Cheetah E

In South African Air Force service

Document prepared by : M. Reid

February 2024

In the compilation of this document, data has been obtained from various Internet sources and contributors. This data has been cross-referenced where needed to ensure, as much as possible, the consistency and correctness of that data. Many of the images have been sourced through Internet searches and have been included in this document on a “fair use” basis for the purposes of historical research and the recording thereof. The quality of images obtained from the internet are, in many instances, low due to resizing of the originals for internet use. These images have been retained as sourced and have not been subject to any adjustments (hue, saturation etc.) and have not been sharpened.

This document is offered as a free e-book and in no way does it provide a source of income for the author or any other party.

There are three main parts to this document :

- Part 1 – General description of the Cheetah E including close-up detail images
- Part 2 - Cheetah #842 walkaround
- Part 3 – General images of the Cheetah E in SAAF service

Thanks to Martin Strumpfer for doing a review of this document and adding valuable input – his title as “Chief Rivet Counter” remains intact !

Thanks to the guys from the “Model Talk” WhatsApp group for all sorts of Cheetah E data and images.

References :

The internet.

Cheetah, Guardians of the Nation, Winston Brent, No. 23 of the African Aviation Series, ISBN 978-0-9802797-1-9.

Part 1 – General description of the Cheetah E including close-up detail images

Introduction to the Cheetah E

The single seat The Cheetah E was based on repurposing the SAAFs fleet of 16 Mirage IIIEZ aircraft. The Cheetah E was designed with the assistance of Israel Aircraft Industries (IAI) and benefited from a high level of IAI technical design input and use of similar components as used on the Kfir C2. The first Mirage EZ conversion to Cheetah E standard was airframe #820 and this work was completed by IAI in Israel. The remainder of Mirage IIIEZ airframes were converted to Cheetah E standard by Atlas Aircraft Corporation (Atlas) in South Africa. Common wisdom has it that the Cheetah E was produced as an interim design whilst the more complex Cheetah C was under development. Project Carver was also in the early concept phases in the late '80s as well.

The fuselage, engine and landing gear of the Mirage IIIEZ were retained, with a large portion of the remaining original airframe components being new. The Mirage IIIEZ airframes which were converted to Cheetah E were 819, 820, 822 to 834, 842. Mirage IIIEZ #821 has crashed prior to the advent of the Cheetah programme and was replaced by a new airframe given the number 842. #842 is the preserved airframe at the SAAF Museum, AFB Swartkop, in Pretoria.

The Cheetah E was operated by SAAF 5 Squadron out of Louis Trichardt (Makhado) Air Base for a limited period (March 1988 to October 1992).

Five Cheetah E airframes (#s 819, 820, 827, 832 and 833) were sold to Chile but were likely only used as a source for spares for the Chile Pantera fleet and thus likely did not fly with the Chilean Air Force.

Differences between Cheetah E and Mirage IIIE

The following are the main changes / modifications introduced to convert the Mirage IIIEZ to the Cheetah E :

Aerodynamic refinements :

- The Mirage IIIEZ wings were not reused. New wings based on the Kfir design were fitted to the Cheetah E. This wing had the outer section leading edge extended resulting in a characteristic dog tooth.
- Small aerodynamic fences were installed inboard of the dog tooth on the wing upper surface.
- Fixed canard foreplanes were installed on the intakes. These required local reinforcing of the intake area. The canards were smaller than those fitted to the Kfir (around 70%).
- Aerodynamic strakes were installed either side of the front of the nose.

Airframe changes :

- Two additional weapons hard points (stations) were installed on the lower engine intakes.
- A new nose was installed which incorporated a ranging radar and improved avionics.
- The EZ doppler radar antenna beneath the cockpit was removed for the Cheetah E.
- A larger engine bay cooling intake was installed on the port upper fuselage. The original size intake on the starboard side was retained.
- The dorsal avionics bay aft of cockpit had a different access cover configuration to that of the Mirage IIIEZ.
- The ventral rear fin was modified to incorporate an integral chaff/flare dispenser (RIMS or Radar and Infrared Misleading System), resulting in a larger angular shape.

Upgraded aircraft systems :

- A fixed aerial refueling probe was installed on the upper starboard intake.

- An upgraded CRWS (Compact Radar Warning System) was fitted with antennae visible on the forward fuselage and vertical stabilizer.
- Additional EW antennae were installed on the nose underside and vertical stabilizer. However, the nose EW antennae was not always installed – check references.
- The Cheetah E had a vastly upgraded avionics suite compared to the Mirage IIIEZ.
- The cockpit instrument panel was significantly changed and included a single Multi-Function Display (MFD).
- A Martin Baker Mk. 10 ejection seat replaced the Mk. 4 of the mirage IIIEZ.
- The undercarriage configuration was similar in arrangement to that of the Mirage IIIEZ but was possibly strengthened as was done for Mirage 5 / Nesher.

The Cheetah E retained the Mirage IIIEZ's Atar 09C engine.

Single piece frameless windshield

At least one Cheetah E, #833, had a single piece windshield installed (similar to the Cheetah C and later as applied to the Cheetah D). Refer to images elsewhere in this document.

Markings

The Cheetah Es were painted in an overall matt medium grey. The exact paint designation is not known.

There were several iterations to markings and overall finish applied to the Cheetah Es. These are discussed below.

