

Knights of the north

F21 NORRBOTTENS FLYGFLOTTILJ (Norrbotten Wing) at Luleå air base has a long history of operating fighters, mainly in the reconnaissance role. The wing was established during World War Two, and in the first decade of its existence it operated aircraft including the Fieseler Fi 156 Storch, North American P-51 Mustang and de Havilland Vampire. It has relied on indigenously built aircraft since the mid-1950s, and with the arrival of the Saab 37 Viggen in the early 1960s — and later the 35 Draken and 37 Viggen — it has also taken on air defence duties.

The unit's function shifted from reconnaissance and air-to-air to multi-role when the first JAS 39A/B Gripens arrived in 2002. These first-generation Gripens were replaced with the more modern and NATO-compatible JAS 39C/D from 2006. The Flygvapnet (Swedish Air Force) maintains so called 'centres of excellence' in different areas of work. F 21 is the centre of excellence for the air-to-ground mission and beyond-visual-range air-to-air combat, while F 17 at Ronneby is now the reconnaissance centre of excellence. Despite its above-average expertise in and official focus on the air-to-ground role, F 21 still considers its fighter squadrons' main role as air-to-air, while air-to-ground, air-to-sea and reconnaissance are

The Swedish Air Force's most northerly fighter wing is dealing with new and resurgent threats and employing Cold War tactics in a fresh guise, as **Dirk Jan de Ridder** reports.



F 21 began to receive JAS 39A/B Gripens in 2002. Four years later these were superseded by the NATO-compatible JAS 39C/D. This aircraft, serial 39263, is a single-seat JAS 39C model.

seen as secondary missions. Indeed, last year F 21 became the first fighter wing worldwide to be equipped with the MBDA Meteor beyond-visual-range air-to-air missile (BVRAAM).

Arctic environment

Luleå is one of the most northerly fighter bases anywhere in the world, being situated only around 62 miles (100km) south of the Arctic Circle. Despite its remote location and Sweden's neutral and non-aligned position — albeit maintaining strong links with NATO — F 21's focus is very much on the global security environment. F 21 wing commander Col Carl-Johan Edström explained: "We have four areas that are really affecting the way we have to train, in order [for us] to be able to face those threats and the missions that we are

supposed to carry out. To the south of Europe that is of course the situation in North Africa and the Middle East. What happened in Crimea also affects how we see ourselves. It shows that Russia is willing to use military force to get its political will. "We have a lot of personnel and materiel in the [Baltic Sea] area doing QRA [quick reaction alert] missions on a day-to-day basis. There are many significant exercises going on in this area, both from the western side, from our side, and the Russian side. This year we will have our large Swedish Armed Forces exercise and around the same time the Russians will have their big exercise in the same area. A lot of things will happen there that we have to be aware of. "We also have to monitor the progress of the Baltic region. If something happens in the Baltic □



A pair of F 21 Gripens breaks for the camera over the training area northwest of Luleå, close to the Arctic Circle. The Arctic environment may be inhospitable for much of the year, but it offers excellent training opportunities. All photos Dirk Jan de Ridder unless stated

A single-seat JAS 39C and two-seat JAS 39D. The aircraft are unarmed except for a single IRIS-T air-to-air missile acquisition round, visible on the starboard wingtip launch rail of the nearest jet.



Above: F 21 pilots don't fly once the temperature drops below -25°C, especially as it can take some time for an SAR helicopter to arrive on the scene should a pilot have to bail out.

it comes to sharing secret information, you have to have bilateral agreements and so on. "We are sharing information, but as it is right now we are [only] sharing open information and we want to deepen that partnership. Of course, we have the possibility to pick up a phone and call each other, but our QRA is commanded and controlled in Sweden and the Baltic [Air Policing mission - see accompanying feature in this volume] is directed by NATO. We do have a liaison officer at the NATO level where they are controlling the Baltic Air Policing mission."

