations and a single AS30 on the fuselage centerline station.

AZ #244 in the 3-colour low visibility camouflage, carrying two RP35 external fuel tanks on the wing inboard stations and a single AS30 on the fuselage centerline station.

Images of AZ #222 above and AZ #230 below carrying a single RP35 fuel tank and two V3B missiles on the wingtips. This would be a typical air defence load, more the domain of the CZ. #222 is in the original buff/dark green/pale blue camouflage whereas #230 is in the final dark earth/green/medium blue-grey camouflage

AZ carrying two RP35 external fuel tanks and two V3B missiles.

AZ in the operational area during the Border War, most likely Ondangwa Air Base. It is loaded with a centerline RP35 fuel tank, two Matra 155 rocket pods and two V3B missiles.

Two images of AZs presenting one of the Border War combat loads which consist of centerline RP35 fuel tank, four Matra 155 rocket pods each with 18 SNEB 68mm rockets and two V3B missiles. The V3B missiles can be identified by the asymmetrical canard foreplane arrangement as can be seen on the missile on the starboard wing. Note that the rocket pods have the frangible aerodynamic covers. These fracture when the rockets are fired. The “Remove Before Flight” tags are fluttering beneath the V3B missiles and rocket pods in the image above – the AZ is on its way to the arming area at the end of the runway where these will be removed and all weapons made live.

AZ #229 heading off on a combat mission.

AZ #222 in hard edge buff/dark green camouflage. Note that the fuel tank has a feathered edge between the camouflage colours. The Matra 155 rocket pods were unpainted and were in various metallic colours. The frangible covers were an off yellow colour. Note the asymmetric canard fin arrangement on the wingtip V3B missile.

The two AZs on the left of the image are carrying three RP35 external fuel tanks whilst the one on the right carries two. All three aircraft have Matra 155 rocket pods on the outboard wing stations. The location looks like it could be Ondangwa in northern Namibia.

AZ carrying two Matra 155 rocket pods on outboard wing stations.

AZ carrying three RP35 1,200 liter external fuel tanks

AZ carrying two RP35 external fuel tanks and an empty CLB4 4-bomb carrier on the fuselage centerline station. The tank on the port wing appears to have been painted in the interim colours of dark earth/green – note the tonal difference between the buff and the dark earth.

AZ #225 late in its career (final dark earth/green/medium blue grey camouflage) carrying two RP35 fuel tanks and an empty CLB4 4-bomb carrier.

AZ #218 carrying two composite (non-metallic) 1,200 liter external fuel tanks developed by CSIR. These were not productionized.

Two images of AZs being fitted with four Mk.82 GP bombs on the centerline CLB4 bomb carrier, RP35 external fuel tanks on the wing inboard station and a Mk. 82 bomb on each of the outboard wing stations. This would be considered a common offensive load on combat operations in Southern Angola. V3B missiles were also carried on the wingtips to provide some form of self-defense if intercepted.
The AZ in the image above is devoid of Castles on the intakes, tri-colour rudder and 1 Squadron badge on the vertical stabilizer. In both images, the AZs are painted in the hard-edge buff/dark green camouflage. Note that the tanks are painted in a soft edge camouflage pattern.

Above : AZ departing on a combat mission carrying six Mk.82 bombs, two V3B missiles and two RP35 external fuel tanks. A heavy load for sure.

Below: AZ carrying a similar load, but these appear to be smaller Mk. 81 bombs – note the space between the front and rear bombs on the CLB4 bomb carrier compared to the image above. The Mk. 82 was a 250 kg bomb whereas the Mk. 81 was a 125 kg bomb (slimmer in profile and shorter). Note the absence of the black tip of the AZ's nose possibly indicating that the ranging radar is not installed.

Head on view of an AZ carrying six Mk.82 bombs, two V3B missiles and two RP35 external fuel tanks.

The AZ in the image above is carrying six Mk.82 bombs, two RP35 external fuel tanks and two V3B missiles. The AZ is painted in the interim colour scheme of matt soft-edge dark earth/green upper surfaces with pale blue lower surfaces and full high visibility markings (with the exception of the tri-colour rudder). The fuel tank is painted in a wraparound dark earth/green soft edge pattern. Note the hard-edge demarcation between the upper and lower surface colours.

Two images of an AZ in a revetment / hardened aircraft shelter carrying a centerline RP35 fuel tank and what appear to be 4 Mk.81 GP bombs, one each on the wing station.

Two images of AZs on combat operations carrying eight Mk.82 bombs, four on the CLB4 bomb carrier and one on each of the wing pylons, and two V3B missiles. This would represent a relatively short range close air support mission as no external fuel tanks are carried.

Both aircraft are painted in the original buff/green/light grey camouflage. However, the AZ in the image above displays the full high visibility markings whereas the AZ in the image below has had most markings removed (no Castles, no Squadron badge and no tri-colour rudder).