High visibility markings

Blue SAAF Castles were applied with a light grey outline and a gold Springbok : these were located on the intakes (both sides) and the upper port and starboard wings. It is possible that the Castles were not applied to the lower wings. Sizes were 30 inches in diameter on the wings and 24 inches in diameter on the intakes (this dimension is the diameter of a circle drawn around the five outer points of the Castle). The Springbok faces forward on the intakes and, on the wings, faces inwards towards the fuselage with legs towards the wing trailing edge.

The aircraft 3-digit tail number (8 inch high numerals) were applied in black on the rear fuselage (both sides) just aft of the wing trailing edge.

The last two digits of the tail number were replicated in small numerals on the forward facing nose gear door.

The 5 Squadron badge was applied to the vertical stabilizer (both sides).

Cheetah E text and the Cheetah logo were applied on the forward fuselage (both sides).

Low visibility markings

All markings including Castles, 5 Squadron badge, aircraft tail number, Cheetah E text and logo were over sprayed to varying degrees with the base medium grey colour to tone them down. This was possibly applied to the aircraft once received at Squadron or during one of the service intervals. Alternatively, some aircraft may have been delivered from Atlas with the low visibility scheme applied some way through the production process.

It appears that the wing Castles may have been deleted entirely or over sprayed to such an extent as to render them invisible on available images.

5 Squadron markings

Apart from the 5 Squadron badge carried either side of the vertical stabilizer, some Cheetah Es had the top of the vertical stabilizer painted in white. This was the Squadron Colour used by 5 Squadron during the Second World War. For those Cheetah Es with the low visibility scheme, this white was over sprayed to varying degrees.

Two-tone grey camouflage

Only Cheetah #842 was painted in an experimental two-tone grey camouflage with a fake canopy on the underside of the nose. This aircraft currently resides at the SAAF Museum at Swartkop in this scheme. The Castles on this aircraft were changed to incorporate the winged eagle in place of the Springbok. It appears that the Castle was applied to the intakes and the upper port wing surface only (based on what can be seen of #842 at the Swartkop SAAF Museum). There was no 5 Squadron badge applied to the vertical stabilizer.

Commemorative colour scheme

Cheetah E #831 was painted in overall gold with a white fin tip to celebrate the 50th anniversary of 5 Squadron. A panel on the forward fuselage was masked off to preserve the *Cheetah E* text and logo, thus displaying the standard medium grey background.

Special markings

At least one Cheetah E, #833, was painted with water soluble white markings on the fuselage and upper and lower wings surfaces for purposes (assumed) as bogey aircraft during air combat maneuvers / weapons camps.

Bogus Spottie

Cheetah E #826 has been painted in "Spottie" Cheetah colours as displayed at the SciBono display hall in Johannesburg. This is a bogus paint job as no Cheetah E flew in this colour scheme. Only Cheetah C #342 was painted in the "Spottie" scheme.

Other details

"No step" boot markings were applied to the upper airbrakes, canard upper surfaces and upper surfaces of the three control surfaces on the wing in dark grey / black. These were over sprayed for the low visibility scheme.

Limited standard NATO symbology was used on the airframe but became quite indistinct with the overspray of the base grey.

General colours

- Cockpit interior is a medium blue-grey.
- Main and nose undercarriage bays and interior of doors – gloss white
- Main and nose undercarriage legs and wheel hubs – light grey
- Airbrake internal surfaces and bays – gloss white

Refueling probe

Whilst most images sourced for this article show the refueling probe in place, there are instances where Cheetah Es were flown without the refueling probes installed.

Cheetah E weapons

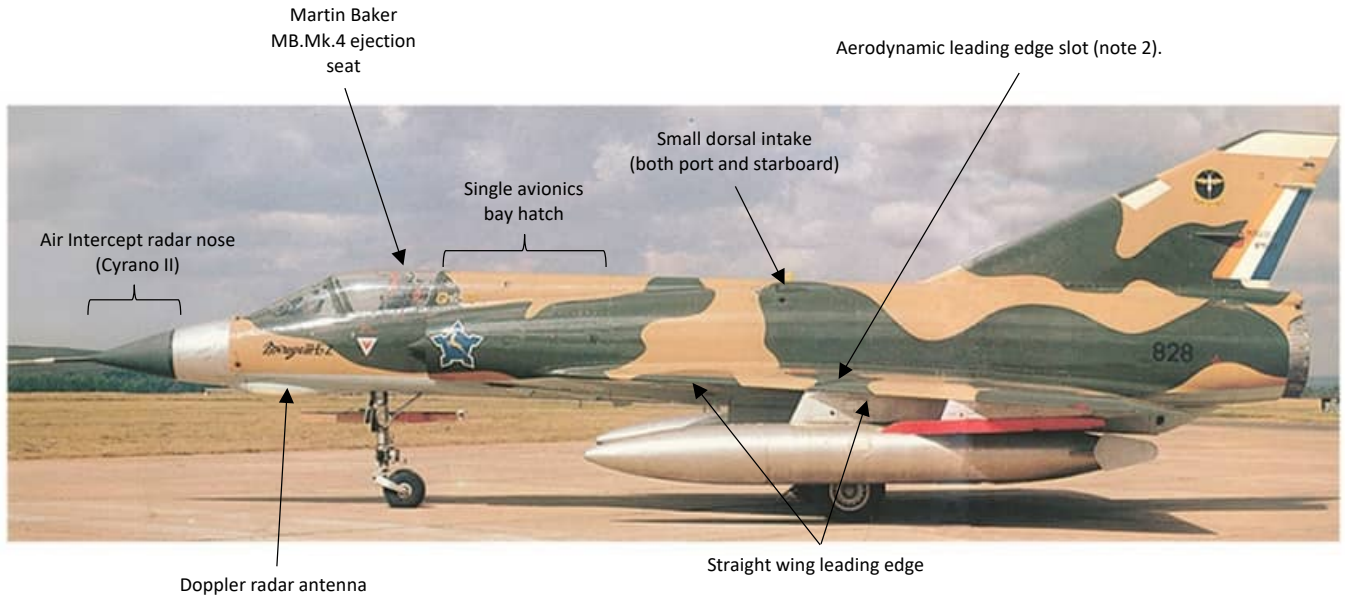
The Cheetah E could carry the following weapons:

