

Playing Catch-Up

An F-CK-1C taxis out of its shelter at CCK AFB, where the 3rd TFW/427th TFW is located. The Indigenous Defence Fighters (IDF), as it is also known, was built by Aerospace Industrial Development Corporation (AIDC). This example is used for solo displays at local airshows, hence its specially marked tail.

Gert Kromhout and Stephan de Bruijn recently visited Taiwan to bring AFM up-to-date on what's happening in the Republic of China Air Force (ROCAF).

Situated just 100 miles (160km) from the coast of mainland China is the island of Taiwan. It is regarded by its giant neighbour as a 'rogue province' that should come under the control of the government in Beijing, a view that might one day be backed up with military action.

Not surprisingly, Taiwan's air force, the ROCAF, has to be on a high state of alert. Air defence is its primary mission. New fighter aircraft are urgently required but no nation is willing to supply them. The rapidly growing economy and military might of the People's Republic of China

means countries are now reluctant to deliver weapons to the ROCAF. Even Taiwan's major weapon supplier, the United States, has reduced its support in recent years.

For a long time the technological and tactical superiority of the ROCAF was sufficient to match the numerical superiority of China's air arms. The situation ended ten years ago, but Taiwan is not concerned, for now, that China will enforce reunification. The political relationship between the two countries is 'warming' and economic co-operation is close. Many see the possibility of a voluntary reunification one day.

According to Jack Lee, once the highest official in the Taipei Representative Office in the Netherlands (Taiwan has no embassy there as the Dutch do not recognise it as a country), there are three conditions that determine whether China will invade or not: "If we [Taiwan] develop a nuclear weapon (the project was stopped a few decades ago due to enormous pressure from the US); if we declare independence; or if, for whatever reason, large-scale civil unrest develops in our country."

Taiwan has a population of 23 million. Its defence budget stands at £6.15 billion (€8.3 billion),

2.2% of GDP (gross domestic product), the percentage having steadily decreased over the years. Accounting for almost £960 million (€1.3 billion), the air force is the highest spender of the three armed forces. The navy's budget is marginally less while the army is well behind at £382 million (€517 million). The Ministry of National Defense does not disclose what the remainder of the £6.15 billion is spent on.

Air superiority

The Taiwanese defence doctrine is that the ROCAF is the first responder against any hostile

action from China, tasked with gaining air superiority quickly. While smaller than the Netherlands, Taiwan nevertheless has a fleet of around 400 fighter aircraft – many in the air defence role – assigned across six wings at six air bases. Two are equipped with Lockheed Martin F-16A/Bs; two with the locally-developed Aerospace Industrial Development Corporation (AIDC) Indigenous Defence Fighter (IDF); one with Dassault Mirage 2000-5Ei/Dis; and one with Northrop F-5E/F Tiger IIs.

Four of the air bases are positioned on the western side of the island, facing China, and

two are on the other side of the north to south-running mountain range that dominates two-thirds of the country. The two IDF wings also maintain a detachment on the island of Penghu, 31 miles (50km) west of the main island.

All the bases have armed fighters on quick reaction alert (QRA) status 365 days a year and are scrambled frequently to intercept intruders. But not all the 'targets' are Chinese – often they are USAF and US Navy aircraft, such as EP-3Es and RC-135s operating in the Taiwan Straits from Japan on intelligence-gathering missions.

The ROCAF also has a composite

wing with 20 Lockheed Martin C-130Hs, six Northrop Grumman E-2K Hawkeyes and 11 Grumman S-2T Trackers. The Trackers – currently being replaced by 12 Lockheed Martin P-3 Orions – were, until the summer of 2013, the property of the RoC Navy but a reorganisation of the armed forces has since brought them under control of the ROCAF.

Six airborne early warning (AEW) Hawkeyes were upgraded to Hawkeye 2000 standard with new radars and software. They fulfil a crucial role in early detection of hostile or unknown aircraft and are supplementary

to a network of land-based early warning radars. One of these is the Raytheon AN/FPS-115 Pave Paws near the city of Hsinchu.

Raytheon says it's capable of detecting aircraft and low-flying cruise and ballistic missiles and has a sophisticated jamming capability. Pave Paws can track up to a 1,000 targets and has a range of 3,100 miles (5,000km). Taiwan cancelled a second such radar because of its high cost.

