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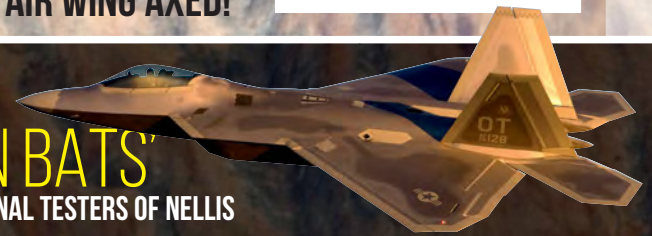


PLUS



TIGER II
SURVIVORS IN THE WILD

'GREEN BATS'
THE OPERATIONAL TESTERS OF NELLIS





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ENDANGERED TIGERS

A popular lightweight fighter, F-5E/F Tiger II numbers are dwindling as the type is steadily retired from service by operators around the world.

report: **Jamie Hunter** with **Giovanni Colla, Marco Dijkshoorn, Gert Kromhout, Santiago Rivas, Babak Taghvaei** and **Mike Yeo**

THE SMALL, AGILE Northrop F-5E/F Tiger II was embraced by a host of air forces around the world seeking to 'buy American' in the 1970s.

The F-5 was developed for export and primarily aimed at nations seeking a more affordable lightweight fighter. It was an improved version of the F-5A/B Freedom Fighter, with added automatic full-span leading-edge slats and trailing-edge flaps that respond to airspeed and angle of attack. Indeed, the Tiger II introduced a number of 'tweaks' brought

about by the experiences of F-5A/B operators, including a two-position nosewheel, which increased wing angle of attack on the ground and, when combined with more powerful General Electric J85-GE-21 engines, dramatically improved take-off performance. The aircraft still possesses rather short 'legs' and many operators have sought to add a bolt-on in-flight refueling probe to increase endurance.

The first F-5E (serial 71-1417) took to the air on August 11, 1972, and the initial Tiger II was delivered to the 425th Tactical Fighter Training Squadron (TFTS) on April



4, 1973. This US Air Force squadron was specifically established in order to train foreign nations that had acquired the type. Although developed primarily for the air-to-air role, some early customers of the F-5E — notably Iran and Saudi Arabia — actually acquired the aircraft for ground attack duties.

In total, Northrop built some 792 F-5Es and 140 two-seat F-5Fs, plus 12 RF-5E reconnaissance variants. Switzerland made 84 F-5Es and six F-5Fs under license. Northrop and the local AIDC (then the Aero Industry Development Center, today the Aerospace Industrial Development

Above: The US Navy has expanded its F-5N adversary operations and now fields two squadrons.
Joe Copalman

Right: A Marine Corps adversary pilot settles into the cockpit of his F-5N.
Jamie Hunter







Corporation) co-produced 100 F-5Es in Taiwan under the Peace Tiger I program. Peace Tiger I was followed by five more lots, Peace Tiger II to VI. The third included the first three of an eventual total of 66 F-5F two-seaters. By the time the last aircraft from Peace Tiger VI was delivered in 1986, a total of 308 Tiger IIs had been produced by AIDC and equipped five Republic of China Air Force wings. Aircraft from the last batch, counting 30 F-5Es and 30 F-5Fs, were fitted with the flatter nose radome of the F-20 Tigershark. KAL in South Korea also locally assembled 48 F-5Es and 20 F-5Fs. Bahrain was the last customer to receive F-5Es, with the final delivery on January 16, 1987. A handful of further airframes were assembled from spares.

The F-5 only ever saw limited operational use in the US. Today, the Tiger II has established itself within US Navy and Marine Corps ranks as an adversary aircraft, ideally suited for simulating

types such as the MiG-21. Indeed, it offers meaningful opposition for front-line squadrons but with low support and operational costs. As a result of its success the US Department of Defense sought to replace fatigued F-5E/Fs with refurbished ex-Swiss examples (for details of the current Swiss F-5s, see the following feature). An initial 32 single-seat F-5Es were delivered from RUAG to Northrop Grumman, later increased to 44. Now known as F-5Ns, these are in service with three adversary units. Northrop Grumman has implemented minor upgrades including a new LN-260 inertial navigation system (INS), multi-function display (MFD), and embedded global positioning system (GPS).