- V3B IR air-to-air missiles – on the outboard wing stations only.
- Mk. 81 /82 series of bombs, either on the centerline PM-3 pylon (two in tandem), intake pylons (singly) and / or on the RPK combined wing tank/bomb carriers (two in tandem), the latter being carried on the inboard wing stations only.
- RP30 1,300 liter subsonic external fuel tank – inboard wing stations only.
- RP825 880 liter supersonic external fuel tank – carried on the centerline station only.

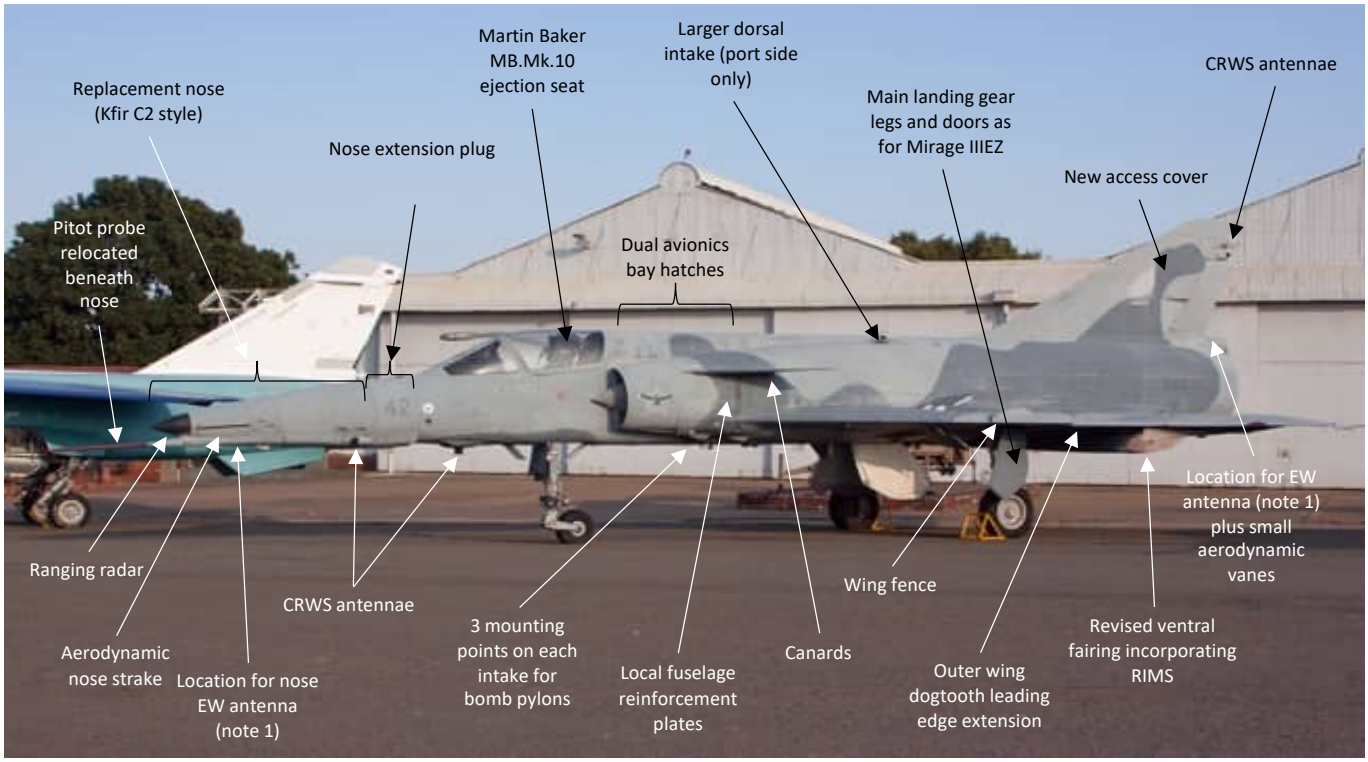
- “AZ” 500 liter supersonic (finned) external fuel tank – inboard wing stations only.
- Griffin LGB on intake pylons only. These required a different arrangement of pylon to that used to carry the Mk. 81 / 82 bomb.
- V3S Snake (Python) IR air-to-air missiles - on outboard wing stations only.
- Wing stores were carried in a symmetrical arrangement i.e. on both wings.

Differences between Mirage IIIEZ and Cheetah E

The images on the following two pages provide a reference of the visible changes done to the basic Mirage IIIEZ to result in a Cheetah E.