Mountain hideaway

The ROCAF's biggest fear is that any first strike by China would destroy its runways while

launching hundreds of ballistic missiles aimed at Taiwan. For this reason, the air force has invested heavily in rapid runway repair kits along with taxiways and highways that could, in times of rising tensions, be used as runways should airbases be destroyed.

Four air force bases (AFBs) have unusual infrastructures. The most southerly, Pingtung, consists of two parts, each with a single runway: Pingtung South and Pingtung North. The taxiway and runway systems are connected by a pair of 2 mile-long parallel taxiways each wide enough to operate aircraft such as C-130s and P-3 Orions. Pingtung South is home to these types while the north side houses S-2 Trackers and E-2 Hawkeyes.

In the northeast of the island, near the city of Hualien, is Chiashan AFB. It is composed of two parts, its western side only activated during large scale exercises.

Connected to the other part by a 1.5 mile-long (2.5km) taxiway, the western section features large underground hangars adjacent to mountains and can accommodate at least 100 fighter aircraft. Zhihang AFB near the city of Taitung has a similar cave complex. ROCAF officers acknowledge the presence of the caves but refuse to say how many fighters they house. In times of tension, Chiashan and Zhihang serve as the operating airfields for aircraft normally based on the west coast.

Biggest base

According to the ROCAF, Ching Chuan Kang (CCK) Air Force Base is the largest in Southeast Asia. During the Vietnam War the US Air Force stationed KC-135 tankers, F-4 Phantoms and B-52 bombers here in the early 1970s. At 4,300ft (1.3km) long and 920ft (280m) wide, the dimensions of the main hardstand are immense for an Asian



Left: A member of the 2nd TFW ground crew, acknowledges the pilot of a Mirage 2000-5Ei at Hsinchu. Right: Gangshan is the ROCAF's main training base, where this AT-3 is used for training pilots to fly fighters. Below: An F-16B of the 455th TFW prepares to touch down at its home base, Chiayi AFB. Bottom left: A dual seat F-16C-1D comes into land at CCK. Bottom: An F-5E and F-5F sit at the end of the runway ready to depart at Zhihang AFB.



country. They are a 4,300ft (1.3km) long and 920ft (280m) wide.

Although the Americans left Taiwan decades ago, their influence is visible everywhere. The ROCAF command structure is along the same lines as the USAF's; and on an air base the wing is the predominant unit. It is the umbrella under which the different groups (called squadrons until some years ago) are aligned – and the wing commander is the senior officer on base, not the base commander.

The bases are all kept in immaculate condition and are well equipped.

It's the same for the aircraft. Many are ageing, but externally they appear new – surprising considering the F-5s are nearly 30 years old and the S-2 Trackers more than 40 years old.

New fighters

The acquisition of a new weapon system is a long-term issue for Taiwan. In the early 1980s the United States was Taiwan's main supplier, but as the People's Republic of China and the US improved economic and diplomatic ties, obtaining new fighter aircraft and weapons systems has proved difficult. Other countries have also chosen not to sell arms to Taiwan.

So Taiwan decided to develop its own fighter jet to replace the F-5E/Fs and Lockheed F-104 Starfighters. It became the AIDC Dragon multi-mode monopulse Pulse Doppler radar is based on the General Electric AN/APG-67 with components from the Westinghouse APG-66.

The fighter was developed with foreign assistance and has

never been exported. General Dynamics played a huge role in its design, and it has many features from the F-16. It's powered by twin ITEC F125-70 jet engines developed in association with US engine manufacturer Garrett.

The IDF's primary weapons are the Tien Chien 1 (TC-1) and Tien Chien 2 (TC-2) air-to-air missiles, which resemble American AIM-9 Sidewinders and AIM-120s. Its GD-53 Golden Dragon multi-mode monopulse Pulse Doppler radar is based on the General Electric AN/APG-67 with components from the Westinghouse APG-66.

Dream not delivered

A planned production run of 256 IDF was quickly reduced due to unexpected thawing in the relationship between China and

the West, and production ended at just 130. But the demonstrations in Tiananmen Square, Beijing, in 1989 and the violent reaction taken by the Chinese authorities brought a halt to the improving relationship with the West in 1992. Taiwan took the opportunity to order 150 F-16s under the Peace Fenghuang programme from the US; and 60 Mirage 2000-5s from France.