Out of the dark

During the depths of winter at Luleå the sun rises above the horizon for just three hours each day, presenting plenty of opportunity for night flying during normal operating hours. During the peak of summer, the opposite is true. The sun sets at

midnight and rises an hour later. This presents both unique challenges and opportunities, as Lt Col Anders Gustafsson, commanding officer of 212 stridsflygdivisionen (212 Squadron), explained: "We fly more night sorties [than the other fighter wings] due to our winter because some of the sorties during regular working hours are more or less night sorties. We also have compressed campaigns where we fly [exclusively] during night hours to get the best training environment for night ops. "During the summer period it is never really dark, so we carry out plenty of night-flight training during the winter period. Training in that period when the circumstances are good is sufficient [to maintain night-flying qualifications]. During summer [night flying] is harder to do, but if you go south you can train there, which we sometimes do. Your body adapts to this in certain ways. During winter you can be a bit more tired and during

area, we cannot stand outside that crisis. We will be dragged into it in one way or another. And finally there is the Arctic environment. We have a lot of interest [in this area] from Russia, the US and the [Scandinavian] countries up here, because of geopolitical concerns. For the Russian fleet it is one of the only ways out to the Atlantic Ocean. We have the skills to be able to operate in the Arctic environment in the cold, in snow and darkness. But our skill levels were higher ten or 20 years ago. We are trying to regain those skills."

Amid these increasing tensions, relations with NATO are becoming steadily closer. Edström continued: "We have both a squadron and the base organisation on readiness for the NATO Response Force from 2016 until 2019. We therefore have to be ready for such missions if our government makes the decision. That means that we have to train for interoperability, we have to train to be able to fit into a structure set up for operations. We frequently have a taceval [tactical evaluation] by NATO, which are known as OCC E&F [operational capabilities concept evaluation and feedback] for non-NATO countries. Our last evaluation was in 2016 and the next one is in 2019.

"We have co-operation when it comes to sharing the recognised air picture with our neighbouring countries. We also have collaboration as a PfP [NATO Partnership for Peace] country, but that is still developing. When



Above: A Gripen taxis at a snowy Luleå. Even before the arrival of the MS20 upgrade, the Gripen C was a notably capable fighter, with provision for 500lb GBU-49 Enhanced Paveway II laser-guided bombs and IRIS-T missiles allied with a helmet-mounted display. Right: The F 21 at base at Luleå is just five minutes' flying time from an area of mostly unrestricted airspace significantly bigger than that used for Red Flag exercises at Nellis AFB, Nevada. Introduction of the Meteor BVRAAM has increased the demand for expansive airspace for training.





The pilot of an Sk 60 jet trainer closely follows two JAS 39 Gripens over the Vidsele training area.



Above: Even at the end May there may still be snow on the ground at Luleå air base. This is a visiting two-seat JAS 39D from sister wing F 7 at Sätene in south-central Sweden. Erik Bruijns and Mark de Greeuw
Below: Officially designated as a centre of excellence for the air-to-ground role, the pilots of F 21 primarily consider themselves as air-to-air warriors. Russia's military resurgence has led to a renewed focus on homeland defence after many years spent adapting to international missions.



summer it may be harder to go to sleep, but it differs between pilots. We always think about it and we try to train during all hours, day and night."

One of the other challenges of being based so far north is the weather. Luleå is normally covered with snow until at least April. F 21 shares the airfield with a civilian airport located on the other side of the runway. The runway itself and the taxiways on the eastern side are kept free of snow thanks to civilian aviation regulations, but the taxi track on the military side is usually left as it is. In times of crisis it might be necessary to fly in these conditions, so pilots must be used to dealing with them.

During the Yearbook's visit at the end of winter, the morning sorties were cancelled due to fog. Around noon, it began to clear up and the afternoon sortie was good to go, but then around halfway into the sorties, fairly intense snowfall required the jets to return to base early.

Gustafsson described the conditions at Luleå: "Winter weather can be extremely cold and really dark with snowstorms, but it can also be crisp weather with blue skies. Then it is just fantastic, easy flying. It differs a lot and it can suddenly change, but our met officers are quite good and it is not often that we are surprised."

"The aircraft works really well in the coldness we have up here. In peacetime we have some limitations, but that is just for the crew. When it is really, really cold it is harder to work and the maintenance guys' hands may get frozen, so we think about the crew instead of the aircraft. We have a limitation meaning we normally don't fly if it's colder than -25° [Celsius]. We can do it if it's something we urgently need to do, but when it takes a while for the SAR [search and rescue] helicopter to arrive and with not many people living here, you can actually freeze to death quite quickly."