The US Navy and Northrop Grumman rebuilt three F-5Fs using parts from a variety of F-5s. The first so-called 'Franken-Tiger' was built from an ex-US Navy two-seat F-5F and a single-seat former Swiss F-5E. The project came about as a

requirement to increase the adversary F-5 force when Fighter Composite Squadron (VFC) 111 'Sundowners' was established at Naval Air Station Key West, Florida.

The Navy's four remaining F-5Fs were becoming too costly to maintain, had very little service life left and needed to be retired. One was subsequently lost in a mid-air collision in 2008 and so the remaining three aircraft were earmarked for rebuild. Having already introduced 41 former Swiss F-5Es into the Navy as F-5Ns, Northrop Grumman set about working on the three F-5Fs. The two-seat cockpit section and the aft fuselage tail section of the old F-5Fs were mated with the centre sections from Swiss F-5Es.

Latin American Tigers

South America has been a happy hunting ground for the Tiger II. Today, numbers have dwindled but capabilities among those survivors are generally high, particularly when it comes to Brazil and

Top left: **The cockpit of the F-5N features a small multi-function display.**
Jamie Hunter

Left: **Embraer has upgraded 48 Brazilian Tiger IIs to F-5EM/FM standard. A follow-on batch of ex-Jordanian examples was also due to be upgraded, but this may be cancelled.**
FAB/Sgt Johnson Barros

Above: **Chile retains a small but meaningful F-5 capability, with its F-5E Tigre IIIs based at Punta Arenas.**
Cees-Jan van der Ende



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Chile. Brazil has arguably placed itself at the top of the ladder when it comes to F-5 upgrades. Embraer is close to completing a huge upgrade project for the Brazilian Air Force's F-5E/Fs. The project dates back to 2001 and initially involved the upgrade of 48 jets in conjunction with Elbit of Israel, which has been heavily involved in a host of F-5 upgrade projects around the world. The updated F-5EM/FM features an FIAR Grifo-F radar, Rafael Derby beyond visual range air-to-air missile (BVRAAM) and short-range Python 3 and 4 AAMs. Brazil acquired 11 ex-Jordanian Tiger IIs as attrition replacements, in favor of ex-Saudi Tigers that were also available. On August 19, 2008, the first of the eight F-5Es and three F-5Fs from Jordan arrived in São Paulo aboard an An-124. The original 48 aircraft have now been upgraded. Although seven of the former Jordanian aircraft were earmarked for the F-5M/FM modernization program, none have entered service to date. Some were transported to Gavião Peixoto, but it is unclear whether the program will be completed due to the poor state of the Brazilian economy.

Chile retains a small but meaningful F-5 capability, its F-5E Tigre IIIs having been modernized by Empresa Nacional de Aeronáutica de Chile (ENAER) in cooperation with Israel Aerospace Industries (IAI) in the 1990s. In total, 12 F-5Es and three F-5Fs were upgraded with Python 3 missiles, Elta EL/M-2032B multimode fire-control radar, new Elop head-up display (HUD), hands on throttle and stick (HOTAS) controls and compatibility with the Elbit Display And Sight Helmet (DASH), which has proved particularly popular with F-5 users. The Tigre III Plus was a further effort launched in 2003, adding Rafael's Derby BVRAAM and Python 4, a new mission computer and datalink. Chile retains 10 F-5E and three F-5F Tigre IIIs with Grupo de Aviación No 12 at Base Aérea Punta Arenas, part of IV Brigada Aérea.