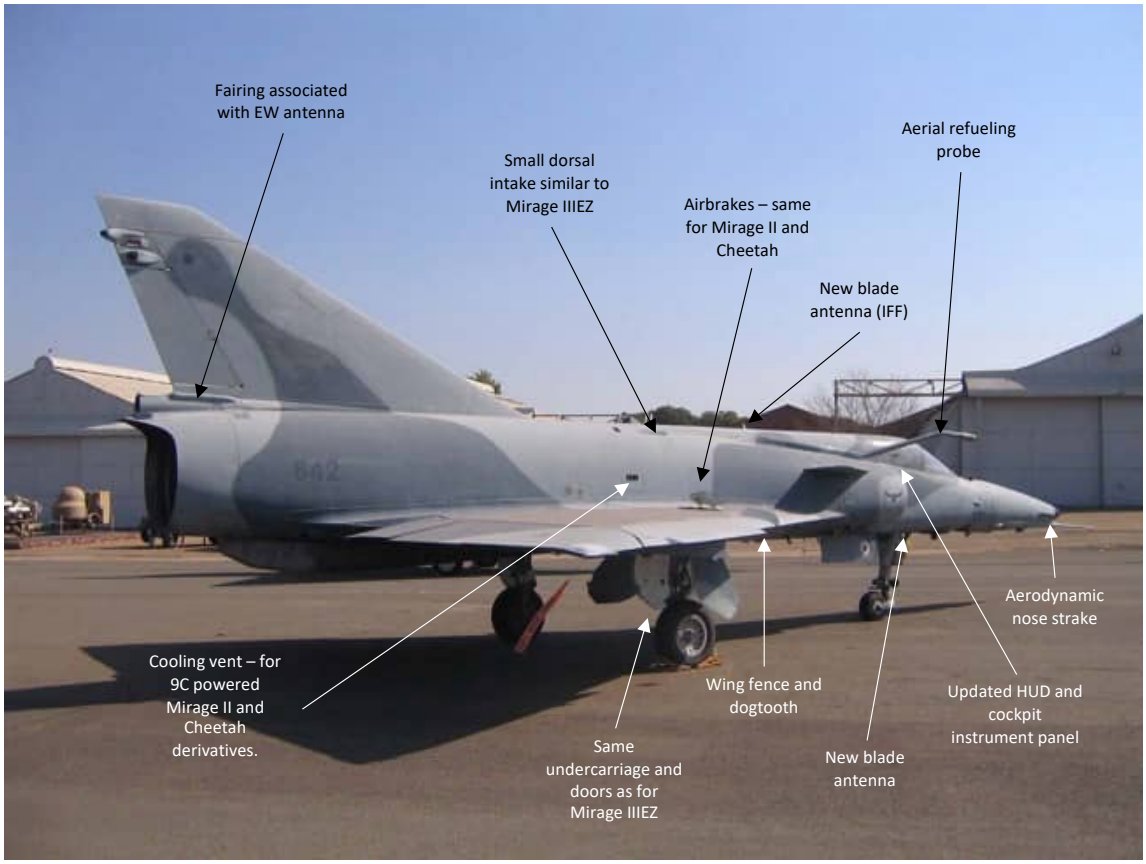


Mirage IIIEZ #829 (above) and Cheetah E #842 (below)



Note 1 – the EW antennae which were variably installed on the Cheetah E fleet are not present on #842 above. Images are presented elsewhere in this document which show these EW antennae.
Note 2 – the aerodynamic leading edge slot on the Mirage IIIEZ wing is not present on the replacement Cheetah E wing.

Mirage IIIEZ #829 (above) and Cheetah E #842 (below)



The Mirage IIIEZ #829 (top) wing has a straight leading edge only interrupted by the aerodynamic leading edge "slot" which can be seen as a dark line at around half span in the image. This was not present on the Cheetah E #842 (above) wings which were Kfir wings with the extended outboard leading edges, resulting in the "dog tooth". The wing fences inboard of the dog tooth were added to provide some aerodynamic interaction with the vortices generated at high angles of attack by the nose aerodynamic strakes and the canards over the wing.

Part 2 - Cheetah #842 walkaround

The following pages contain images of Cheetah E #842 as it is on display at the SAAF Museum at Swartkop Air Base. #842 is representative of production standard Cheetah Es.

Cockpit of Cheetah E #842 showing a much more modern layout than the standard Mirage IIIEZ. Note the MFD at bottom left of the panel and the RWR (threat) indicator at top right of the panel. The ejection seat is a Martin Baker MB.Mk.10.

Cockpit layout typical of a Mirage IIIEZ showing the radar scope display for the Cyrano II radar in the center of the panel. The ejection seat is a Martin Baker MB.Mk.4.

Martin Baker MB.Mk.10 ejection seat

View of the left side of the cockpit.

View of the right side of the cockpit

Cheetah E #842 at Swartkop – looking rather faded. Note the low visibility markings, including the dull red ejection warning triangle.

The apparent changes from the Mirage IIIEZ can be seen in these images – new nose with strakes, canards, fixed refueling probe, new RWR and EW antennae, wings with leading edge “dog tooth” extensions and wing fence. The nose gear door is dark grey – this is part of the “false” canopy painted on the aircraft underside.

The larger air intake on the upper left side of the fuselage is clear in the image above. Note the location of the wing fences in relation to the “dog tooth” and the single pitot probe offset to starboard ahead of the windshield. The large two-digit code on the nose gear door replicates the last two digits of the aircraft number.