Aces on the range

The key advantage of F 21's far-north location is the proximity of a vast training area – a mere five minutes' flying time away. The available airspace is four times larger than that of Red Flag at Nellis Air Force Base, Nevada, and it has very few restrictions.

Edström said: "We can train everything up here. The airspace is the facilitator for big exercises like ACE [Arctic Challenge Exercise]. The stand-off distance of new air-to-air missiles creates a significant need for very large exercise areas. If you look at the Red Flag training area, and you start to use the Meteor and the latest AMRAAMs, then it is actually too small if you want to use the maximum stand-off distance. This is one of the few overland areas in Europe where we are able to train full-up scenarios with modern air-to-air missiles."

"An exercise like Frisian Flag [in the Netherlands] is great, but its live firing area is about as big as the small ones we have here. We have five or six of them in this area and then we have three much bigger areas. When we're doing these large exercises the airspace extends from the ground to unlimited. That makes it possible to train full-up tactical operations."

"The United States has shown interest in our training area, but also in the Cross Border Training [CBT] exercises that we hold with Finland and Norway."

Gustafsson took up the story of the frequent CBT flights with the Finnish and Royal Norwegian Air Forces: "A long time ago, on my first trip to Norway in 1996, we discussed CBT, but it had not matured yet. In 2003 we started to shift our



A Norrbotten Wing JAS 39C launches from Luleå during this summer's ACE 17 multinational training exercise. Erik Bruijns and Mark de Greeuw



Above: A pair of F 21 JAS 39Cs prepares to take off from Luleå for an ACE 17 mission in May. Note the Litening III pod under the nearest jet, used for reconnaissance as well as air-to-ground targeting. Erik Bruijns and Mark de Greeuw

focus from national defence to international operations, at least for this wing. The first Cross Border Training took place between Finland and Sweden in 2004. It is a really good partnership that has been working now for several years. I would say that it multiplies our effort, because we can start here and train with both Finland and Norway or one of these countries, so instead of flying with eight aircraft by ourselves we can fly with 30 aircraft or more during one sortie.

"The initiative works very well, especially since we do it almost every week. We know the crews, we fly according to the same standards and we can do all kinds of training together. Other [Swedish] fighter wings deploy up here and to Vidsel to participate in Cross Border Training. During some periods, we even fly every sortie in accordance with CBT and then it is very common for another fighter wing to come up here. Crews from other countries come to Vidsel for several weeks each year and sometimes we exercise with them.

"We have a lot of opportunities to train with them, so much that we sometimes even have to say no because we also have to train our [combat readiness training] students. This year, we will also have the ACE exercise taking place here, which is based on the Cross Border Training concept, but much bigger."

ACE 17 was held between May 22 and June 2. More than 100 aircraft from 11 nations participated in the exercise, which was carried out in the airspace over the northern areas of the host countries: Finland, Norway and Sweden.

On the road

One of the measures taken to meet the increasing security challenges is the reintroduction of road-based operations, originally developed in the 1930s. This skill was more or less lost after the Cold War, but times have changed. In March last year, a JAS 39C piloted by Lt Col Gustafsson flew sorties from a forward operating location (in Vidsel) for the first time in many years.

The goal was to evaluate a new concept of establishing a unit consisting of one aircraft, one pilot, and six technicians equipped with just two modified vans and a fuel truck.

Gustafsson explained: "We didn't get rid of our road-based skills; we just haven't used them that much. What we did in Vidsel was a new concept together with maintenance [personnel]. We are starting to build it up again and we will increase our use of it. It is part of our concept to spread our resources and use whatever hard area we can land on and take off from. It will be applied all over Sweden. It is not exactly the old system, but the idea of spreading our resources is absolutely the same. What we need is a [strip of a certain] minimum length and width... That could be a road or a hardened area.