The first two F-16 wings received their aircraft in 1997, and were declared operational on December 18, 2002 with three squadrons. The second wing acquired its F-16s in 1998 and was operational on January 16, 2002, again with three squadrons. It added a fourth a short time later. In the US, 14 ROCAF F-16s fly with the 21st FS at Luke AFB, Arizona, for pilot training.

The ROCAF's F-16s

are Block 20s and have mid life upgrade (MLU) specifications. Originally, they did not have the software to launch AIM-120 AMRAAMs – their air-to-air armament comprising AIM-9M Sidewinders and AIM-7M Sparrows. In 2004, Raytheon delivered the first AMRAAMs, but in such limited quantities that the Sparrow remains in use today.

The F-16s' air-to-ground weapons are 'dumb' bombs, AGM-65 Mavericks and the AGM-84 Harpoon anti-ship missile. The ROCAF also has Pathfinder/Sharpshooter night navigation and targeting pods, but currently no laser-guided bombs are in service.

F-16 update

A major update programme is planned for the F-16s, after which the type will be renamed the F-16V.

Originally, the upgrade of the 145 ROCAF F-16s was to include the US Air Force Combat Avionics Programmed Extension Suite (CAPES) programme – under which 300 F-16s would have been modernised – but the USAF withdrew from it in early 2014 as a cost-saving measure. The modernisation for the ROCAF will, however, proceed as planned but F-16 upgrade will not be as comprehensive.

Important components of the programme are the Northrop Grumman Scalable Agile Beam Radar (SABR) AESA radar, an embedded Global Positioning System inertial navigation system and the Terma ALQ-213 Electronic Warfare Management System.

Additionally, the ROCAF F-16s will get the Boeing GBU-31 and GBU-38 Joint Direct Attack Munition ▶



Republic of China Air Force (Chung-Hua Min Guo Kong Jun) Order of battle

Tainan	1
1st TFW - 443rd TFW	
1st TFG	F-16C-1C/D
3rd TFG	F-16C-1C/D
9th TFG	F-16C-1C/D
Hsinchu	2
2nd TFW - 499th TFW	
41st TFG	Mirage 2000-5Ei/Di
42nd TFG	Mirage 2000-5Ei/Di
48th TFG	Mirage 2000-5Ei/Di
Ching Chuan Kang	3
3rd TFW - 427th TFW	
7th TFG	F-16A/B
28th TFG	F-16A/B
Chiayi	4
4th TFW - 455th TFW	
21st TFG	F-16A/B
22nd TFG	F-16A/B
23rd TFG	F-16A/B
Rescue Sqñ†	S-70C, EC225
Chiashan (Hualien)	5
5th TFW - 401st TFW	
12th TRG	RF-5E/F-16A/B
17th TFG	F-16A/B
26th TFG	F-16A/B
27th TFG	F-16A/B
Pingtung	6
6th CW - 439th CW	
Anti-Submarine Warfare Group	
33rd Sqñ	P-3C*, S-2T**
34th Sqñ	P-3C*, S-2T**
20th Electronic Warfare Group	
2nd EWS	E-2K**
6th EWS	C-130HE*
10th Tactical Airlift Group	
101st TCS	C-130H*
102nd TCS	C-130H*
Zhihang/Taitung	7
7th TFW - 737th TFW	
44th TFG	F-5E/F
45th TFG	F-5E/F
46th TFG	F-5E/F
Gangshan	8
Basic Training Group	
	T-34C
Fighter Training Group	
	AT-3
Airlift Training Group	
	Beech 1900C
Songshan (Taipei)	9
Special Transport Sqñ	Beech 1900C/ Fokker 50
Presidential Flight Section	Boeing 737/ Fokker 50
Makung	10
Detachment F-CK-1 of 443rd TFW or 427th TFW	

*located at south base. **located at north base. † maintains detachments at several air bases including Zhihang.

(JDAM), AGM-154 Joint Stand-off Weapon (JSOW), laser-guided bombs, Joint Helmet Mounted Cueing System, new AIM-9 Sidewinders, improved targeting pods, upgraded ECM systems and more powerful engines. The first two test aircraft are now being readied for evaluation at Edwards AFB, California. The remainder of the fleet will follow from 2016.

IDF updates

Another fighter due for modernisation is the IDF, enabling it to soldier on for at least another 20 years. The type was originally an air defence fighter but modifications gave it improved attack capabilities. The upgrades focus on avionics, radar, flight control and a new stand-off weapon while new software provides multiple target tracking and better jamming resistance. The IDF's official type designation changed to F-CK-1 C/D Hsiang Sheng.