Undercarriage bay interiors and inner surfaces of the doors were painted in white. The landing gear legs and wheel hubs were painted light grey.

The almost cylindrical nose extension plug can be seen here with “42” painted on it.

Note the difference in shape and size of the fuselage dorsal intakes between port and starboard.

Cheetah E #842 was converted from Mirage IIIEZ #842. The two-tone grey camouflage scheme was unique to this particular aircraft. 842 was delivered to the SAAF Museum at AFB Swartkop in this camouflage scheme. The Castles have been applied with the SAAF Eagle in place of the earlier Springbok.

The cylindrical shaped nose plug can be clearly seen. This has a cooling vent at the bottom. The black antenna just forward of the nose plug and the cylindrical antenna below the Cheetah E logo are part of the Compact Radar Warning System (CRWS). The blade antenna is most likely a UHF antenna.

The inside of the nose gear door is white. The nose gear leg is light grey. The avionics bay access panel aft of the canopy opens in two sections. On the Mirage IIIEZ, this was a long single access door which hinged at the back.

The round antenna on the nose gear door is the IFF antenna. The probe beneath the fuselage aft of the nose gear door is the total air temperature probe, which forms part of the air data system.

The rectangular shape beneath the canard foreplane is the engine intake blow in door – this opens to allow more air flow into the engine. There is a “C” shaped reinforcing strip at the rear of this intake door and is a local reinforcement required due to the additional aerodynamic loads imposed on the intakes by the canards.

Port side view of the vertical stabilizer. The rudder control actuator failing is visible. Note that the outboard two control surfaces (elevons) on the wings are slightly drooped – this is typical of Mirage III and Cheetah aircraft in a static configuration. The inboard control surface is at the neutral position.
Barely visible is a trapezoidal shaped access cover at an angle just above the rudder actuator fairing. This panel appeared on the Cheetah E port vertical stabilizer surface and was not present on the Mirage IIIEZ.

Starboard side view of the vertical stabilizer. The two spherical black objects are part of the CRWS.

Cheetah E details – note the configuration of the two CRWS antennae at the top of the vertical stabilizer. Two other details to note (different from the Mirage IIIEZ) are :

a) The long fairing just beneath the rudder – assumed as a protective cover over cables which would likely have serviced the rear EW antenna (not installed on 842) which was located above the drag chute housing.
b) Two small vanes above the exhaust nozzle (both sides) – possibly to do with assisting extraction of the drag chute due to air flow interference from the EW antenna. The cap for the drag chute housing above these vanes is missing.

Underside of the nose – there are two cooling vents visible for the avionics in the nose. The round transparent item is the cover for the crash tow tube.

The pitot probe was relocated from the tip of the nose on the Mirage IIIEZ, to beneath the nose on the Cheetah E. The black nose is where the ranging radar is located. The aerodynamic strake can be seen just aft of the radome. The white circle is where the angle of attack (incidence) probe is located. This is located on the port side only.

The fairing onto which the CRWS antenna is located is a distinctive feature of the Cheetah E. Note the dark grey false canopy painted on the underside. 842 was the only Cheetah E painted as such.

The leading-edge wing fence with reinforcing plate. This was located where the aerodynamic slot was on the Mirage IIIEZ. This was only installed on the Cheetah E and D and not the C and may have something to do with the fact that the E and D were fitted with the 70% sized canards.
There is also a small rectangular fairing at the wing to fuselage junction (visible on the left in the image above) which was not present on the mirage IIIEZ and is assumed to be local reinforcing required for the Kfir wing.

Airbrakes on Mirage IIIs and Cheetahs were typically seen at various raised positions with hydraulic power off. These were operated to bleed the hydraulic system when the engine was powered down. Note the “no step” footprint on the airbrake.

Starboard underside air brake detail. Interior of the air brake and the bay are painted white.

Port side wing fence and airbrake. The interior of the air brake and the airbrake bay were painted white.

Starboard side cooling intake – this is the same configuration as for the Mirage IIIEZ.

The larger air intake as installed on the Cheetah E port fuselage. The Mirage IIIEZ had a smaller intake in this position, similar in size and configuration to that on the starboard side.

The oval opening on the starboard side of the fuselage was characteristic of Mirage IIIs and Cheetahs equipped with the Atar 09C engine. The Cheetah C and D fitted with 09K50 engines had this covered.

The wing fence and dogtooth on the leading edge of the wing can be seen in the image above.

Images showing the dogtooth and wing fence on both wings. The pylons for carriage of air to air missiles can be seen at the outboard wing station in the images above.

Details of the fixed refueling probe. The probe has a slightly nose-down attitude when viewed from the side.
Note the localized reinforcing around the intake blow-in door beneath the canard in the image below right.

Mounting points for the intake bomb pylons – 3 points per side. The Mirage IIIEZ was not equipped with these. Note the various cooling vents on the underside of the fuselage.
The twin air scoops for the gun bay purge air can be seen in the image on the right. The T-shaped object is the total air temprature probe, part of the aircraft's air data computer system.

The Mirage IIIEZ ventral fairing was replaced with a larger angular unit on the Cheetah E as seen in the images above. This incorporated the chaff and flare dispenser.