AZ at AFB Grootfontein with an interesting mix of four Mk.82 bombs on the centerline bomb carrier, two RP35 external fuel tanks and an ACS pod on the port outboard wing pylon. The aircraft has the RWS installed but not the RIMS ventral fins.

AZ #244 in the three-tone low visibility blue/grey camouflage scheme. #244 carries four Mk. 82 bombs on the centerline CLB4 bomb carrier, two RP35 external fuel tanks and an ACS pod on the port outboard wing pylon. The starboard outboard wing station is empty. Note the downward angle of the rear bombs when carried on the CLB4.

AZ with two RP35 external fuel tanks and CLB4 pylon carrying Mk.81 bombs. The tanks have been painted blue-grey.

AZ carries an empty CLB4 bomb rack, two RP35 external fuel tanks and an ACS pod on the port outboard wing pylon.

Interesting image of an AZ in the interim camouflage with two RP62 external fuel tanks on inboard wing stations and a CLB4 bomb rack on the fuselage station – in this case on two Mk.82 bombs are carried on the forward shackles of the CLB4.

AZ #231 at TFDC Overberg in the southern Cape. It is carrying two ACS pods and two V3B missiles. #231 is also carrying two chaff/flare dispenser pods on the inboard wing station 0 just next to the fuselage. The AZ usually carried only one ACS pod as standard during combat operations in Southern Angola. Equally, the carriage of these particular chaff/flare pods on combat operations was also unlikely.

Two great images of AZs being prepared for a bombing sortie at Ondangwa Air Base in northern Namibia. The load out includes four 450kg bombs on the centerline bomb carrier and two 450kg bombs on each outboard wing station. V3B IR missiles are carried on the wingtips. The RP35 1,200 liter external fuel tank was not carried in this configuration and this would've been a short range sortie.

AZ departing Ondangwa with a heavy load of six 450kg bombs and two V3B missiles

AZ in the Operational Area of Northern Namibia (Ondangwa) carrying an empty CLB4 bomb carrier on the centerline and a 450kg GP bomb on the starboard outboard wing pylon. It also carries V3B missiles on the starboard wingtip.

CLB8 / A26 bomb carriers.

The SAAF introduced the A26 4-bomb carrier in the early 1990s. These would be carried by the AZs on the inboard wing stations. These were used to provide the AZ with an overall bomb capacity of 14 as shown in the following images.

In 1975, according to the Dassault external loads diagram presented earlier in this document, the 4-bomb carrier was designated CLB8 (apparently the 8 was allocated as these carriers had to be carried symmetrically thus totaling 8 bombs) and noted at that stage as "*Study in progress*". The author is unsure why the CLB8 was referred to as far back as 1975 in the Dassault document but only adopted for use by the SAAF in the 1990s and allocated the designation A26. It is possible that this CLB8 remained in development for a significant period, with the SAAF version being finalized later and designated A26.

The A26 carriers were handed (i.e. mirror image) with the inboard bombs being staggered forward of the outboard bombs.

The author could find no images of French or foreign F1s in operational use carrying the CLB8 bomb carriers.

AZ #216 with a trial load of 14 GP bombs. These may be French bombs.

TFDC's AZ #233 is seen carrying 14 x Mk. 82 bombs. The bombs were carried as follows: four on the fuselage CLB4 bomb carrier, four each on the inboard wing stations using the CLB8/A26 bomb carriers and two each on the outboard wing stations (although, on close inspection of the image, the latter appear to be smaller Mk.81s). V3B missiles are also carried on the wingtips. That's 7,000lb or approximately 3 tons of bombs ! AZ would have struggled to get going in this configuration. A more reasonable load would have been 14 x Mk. 81 bombs (3,500lb/1,600kg). This configuration never saw combat operations.

Two views of TFDC's AZ #233 is seen carrying eight Mk. 82 bombs, four each on the inboard wing stations on the CLB8/A26 bomb carrier, ACS pods on the outboard wing stations and an RP35 1,200l liter external fuel tank on the fuselage centerline. The bombs are test articles painted black and white for filming purposes

AZ in final camouflage scheme of matt soft edge dark/earth/green/medium blue grey scheme with toned down markings. It is carrying 10 Mk. 81 bombs and V3B missiles.

The AZ in the foreground is carrying 14 Mk.81 bombs and two V3B missiles, whereas the second AZ is carrying 4 Mk. 82 bombs on the CLB4 carrier, two RP35 external fuel tanks, two V3S Snake IR missiles on the wing outboard stations and two V3Bs on the wingtips.

Two images of AZ with the 14 bomb configuration. These look like Mk. 81 bombs.