Both Mexico and Honduras still fly a handful of F-5E/Fs. Honduras has sought to keep its aircraft operational with a service life extension from Embraer, but these aircraft have not received capability upgrades. Mexico has seven F-5Es and two F-5Fs with Escuadrón Aéreo 401. At the end of 2014, just three F-5s remained

Above: Honduras retains a few F-5E/Fs and has been looking for a suitable upgrade program. Nelson Mejia via Santiago Rivas

Right: Evident in this shot of a Mexican F-5F is the dorsal fin fillet, which was added to enhance the directional stability of aircraft ordered by Brazil, Chile, Kenya, Mexico, Morocco, Sudan, and Tunisia. Ivan Peña Nesbit





Above: **The Royal Bahraini Air Force still operates around a dozen F-5E/Fs, although these are slated for retirement.** Alexander Golz

Below: **The exact status of Yemen's F-5E fleet is unclear, but it appears likely that few, if any, remain operational.**



operational, but Swiss company RUAG was tasked with returning five jets to service. Despite being dwarfed militarily by its northern neighbor, and with high levels of criminal activity, Mexico has no current plans to replace its F-5s. Their capabilities are modest, to say the least, and the aircraft need to forward-deploy if they are to project air power in a meaningful manner.

Persian Tigers

Middle Eastern operators have proved particular fans of the F-5E/F. None have been quite as pro-active with their Tiger IIs as Iran. Today, the Islamic Republic of Iran Air Force (IRIAF) is the second largest operator of the F-5, with notable ingenious derivatives having been developed. Examples of the SR.II, Simorgh, Saeghe and Saeghe II are among the 91 aircraft in service with three tactical fighter squadrons and two tactical training squadrons at Tactical Fighter Base (TFB) 2 Fakkuri, TFB.4 Vahdati, and at Mashhad Forward Air Station.

Iran became the first customer to receive the F-5E. At the same time it passed on 41 of its original Freedom Fighters to South Vietnam, and its remaining F-5A/Bs to other US allies. The first 32 F-5Es were delivered in 1973 and 1974 under Peace Rush I, followed by 109 F-5Es and 28 F-5Fs



under Peace Rush II and Peace Rush III between 1975 and 1977, to form a total of eight tactical fighter squadrons.

Iran's F-5Es were pressed into combat almost immediately when the Iran-Iraq War broke out in September 1980. F-5E/Fs from Vahdati flew hundreds of close air support, air interdiction, and air defense missions — even scoring victories against MiG-21, MiG-23, Mirage F1 and MiG-25 jets during air-to-air engagements. However, the toll was heavy. The IRIAF lost 55 pilots and 85 F-5s. During the war the remaining fleet was to go through a sustainment project by the Owj Aerospace Complex in collaboration with the IRIAF's Self-Sufficiency Jihad. This led to project Azarakhsh (lightning), in which IRIAF technicians and engineers were forced to reverse-engineer airframe and engine parts to support the aircraft in service.

Simultaneously, while the IRIAF was rebuilding battle-damaged F-5Es under Azarakhsh, IAMI (Iranian Aircraft Manufacturing Industries) was contracted to convert 12 F-5As and RF-5As into twin-seat F-5Bs. Iran lacked sufficient numbers of these aircraft, which were required for advanced fighter training. It took almost 20 years for IAMI to modify 11 of the aircraft as F-5Bs under project





Simorgh, with support from the Pakistan Aeronautical Complex (PAC).

Confidence following Azarakhsh was running high, so much so that Owj felt able to start aerodynamically upgrading F-5Es under project Saeghe 80, beginning in 2001. The aircraft were equipped with dual vertical stabilizers to improve flight characteristics. Simultaneously, help was received from China under project Silk Road II (SR.II), the aim being to upgrade the type's avionics including its self-defense and fire-control systems. However, SR.II ultimately failed in 2004 due to poor-quality work from CATIC on these first three prototypes.

Responsibility for continuing both the Saeghe and SR.II projects was granted to IAMI in 2006. Three more F-5Es were converted to Saeghe production standard between 2006 and 2012, joining the three earlier prototypes. Work to convert one F-5F to Saeghe II standard began in 2011, and the last Saeghe was completed and delivered to the IRIAF in 2014.

Today, the IRIAF has 24 F-5A/B Freedom Fighters, including Simorghs, in service with the 43rd Tactical Training Squadron (TTS), and 61 F-5E/Fs including two grounded SR.IIs with the 41st TTS, the 42nd Tactical Fighter Squadron (TFS) and the 21st TFS (from which six F-5E/Fs are always forward-deployed to Mashhad Air Station to provide air defense), as well as seven Saeghe I/II with the 23rd TFS.