Note the variation in the vents and drains either side of the ventral fairing. The configuration of the vent shown in the image on the left above is typical for both sides of the Mirage IIIEZ. The additional intake and vent in the right hand image was specific to the Cheetah E.

The rectangular chaff / flare dispenser results in the ventral fairing having a more bulky and angular shape than seen on the Mirage IIIEZ. The two circular hatches are part of the ventral fuel tank system. Note also the additional intake and vent on the starboard side which was particular to the Cheetah E.

Details of the port canard.

Nose gear leg and door configuration was unchanged from the Mirage IIIEZ.

The Cheetah E retained the Mirage IIIEZ undercarriage and two door arrnagement. The undercarriage on the Cheetah D and C were upgraded to 16 ton capacity and consted of a more complex door arrangement.

Lower forward fuselage vents, intakes and cannon muzzle brake detail. The arrangement of the vents was similar to the Mirage IIIEZ. The two forward-facing vents were for air to purge gasses from the gun bay – the grilles in the image above are the purge outlets. The Cheetah E retained the mirage IIIEZ's two DEFA 30mm cannon – the muzzle brakes can be seen beneath the intakes. The panels with the dark grey stylized canon round are the access panels to the cannon. For the Mirage IIIEZ, the cannon tray was a single unit which would need to be dropped for servicing necessitating the removal of the centerline pylon. On the Cheetah E, this was modified to a three panel arrangement as can be seen in these images – this allowed access to the cannon independently.

Main landing gear details. Cheetah E main landing gear was unchanged from the Mirage IIIEZ. The Inside of the doors and gear bays was white. The landing gear legs and wheel hubs were light grey. The two main doors as seen in the image bottom left were usually closed once the landing gear had been extended. The striped panel in the image below right was a hatch whebrey ground crew could access and overide the door retraction for maintenance purposes.

Image left – port main landing gear leg. Note the typical inward angle of the landing gear leg. The inward retraction piston is to the upper left of the image. The hoses are for the wheel brake units.

Image left – port main landing gear leg. The secondary retraction piston can be seen upper right of the image. This piston was used to pull the landing leg partially forward whilst being retracted and had a dual function as a shock strut.

There is a lot of hydraulic hose detail for the modeller.

Image left – Port main landing gear hinge axle. The inward retraction piston is seen on the left with the secondary retraction piston to the right, undercarriage leg in the middle. It is connected to the axle via a pivot joint. This arrangement allows for the simultaneous inward and forward movement of the leg during retraction.

Image left – Port main landing gear outer door and forward retraction piston.

Rear view of port main landing gear leg with inward retraction piston.

Detail of starboard main landing gear leg showing the two gear retraction pistons. The rear piston retracts the landing gear leg inwards whilst the forward piston pulls the landing gear slightly forward.

Port landing gear door. Note the two door lock mechanisms.

View looking forward into the port landing gear bay. The grey object is the door retraction piston.

View looking forward into the starboard landing gear bay. The inward retraction piston is visible at top right of the image

Closer view of the port landing gear inward retraction piston and hydraulic hoses.

Cheetah E logo – port side

Cheetah E logo – starboard side

Last two digits of the aircraft number are painted onto the nose plug extension. This appeared to be unique to #842.

3-digit aircraft number painted onto the rear fuselage.

Castle on port intake.

Castle on starboard wing.

Ejection seat waring triangle and canopy marking on starboard forward fuselage.

Ejection seat waring triangle and canopy marking on port forward fuselage.


842

Note the angular shape of the ranging radar and the cooling vent beneath the strakes. Some Cheetah Es carried a prominent EW antenna just ahead of this vent.

Note the “C” shaped reinforcing strip around the intake blow in door.

Starboard wing outboard stores pylon. The air-to-air missile launch rail would be mounted onto this pylon. The Cheetah E could carry either the V3B Kukri or V3S Python. These missiles had different rail configurations.

Note the “no step” footprint markings on each of the three wing moving surfaces.

Data plates seen inside #842's main landing gear bays. These are clearly not Mirage IIIEZ wings and are designated as R25-000-101 and -102. Note that the date of manufacture is August 1986. It is assumed that these were new build wings and not reused ex-Kfir C2 wings.

Part 3 – General images of the Cheetah E in SAAF service

Part 3 provides images obtained from various sources showing the Cheetah E in service at Squadron level with the SAAF. These images provide further information pertaining to the variable paint schemes as well as weapons configurations, whether cleared for operational use or for test purposes only.

Clean Cheetah E (apparently #820) with air brakes fully deployed. It appears that the refueling probe has not been fitted and there is a non-standard white antenna just aft of the cockpit which was not fitted to the rest of the Cheetah E fleet. Note as well the non-standard pitch and yaw sensors on the pitot probe. These items were likely flight test equipment fitted to #820 as part of the Cheetah E flight test programme.

The angle of the sunlight shows up some of the underside details nicely. The large circular shape ahead of the port wing airbrake is assumed to be an access panel and did not appear on the Mirage IIIEZ. The wing leading edge dogtooth, wing fence, nose aerodynamic strake, canards, ventral RIMS housing and various CRWS antennae are clearly visible.

The light grey triangular shapes on the wing undersides are the outboard elevon (control surfaces) actuator aerodynamic fairings. The Cheetah, like the Mirage III, had three trailing edge control surfaces per wing – the inner control surface was part of the stability augmentation system (SAS) and moved independently of the outboard control surfaces, or elevons (2 on each wing). The elevons were used to control the aircraft in pitch and roll.