The improved IDFs are now capable of employing the new Chung-Shan Institute of Science and Technology (CSIST) Wan Chien (Ten Thousand Swords) stand-off air-to-surface missile, which has similar capabilities to the AGM-154 JSOW. It is primarily developed for use against air bases, ports, missile and radar sites at distances of up to 124 miles (200km). Conformal fuel tanks on top of the fighter's fuselage were considered but, according to aircrews, costs meant they were not purchased.

The 443rd Tactical Fighter Wing (TFW) at Tainan has now fully converted to the F-CK-1C/D while the 427th TFW at CCK recently commenced transition to the type.

'For more than eight years, the ROCAF has been trying to purchase 66 F-16C/Ds to replace the Mirages, but the US has already refused the sale three times.'

This C-130H moves slowly along the taxiway at Pingtung South AFB. The ROCAF has a fleet of 20 C-130s, one of which is used for electronic warfare.



New indigenous fighter

There doesn't seem to be much of a future for the Mirage 2000. Costs per flying hour are much higher than the F-16 and there are no plans for an update programme. For more than eight years, the ROCAF has been trying to purchase 66 F-16C/Ds to replace the Mirages, but the US has already refused the sale three times.

It is said the ROCAF will now opt for the F-35B Lightning II. Not only is it much more modern,

the 'B' variant can operate from very short runways. But the chances of the US selling the F-35B to the ROCAF are remote.

With no replacement for the Mirage 2000, the fighter will remain in service for the time being. It has to, because the number of available F-16s will drop sharply during their modernisation programme – the equivalent of a whole squadron will not be available for at least five years.

Repeated unsuccessful attempts to get new US fighter aircraft have

again forced Taiwan to develop its own 'new' fighter aircraft. While still in its early stages, the jet will be stealthy, capable of flying long distances, equipped with in-flight refuelling and able to attack air, ground and maritime targets.

Training

Training for young pilots starts at Gangshan Air Force Base in the city of Tainan. The facility is also home of the Air Force Academy where Beech T-34C



Turbo Mentors are used by the Basic Training Group. For pilots selected for fighters, the training proceeds on the AIDC AT-3 Tzu Chiang jet trainer with the Jet Training Group. Successful students then go to Zhihang AFB for lead-in fighter training on the F-5E/F. After that it could be the IDF, F-16 or Mirage 2000.

Pilots heading to other fixed-wing types such as the C-130 and P-3

Orion continue their training on the twin-engine Beech 1900C, flown by the Airlift Training Group.

The ROCAF intends to replace the T-34C soon. It is over 30 years old and just passed its projected useful service life of 16,000 hours per aircraft. A replacement is also needed for the AT-3 and F-5, the ROCAF looking to replace both with a single type capable of flying combat



Above: A Beech T-34C comes into land at Gangshan. The ROCAF is seeking a replacement for these basic trainers.

Below: Eleven Grumman S-2Ts soldier on with the Anti-Submarine Warfare Squadron at Pingtung South AFB. They will be retired when the Orion work-up programme has progressed sufficiently.



missions in the event of a conflict.

One wing with three tactical fighter groups is equipped with the classic F-5; current plans call for the type's retirement in 2019.

Expensive

Replacing the trainers will be relatively easy. Taiwan's isolated position on the arms market will, however, create problems with the replacement of its navy's

submarines and frigates. Like

the purchase of a new fighter, the ROCAF has initiated a development programme for a maritime aircraft too. The cost for the trainer for the air force, submarines and frigates for the navy is estimated at US\$16bn. Considering the magnitude of these needs, it would come as no surprise if the costs rose beyond this, but Taiwan has to maintain a potent 'defensive force' that is able to counter any threat from its neighbour.



Above: A P-3C Orion wearing the emblem of the 33rd Anti Submarine Warfare Squadron, parked on the ramp at Pingtung South. Twelve aircraft are on order (the first two in the high visibility marks) and are due to be delivered by the end of this year. Left: The ROCAF's Air Rescue Squadron flies with the Sikorsky S-70 Blue Hawks and three Eurocopter EC225s. Right: All the E-2Ks serve the 20th Electronic Warfare Group at Pingtung North. The aircraft still wear the original E-2C designation under the horizontal tail plane above the US BuNo.