Top left: **The third Saeghe (serial 3-7368) was actually a battle-damaged F-5E converted by Owj technicians at Shahin-Shahr in 2003-04.**
Babak Taghvaei

Top: **Tunisian F-5E/Fs at Talavera la Real in Spain during a squadron exchange with the resident SF-5Bs.**
Lucien Blok

Above: **Elbit has played a key role in a number of F-5 upgrades, including that for the Royal Moroccan Air Force.**
Giovanni Colla

Left: **Kenya's small F-5E/F fleet remains active and has been heavily engaged in recent combat operations against al-Shabab terrorists.**

African Tigers

Kenya's F-5s remain operational in small numbers. The aircraft are known to have participated in recent combat operations against two camps in the Gedo region used by al-Shabab terrorists.

The Royal Moroccan Air Force retains 16 F-5Es and four F-5Fs. They operate from the 2ème Base Aérienne (2nd Air Base) at Meknès and fly with the 'Borak' Squadron, specialized in close air support and air-to-ground missions, the 'Chahine' Squadron that handles air defense missions, and the ERIGE (Escadron de Reconnaissance, d'Interprétation et de Guerre Electronique) squadron, responsible for reconnaissance and electronic warfare missions.

Between 2001 and 2004 the RMAF's F-5E/Fs received a full refurbishment and upgrade from SOGERMA, Elbit and the Lahav Division of IAI. A pair of aircraft was dispatched to Israel for prototype and test work, before serial upgrades commenced in Morocco. The aircraft feature an improved FIAR Grifo-F/X Plus radar (similar in performance to the AN/APG-69), Elettronica ELT/555 active electronic countermeasures pods, HOTAS, new EWPS/-100 (DM/A-104) radar warning receivers (RWRs), a new HUD, weapons delivery and navigation system (WDNS), MFDs, precision-guided bombs and the Litening targeting pod, plus BVR missiles.

With the RMAF F-5s nearing retirement, the 'Moroccan F-X' program has been

established to enable it to buy an F-5 replacement. Indeed, Morocco is reported to have requested that the JF-17 participate in the Marrakech Air Show in 2016, amid local speculation that the type is being considered to replace the local F-5 fleet.

Tunisia is an elusive Tiger II operator, with little known about the status of its F-5s. In September 2013 the US Defense Security Co-operation Agency notified Congress of a possible Foreign Military Sale to Tunisia of F-5 avionics upgrades and associated equipment, parts, training and logistical support, at an estimated cost of \$60 million. This has since been described as a Block 1 avionics upgrade and is thought to be for 12 aircraft. It appears similar to the work carried out by Northrop Grumman on US Navy F-5s and includes an LN-260 Standard Advanced Embedded GPS/INS, control display unit, electrical power and environmental control system, repairs and training. Northrop Grumman is expected to complete the project by the end of 2018.

Eastern Tigers

The Republic of Korea Air Force (RoKAF) is by far the largest current operator of the F-5E/F. Around 120 examples probably remain in action. A number of upgrades have included a service life extension program from Korea Aerospace Industries (KAI) and Elisra SPS-1000(V)5 radar homing and warning (RHAW) systems, which are integrated with both on-board systems and pod-mounted jammers.

Bottom: Taitung remains a major Republic of China Air Force hub for the F-5E/Fs. Several aircraft there retain the markings of the now-disbanded aggressor squadron that operated under the Tactical Training and Development Center.
Gilles Denis

Bottom right: South Korea is thought to retain over 100 F-5E/Fs in service, but they are being steadily replaced by KAI T-50 and FA-50s.
Dr Andreas Zeitler

JORDAN STANDS DOWN F-5s



In December 2015 the Royal Jordanian Air Force (al-Quwwat al-Jawwiya al-Malakiya al-Urduniya) ceased Tiger II operations. Having operated the F-5A/B, 61 F-5Es were supplied between 1975 and 1978 under Foreign Military Sales (FMS), of which seven were transferred to Singapore in 1994, eight to Brazil from August 2008 onwards, and 13 to Kenya in 2010. Twelve F-5Fs were supplied between 1976 and 1980 under FMS, followed by one ex-Sudanese example in 1980. Of the F-5Fs, three went to Brazil and two were sold to Kenya.