Two images of Cheetah E (#828 above) carrying only air to air missile rails on the outboard wing stations. These are most likely for the V3B missiles. The angular shape just aft of the pitot probe on the lower nose is the forward avionics bay cooling vent. Note the twin landing lights on the nose undercarriage leg. Other details to note are : a) the angle of attack sensor protruding from the port forward fuselage in the image above, b) the forward CRWS antennae visible in both images, c) the wing fences and dogtooth wings and d) the nose aerodynamic strakes. Note also the different configuration of the port and starboard dorsal fuselage intakes.

Cheetah E #832 carrying V3B missiles and RP62 1,300 liter external fuel tanks on the wings and empty bomb pylons on the intakes. There appears to be a bomb on the rear station of the PM-3 bomb beam which is carried on the aircraft centerline. The Castle on the intake is blue with light grey edge and gold Springbok. The ejection seat warning triangle is in red and white and appears not to have been toned down.

Cheetah E #829 carrying two RP62 1,300 liter external fuel tanks. Note the distinct access panel on the vertical stabilizer just above the rudder actuator. This appeared on the port side of the Cheetah E, and was not present on the Mirage IIIEZ

Two images of Cheetah E #842. In the image above it is seen carrying a light blue (inert) V3B missile on the outboard port wing station and an RP825 880 liter centerline fuel tank and the original Castle with Springbok in low visibility grey. In the image below it is carrying two RP62 1,300 liter fuel tanks and the Castle has been replaced with one which is a lighter grey with dark grey border and a dark grey Eagle.

Cheetah E trailing its drag chute on landing. It appears to be carrying two different CATM (Captive Air Test Missiles) on the outboard wing stations. The CATM on the port wing has what appears to be an IR seeker in place and is likely the V3S CATM. For a CATM item, the IR seeker would be fully functional and is connected to the helmet mounted sight and is used for training purposes. The item on the starboard wing is likely a V3S dummy store, and not a CATM.

This page presents an interesting selection of images of Cheetah Es preparing for a sortie at Louis Trichardt (Makhado) Air Base. Note the white fin tip on some of the aircraft – white was the 5 Squadron colour which originated from WW2.

Although the other aircraft in the images on this page appear to carry all-blue V3B missile (indicating inert or training articles), #833 above has a V3B with a buff forward section. Typically, the buff coloured missile indicated a live round, but in this case may imply a CATM article. #833 has several temporary white markings applied to the upper and lower wings, canards and on the spine aft of the cockpit. It is assumed the purpose of this was to make #833 more visible as a "bogey" for air combat maneuver training. #833 also has a single piece windshield fitted where the others likely retain the framed windshield.

All of the aircraft in these images carry the centerline RP825 880 liter supersonic external fuel tank.

The middle aircraft has a white painted cover over the VHF antenna on the vertical stabilizer leading edge.

More images on this page from Cheetah E operations at AFB Louis Trichardt (now Makhado Air Base).

Cheetah E parked in the revetment at Makhado and is carrying two RP62 external fuel tanks and intake bomb pylons.

Take off sequence of Cheetah E with what appears to be a white centerline pylon (may be natural metal) and a white cover to the leading edge VHF antenna. It carries the prominent EW antenna beneath the nose aerodynamic strakes. An RP825 tank is carried on the centerline and two V3B missiles on the wings.

Assumed to be another image of #833 with the whitewash areas clearly visible, including the pylon for the centerline RP825 fuel tank and lower wing areas. The EW antennae have been installed beneath the nose just aft of the pitot probe and aft of the vertical stabilizer above the drag chute housing.

Cheetah E carrying two RP62 1,300 liter external fuel tanks. The outboard wing station pylons have been fitted for the carriage of missiles, but the missile launch rails are not in place. These pylons replace the aerodynamic fairings over the outer elevon actuator. The aircraft also carries an empty PM3 bomb beam on the centerline (note the bomb shackles in tandem) as well as the intake bomb pylons. The ventral fairing on the rear fuselage is the original (early) narrow configuration for the chaff / flare RIMS dispenser. Later configuration RIMS dispensers fitted to the Cheetah D and E were wider. There don't appear to be any Castles on the lower wings.

Image above left (and magnified section, above right) of what appears to be #833 with the temproary white markings and a single piece windshield.

Clean Cheetah E with white fin tip and cover over the VHF antenna. This Cheetah E is not carrying a refueling probe.

Another close up image of #833 clearly showing a frameless wifnshiedl. The extent of this modification to other Cheetah Es is unknown.

Overall medium grey Cheetah E, emerging from the hardened air shelter (HAS) at Makhado.

Cheetah Es carrying the finned AZ 500 liter supersonic fuel tanks. The tank on the aircraft with the white fin tip is a goldish colour (compared to that at bottom left of the image), indicating that it may have been treated with a protective lacquer coat.

Cheetah E in clean configuration showing off the location of the wing Castles.

Aviator sign language – no doubt pilot telling ground crew that one engine is turning and burning !

Cheetah E most probably seen at a weapons camp at Durban in the early 90's. It is carrying a buff painted V3B missile. Castles are blue with light grey edging and gold Springbok.