Mk-20 Rockeye Cluster Bomb Unit (CBU) installed on the CLB4 centerline bomb carrier. The SAAF F1s used the “long toss” profile during which the aircraft pitches up and releases the bombs so that they fly towards the target in a parabolic arc, allowing an amount of stand-off of the F1 away from the threat of ground-based air defence missiles and guns. This was used to great effect during the Border War operations with Mk.81 and 82 GP bombs.. However, it is not sure if the same profile could be used for the deployment of CBUs as these require the CBU to spin and drop vertically over the target whilst dispensing the bomblets in a radial pattern.

Great image of an AZ showing off a full combat load of four Mk.82 bombs on the centerline bomb carrier, two RP35 external fuel tanks, two V3S Snake IR missiles on outboard wing stations and two V3B IR missiles on the wingtips. Note the RIMS chaff/flare dispensers located integral to the ventral fins.

TFDC's AZ #233 carrying a V3S Snake IR missile on the starboard outboard wing station.

V3S IR missile on an AZ. Note the details of the V3S launcher rail. It is mounted on a pylon specially designed for the V3S in the early 1990s and was unique to the AZ.

AZ at TFDC with a V3C IR missile on the wingtip launcher and a V3S Snake IR missile on the outboard wing station.

V3C missile on the wingtip launch rail of an AZ. The V3C looks similar to the R550 but has a different seeker head and proximity fuse arrangement – note the circular recesses aft of the canard fins on the missile.

AZ #216 is pictured here with the Russian R-73 (AA-11 Archer) air to air missile installed on the outboard wing pylon. #216 was also fitted with a Russian SMR-95 engine in place of the Atar 09K50 and was dubbed “Super Mirage F1”. Neither were taken into operation by the SAAF.

This is AZ #233 was operated by the Test Flight and Development Center (TFDC). Note the TFDC badge on the vertical stabilizer. It appears to be carrying a red painted H2 glide bomb test article on the starboard inboard wing pylon, a data link pod on the centerline and what looks to be a CLB8/A26 bomb carrier on the port inner wing station. The wingtip launch rails have been painted in black and white for photographic reference purposes. A prominent fairing has been installed on the lower rear fuselage between the ventral fins and the forward RWR antennae on the vertical stabilizer leading edge has a more rectangular shape indicating some upgraded avionics have been installed. The H2 was a locally developed glide bomb with electro-optical guidance. This was successfully used by the Buccaneers of 24 Squadron on several combat missions in Angola in 1988.

AZ #242 in interim matt soft edge dark earth/green camouflage carrying an H2 bomb on the centerline pylon and the H2 command module on the starboard outboard wing station.

Two images of AZ #241 carrying the H2 bomb and the command pod. It also c
arries two RP35 external fuel tanks, the starboard one painted in an overall medium grey colour.

AZ #241 carrying two RP35 fuel tanks, H2 bomb on the fuselage centerline, H2 command pod on starboard wing and ACS pod on port wing.

Anonymous AZ in the final camouflage scheme with a similar load to #241 in the first image on this page.

AZ carrying a LGB 745 Griffin Laser Guided Bomb on the centerline pylon. This was not a very typical weapon used by the AZ.

Another view of an AZ with a Griffin Laser Guided Bomb (LGB) on the centerline station. Note the adaptor between the pylon and the bomb.

Reference list.

Apart from the Internet, several published reference works were used in the compilation of the three Volumes of this book. These are :

Aircraft of the South African Air Force	Herman Potgieter and Willem Steenkamp	Struik ISBN 0 86977 133 7 1980 first edition
South African Air Force In Profile Artwork (1960 - 1989)	Piet van Schalkwyk	Golden Eagle Artwork, 2022
South African Air Force In Profile Artwork Volume 2 (1985 – 2003)	Piet van Schalkwyk	Golden Eagle Artwork, 2024
Squadrons of the South African Air Force (and their aircraft 1920 – 2005)	Steven McLean	Interpak Books ISBN 0-9584929-4-8 2005
More Than Game – A salute to the South African Air Force	Herman Potgieter	AirReport ISBN 0-620-19213-5 1995
Vlamgat – the Story of the ~Mirage F1 in the South African Air Force	Dick Lord	Covos-Day Books ISBN 0-620-24116-0 2000
The SAAF at war 1940 – 1984	JS Bouwer and MN Louw	Chris van Rensburg Publications (Pty) Ltd ISBN 0 86848 056 7 1989
The MiG diaries – Fighter pilot memoires & accounts of Cuban, SAAF and Angolan air combat in Southern African skies	Lt-Col E. Gonzalez Sarria & Lionel Reid	Burnet Media ISBN 978-1-990956-60-7 2023
Africa @ War 54 – War of Intervention Angola Volume 4	A. Fontanellaz, T. Cooper, J.A. Matos	Helion & Company Limited ISBN 978-1-804510-59-9 2021