The first flight of an F-5E in Jordan occurred on May 10, 1975. With the version's introduction, the F-5 fleet was at its most diverse. F-5A/B Freedom Fighters and F-5E/F Tiger IIs operated together in the advanced training, interdiction and ground attack roles.

With the introduction of the Saudi-sponsored Mirage F1BJ and Mirage F1CJ in 1981, a formidable fighter was added to the inventory, rendering the F-5A and

This image and above: **The last flying Royal Jordanian Air Force F-5F. The type has now been replaced by former United Arab Emirates Air Force BAe Hawk Mk63s.**
Marco Dijkshoorn



F-5B outdated and obsolete. By 1988, only the Tiger II was left in RJAF service.

The F-5's armament was rather rudimentary but effective: Mk82 general-purpose bombs and AIM-9J short-range AAMs as well as Mk20 Rockeye free-fall cluster bombs could be carried. In 1989 the F-5E fleet received an upgrade that was eventually paid for by selling six aircraft to Singapore. The prime contractor for this program was Smiths Industries. It included head-up navigation and targeting equipment and a radar altimeter as well as a head-up display weapon aiming computer (HUD/WAC), BAe LINS 300 ring laser gyroscope INS and an electronic warfare suite. Plans for a forward-looking infra-red (FLIR) sensor were delayed, as was acquisition of the Selenia AN/ALQ-234 countermeasures pod. Neither modification materialized.

Six aircraft were sold to Singapore in 1994. After conversion by Singapore

Technologies Aerospace to F-5S standard, they entered service with 144 Squadron and 149 Squadron at Paya Lebar. The RJAF sold these jets to pay for the vital upgrade program that had been completed a few years earlier and had drained available funds.

Between 2008 and 2009, 11 Tigers were sold to the Brazilian Air Force, and in late 2008 a further 15 surplus RJAF F-5s were transferred to the Kenyan Air Force. Prior to their delivery the Kenyan aircraft received an upgrade at Amman-Marka by the Jordan Aeronautical Company (JAC) with the help of US avionics technicians. Kenya originally operated 14 F-5Es and F-5Fs, and the former Jordanian examples were supposed to augment the existing fleet that was by now barely serviceable. Since their transfer to Kenya there have been no reports of the aircraft gaining operational capability and their status still remains unclear. The deal was highly controversial

at the time and was plagued by allegations of wrongdoing.

A final operational mission was flown by an F-5 in Jordan during late 2015. As a replacement for the venerable type in the lead-in fighter trainer (LIFT) role, the RJAF acquired 13 former United Arab Emirates Air Force BAe Hawk Mk63s.

With the introduction of the Hawk, the F-5s were officially phased out in late 2015, after 42 years of active duty. Some of the remaining aircraft will be sold off to Tactical Air Support, Inc in Reno, Nevada. It is expected that they will be transported to the US in the first quarter of 2016. With TacAir they will either serve as a spare parts source or once again perform advanced training for pilots.

That the RJAF itself is feeling nostalgia for this classic fighter is clear: single examples of the F-5E and F-5F will be kept in flying condition at Prince Hassan Air Base (H5) for ceremonial purposes. **Marco Dijkshoorn**



How many Tiger IIs the RoKAF still flies is hard to ascertain; however, they still equip roughly five or six fighter squadrons and two training squadrons. Today their numbers are dwindling, as replacement by the KAI FA-50 continues.