Cheetah E, again possibly at Durban, this time carrying a light blue V3B missile and wing mounted RP62 1,300 liter fuel tanks. There also appears to be an RP825 880 liter tank on the centerline station. This would be a typical ferry configuration. The silver square area looks suspiciously like duct tape covering an access panel. The ground cooling unit is plugged into the nose avionics bay.

A collection of images of Cheetah Es possibly at a weapons camps. The various external fuel tank configurations visible are the AZ finned 500 liter wing tanks (top left), RP825 880 liter centerline tanks (top right and bottom left) and wing mounted RP62 1,300 liter tanks (bottom right).

Cheetah E #842 operations. It would be interesting to find out if the two-grey camouflage provided any benefits over the single medium grey scheme. In the image below left, the 5 Squadron Badge can just be seen ahead of the rudder actuator fairing.

Cheetah E plugged into the ground airconditioning unit to keep the avionics cool. Of interest are the light blue inert V3B missiles and the unpainted RP62 1,300 liter fuel tanks. The tanks were more commonly painted in an overall medium grey.

SAAF Boeing 707 and three Cheetah Es; the center Cheetah E with white wing markings may be #833.

Cheetah Es with the nose and rear EW antennae installed.

Cheetah E #828 with white fin tip and cover over VHF antenna.

Cheetah E with three Mk. 81 or 82 bombs, two RP62 fuel tanks and two V3B missiles

Cheetah E showing that it was quite a sleek looking machine from some angles …

Cheetah E #826 painted in the bogus “Spottie” colour scheme.

Cheetah E in a compromising position amongst the thorn trees – of interest is the round shaped EW nose antenna.

This is an image of a Chilean Pantera which was very similar to the Cheetah E. It is carrying two Griffin laser guided bombs and two RP62 fuel tanks. The Cheetah E could carry the same weapons.

Cheetah E #829 and one of its DEFA 30mm cannon.

Cheetah E equipped with outboard air to air missile pylons. However, the missile launch rails are not present. These pylons, when installed, would replace the outer elevon actuator aerodynamic fairings.

Cheetah E in South African Air Force service

Cheetah E #831 was painted in overall gold with a white fin tip and black “50” on the fuselage to celebrate the 50th anniversary of 5 Squadron. A panel on the forward fuselage was masked off to preserve the *Cheetah E* text and logo.

Beautiful image of Cheetah E #832 with a V3B missile on the outer wing station and RP62 1,300 liter tanks on the inboard wing station. This load would have been carried symmetrically. The intake bomb pylons are also in place as well as what appears to be a PM3 bomb beam on the centerline (the front can just be seen aft of the intake pylon) as well as the fins of a bomb on the rear station.

Cheetah E with a “live” V3B missile as denoted by the buff colour. Note the light grey colour of the missile launch rail.

Cheetah E with two RP62 1,300 liter eternal fuel tanks on the inboard wing stations and empty missile launcher rails on the outboard stations. It also carries an empty centerline PM3 bomb beam. The rear bomb stabilizing arm can be seen at the trailing edge of the beam.

A damp Cheetah E with either Mk. 81 or 82 bombs on the intake pylons, RP62 fuel tanks and V3B missiles.

Images of Cheetah E #834 taken in 1991 during the integration of the V3S Snake (IAI Python 3) missile onto the outboard wing stations. In the image above, two V3S missiles are carried. In the image below only one is visible on the port wing, possibly indicating that the other one has been launched. Note how angular the nose looks in the image below. The airbrakes are fully deployed and the auxiliary engine air intake door beneath the canard is open. The forward EW and RWR antennae are clearly visible.

V3S testing on Cheetah E #834. Note the EW antennae beneath the nose and above the engine exhaust. The white spherical object above the exhaust is the drag chute cover.

Cheetah E #823 with a theoretical external stores load – on the centerline, 3 bombs on a Triple Ejector Rack (TER) on the forward position of the PM3 bomb beam with another bomb on the rear position of the PM3, two bombs on the intake stations, two bombs each on the RPK combined fuel tank / bomb carriers on the inboard wing stations and one V3B each on the outboard wing stations. The bombs are most likely Mk. 81 GP bombs (125kg / 250lb). The V3B is painted light blue indicating an inert round.

The RPK combined tank/bomb carrier is unpainted. Note the angle of the main gear doors (not fully open) likely required to clear the TER and bombs. It is uncertain if the TER was indeed a viable stores option due to interference with the landing gear doors and whether the landing gear could in fact be retracted with the doors at this angle. Blue bomb bodies represent inert practice (non-explosive) bombs.

Cheetah E #829 fitted with a single TER on the forward station of the PM3 bomb beam. In the image below, it appears that two sets of chaff and flare dispensers have been installed either side of the PM3 beam. The bomb on the left of the TER appears to be a rocket boosted weapon most probably designed for penetrating concrete / runways. Once again, note that the port main gear door appears to not be fully open.

The original style RIMS chaff and flare dispenser located on the narrow ventral fairing, in this case a Cheetah D. – the E would have been similar. There are two blank covers over each of the 2 row side by side chaff/flare dispensers.

In comparison, the later wider RIMS chaff and flare dispensers (fitted to #842), this time without blank covers. Instead of the total of 4 dispenser rows, it is now 10 rows wide.

Here's an interesting one – a Cheetah E (at left) spotted at an ACM camp with a gaggle of Mirage IIICZs – the Cheetah sports an orange/white/blue rudder flash. This is most likely a replacement item from a Mirage III.

Cheetah E with "Mach 2" marking.