"The Gripen is a really good aircraft to land. It is more or less built for these kinds of operations, just like the old Viggen. I was a Viggen pilot before and that was heavier and harder to land on war bases or road bases. The thrust reverser was a good thing about the Viggen, especially during winter, but the Gripen is much smoother and easier to land. The whole system with its quick turnaround time and easy handling for the crew makes the Gripen very useful for these conditions. The maintainers can reload and refuel really quickly and then we get airborne again quickly."

The aircraft can reportedly be refuelled and rearmed in less than ten minutes for an air-to-air mission and under 20 minutes for an air-to-ground mission, but personnel at F 21 would not confirm this.

Gustafsson added: "This squadron [212] will also participate in Finland's big air force exercise called Ruska, flying on the Blue side for the first time [for any Swedish fighter wing], so then we will participate 'all-in' with their road-based system and be part of their defence network."

Conscription returns

In March the Swedish Government decided to reactivate conscription in order to ensure military readiness. Edström outlined what this will mean for F 21: "It is a positive thing for us in several ways. We have 32% soldiers and 43% officers, so it will be easier for us to fill up the organisation with soldiers. Above all, we can use conscript soldiers for positions held by part-time soldiers. But we don't have as many part-time soldiers as the army.



Left: F 21 Norrbotten Wing commander Col Carl-Johan Edström. Right: Commanding officer of 212 Squadron is Lt Col Anders Gustafsson, a former Viggen pilot.



The long-term fate of the current JAS 39C/D fleet remains uncertain. However, a stated requirement for 100 fighters means the Flygvapnet may yet retain the older jets in a mixed force. The two-seat JAS 39D could be especially useful, as currently only 60 single-seat Gripens are on order.

It will give us a bigger base to recruit from when it comes to officers and it is gender-neutral.

"We will hopefully get more women in the conscript education and basic training and from that we will be able to recruit more women [to become] officers."

During the same month that conscription was reinstated, an additional €45m was invested in the armed forces' annual budget. F 21 will be affected in a positive way, albeit indirectly. The investment focuses on increasing the levels of readiness for the QRA elements, exercises and ammunition.

Edström commented: "It's a sensible decision and it is very good that there is a political will [to support the armed forces] from a lot of different [political] parties. Five parties agreed on this decision. Hopefully the investment will increase in the upcoming years."

New-generation Gripen

The biggest improvement for F 21 in the near future will be the arrival of around 20 newly built JAS 39E Gripens. Although the latest JAS 39Cs were delivered as recently as two years ago, the Flygvapnet ordered 60 new JAS 39E airframes to either replace or partially replace its current Gripen fleet.

There have been discussions about whether the JAS 39C should bow out of service.

Gustafsson reflected: "We will buy 60 new 'Echo' versions, single-seaters, and it has not been decided that we should go down to 60 aircraft. As far as I know, the latest decision was that we should have 100 aircraft. I don't know what will happen, but we will have C/D versions flying until we have the 'Echo' version operational.

"They are still good aircraft, but the 'Echo' is much more advanced and in this area you always need to be in front. If you look into the future, you can see that we need the 'Echo' version.

"There are many things we are looking forward to. Compared to the C/D you can carry more load, it has more stores, AESA [active electronically scanned array] radar, better sensors, more fuel capacity and so on. The electronic warfare system in this aircraft will be very good too. Also, the architecture for the software system is really good, because for the first time they separated the flight-safety parts of the aircraft [software] from the tactical [parts]. That means that you can actually change and adapt the tactical systems and the fusion systems much faster and adapt to whatever happens. You can develop the aircraft much faster and I think that is really important.

"In all the Saab aircraft I've flown, the human-machine interface is really good and I'm looking forward to what the Swedish Air Force will do with one big screen or three screens [in the cockpit]."

Another feature he did not mention, but will no doubt be interested in, is the JAS 39E's ability to supercruise - fly supersonic without using afterburner.

When asked about the possibility of the Flygvapnet flying the JAS 39C alongside the JAS 39E and whether pilots would be able to be dual-qualified, Gustafsson was fairly clear: "I've flown the Viggen and the Gripen and I think the good parts will remain, so I would say it would be workable for pilots, but I don't think it will be necessary. A squadron will retrain and then they will have the 'Echo' and then another squadron continues [the process]. We should probably concentrate on one aircraft." **AFM**