More is known of the F-5s in service with the Republic of China Air Force (RoCAF). Taiwan began its relationship with the F-5 in 1965 with the F-5A/B, and in later years the T-38 Talon, F-5E/F and the RF-5E Tigereye/Tigergazer. Today the type's primary mission is lead-in fighter training. Three subordinate groups of the 737th Tactical Fighter Wing (TFW) — the 44th Tactical Fighter Group (TFG), 45th TFG and the 46th TFG (until a few years ago, they were designated as squadrons) — are tasked with the LIFT mission. Each has 18 to 20 Tigers. Until a couple of years ago, the 46th was a dedicated aggressor unit, but it is now a regular training squadron in line with the other two squadrons



GONE BUT NOT FORGOTTEN

Singapore operated the F-5E/F (later upgraded to S/T standard) Tiger II between 1979 and 2015, ordering small numbers of aircraft in several batches from 1979 to 1989. The five aircraft ordered in 1989 were the last F-5s built by Northrop, these being completed from stock parts after F-5 production had already ended. Seven ex-Jordanian aircraft were bought by Singapore in the early 1990s and impressed into service with the Republic of Singapore Air Force (RSAF).

At its peak the RSAF operated 49 aircraft within three squadrons, including nine twin-seaters and eight locally-converted RF-5E Tigereyes. 144 'Black Kite' squadron was formed in 1979 to operate the F-5E/Fs at Tengah in Singapore's west. During 1985 it was joined by 149 'Shikra' Squadron at Paya Lebar, with 144 Squadron joining its sister squadron at the same base soon after. In the mid-1990s eight F-5Es were converted to RF-5E standard and took over the reconnaissance role from the retiring Hawker Hunter FR74A/Bs of 141 'Merlin' Squadron.

The fleet was upgraded to F-5S/T standard under Project Metis in the late 1990s with the installation of the Italian FIAR Grifo radar, Israeli Elbit DASH and Rafael Python AAM capability, and the ability to perform a precision strike mission using AGM-65 Mavericks and Paveway laser-guided bombs. The type gained a limited electronic warfare role with Elta EL/L-8212 jamming pods. The RF-5Es were upgraded to RF-5S standard, but without the radar element of the project.

Singapore quietly retired its F-5S/Ts in September 2015, ending 36 years of RSAF Tiger II operations. Mike Yeo



at the base. The group keeps a few non-standard-painted F-5s that recall the unit's previous mission. Some are green and light brown, while others are silver with red serials. In common with all fighter wings in Taiwan, and despite being primarily tasked with training, the wing maintains a quick reaction alert element.

Chiashan is the second RoCAF air base where F-5s are stationed. Here the 401st TFW (also known as the 5th Wing) includes the 12th Tactical Reconnaissance Group, which flies the rare RF-5E Tigereye (also dubbed the Tigergazer). In the late 1990s, the aging RF-104G Starfighter

The RF-5Ss were retired in late 2004 and the reconnaissance role handed over to the RSAF's F-16s. 149 Squadron traded in its Tigers for the F-15SG Strike Eagle in early 2010, leaving a dwindling number of Tiger IIs with 144 Squadron. The 'Black Kites' finally retired the type with little fanfare in September 2015, ending 36 years of RSAF Tiger II operations.

The Tentara Udara Diraja Malaysia (Royal Malaysian Air Force) began its association with the F-5 family in 1975 when it acquired 14 F-5Es and a pair of F-5B Freedom Fighters. The F-5 marked the first supersonic air defense capability in the RMAF since Malaysia gained independence in 1957. The F-5Bs were sold to Thailand in 1982, when Malaysia consolidated type training on the more advanced F-5F. The eventual fleet totaled 17 F-5Es, four F-5Fs and two RF-5Es.

The F-5Es were assigned to 12 Skuadron while the F-5Fs and RF-5Es were operated by 11 Skuadron, both flying from RMAF Butterworth in the northern part of peninsular Malaysia. Following acquisition of the MiG-29 and the BAe Hawk Mk108/208 in the late 1990s, the F-5 fleet was initially retired in August 2000. By this time, attrition meant that F-5 operations had already been consolidated in 12 Skuadron since 1993.

The RF-5Es were reinstated in August 2003 to cover a capability gap in reconnaissance. Pairs of single- and twin-seaters were brought back into service to provide crews with type currency and conversion training in 12 Skuadron. The F-5s were retired again in December 2014. *Mike Yeo*

base with the 828th TFW at Chiashan AFB, the recce jets were assigned to the newly-established 4th TRS. This unit was disbanded in 2005 and its aircraft reassigned to the 12th TRS at Chiashan. Two of the seven RF-5Es have been lost in accidents, and today the five remaining aircraft fly alongside a few two-seat F-5Fs. The F-5E/Fs are slated to continue in service until 2019, with the Tigereyes possibly lasting a little longer.

Northrop Grumman had hoped that Thailand would be the lead customer for its Tiger IV upgrade. This was cancelled due to a change of government. Smiths Aerospace has completed a basic upgrade for 20 Royal Thai Air Force (RTAF) F-5E/Fs, with a GEC HUD and HUDWAC as well as a Northrop



reconnaissance jets required replacement with a more modern platform. The RoCAF contracted Singapore Technologies Aerospace to convert seven F-5Es with a nose containing photo-reconnaissance equipment. The result is an unusual-looking aircraft, with a much longer nose than the standard Tiger.

Only a very limited number of 'true' RF-5Es were built for service with Malaysia (two examples) and Saudi Arabia (10). Taiwan's RF-5E conversion entered service in 1997, with the 12th Tactical Reconnaissance Squadron (TRS) of the 401st TFW at Taoyuang AFB. When this wing swapped its home



Although the primary mission of the 737th TFW is training, the Taiwanese unit maintains a quick reaction alert capability with two F-5Es. Gert Kromhout

Grumman (Litton) INS and new RWR and chaff dispensers.

Elbit of Israel was selected to perform a cockpit upgrade on part of the RTAF F-5E/F fleet in 1998, a first updated example flying in February 2003. As with Elbit's F-5S/T upgrade for Singapore, the Thai package involved new digital avionics and twin color MFDs, a new HUD and provision for Rafael Python 4 missiles, but retained the original Emerson fire control radar to minimize costs. Around 20 aircraft were upgraded under this program, which ran until 2004. Elbit also incorporated a new multi-mission computer to allow integration of the DASH. The last upgraded examples are assigned to 211 Squadron at Ubon Ratchathani. 



The Elbit Display And Sight Helmet (DASH) helmet alludes to the fact that Royal Thai Air Force F-5E/Fs were upgraded by the Israeli contractor. Giovanni Colla



Taiwan converted its own F-5Es into RF-5E Tigergazers. Five remain active with the 12th Tactical Reconnaissance Squadron. Gert Kromhout

TABLE OF OPERATORS

COUNTRY	UNIT	BASE
Bahrain	6th TFS	Sheikh Isa
Brazil	1°/1° GAvCa	Santa Cruz
	2°/1° GAvCa	Santa Cruz
	1°/4° GAv	Manaus
	1°/14° GAv	Canoas
Chile	Grupo de Aviación No. 12	Punta Arenas
Honduras	-	La Ceiba
Iran	21st TFS, 23rd TFS	Fakkuri
	41st TFS, 42nd TFS, 43rd TFS	Vahdati
	21st TFS (Det)	Mashhad
Kenya	15th TFS	Laikipia
Korea, South	101 FS, 201 FS	Suwon
	103 FS, 207 FS	Wonju
	105 FS, 112 FS, 205 FTS	Gangneung
	202 FS	Yecheon
	206 FS	Gwangju
	192 Tactical Development and Training Squadron	Cheongju
Mexico	Escuadrón Aéreo 401	Santa Lucía
Morocco	Escadron de Chasse 'Chahine'/'Borak'/ERIGE	Meknès
Switzerland	Escadrille 6	Payerne
	Fliegerstaffel 8	Meiringen
	Fliegerstaffel 19	Sion
Taiwan	12th TRS	Hualien/Chiashan
	44th TFG, 45th TFG, 46th TFG, Tactical Training and Development Center	Taitung/Zhihang
Thailand	211 Squadron	Ubon Ratchathani
	904 Squadron	Don Muang
Tunisia	15 Squadron	Bizerte
US	VFC-13	Fallon
	VFC-111	Key West
	VMFAT-401	Yuma
Yemen	121 Squadron	Sanaa