

Report by Cristian Schrik



# The men who keep the aircraft servicable

It is 07h00 as the door of the Royal Netherlands Air Force (RNLAf) 322 Squadron maintainers building gets unlocked on the north side of Leeuwarden Air Base, the Netherlands. Within 30 minutes all flight line personnel gather in their crew room for the morning briefing

## Squadron History

When the Netherlands was forced to surrender to the Germans during the Second World War, many people and military personnel went to the United Kingdom (UK) to continue the battle against the Germans. Amongst them were His Royal Highness (HRH) Prince Bernhard and his family.

From the UK Prince Bernhard coordinated the training of Dutch pilots in the Royal Air Force (RAF). He also completed his pilot training with No.1 Elementary Training Flying School at RAF Hatfield, Doncaster. In May 1941 the prince was awarded his pilot wings, he made it his aim to create a Dutch fighter squadron within the RAF from that moment on.

The aim was to form an entire squadron with Dutch pilots and maintainers and No.167 "Gold Coast Squadron" was chosen as the core. Whilst the negotiations to create the squadron were still in progress however the biggest obstacle was finding enough Dutch maintenance personnel. The problem was soon overcome by re-educating technical personnel from the army.

After much negotiation, led by HRH

Prince Bernhard, the British Air Ministry gave permission to form an entirely Dutch squadron.

On 12 June 1943 the squadron moved to RAF Woodvale, Merseyside, UK, and was renamed into No.322 (Dutch) Squadron.

## Squadron Task

322 Fighter Squadron's mission is to provide offensive and defensive fighter power with their F-16 Fighting Falcon fighter aircraft. These tasks are performed in peacetime, crisis and/or humanitarian operations. The squadron maintains at all times enough combat ready pilots for all the appropriate roles within the tasks. The primary duty for the squadron maintainers is to provide combat ready aircraft and support flying operations.

## Flight line personnel

At 07:45 whilst enjoying a fresh cup of coffee, all flight line maintenance personnel gather in their crew room for the morning briefing.

The flight-chief (FC) reads out the daily chart, that indicates which "pair", consisting of a crew-chief (CC) and assistant crew-



Top to bottom:

chief (ACC), are assigned to which aircraft and the hardened aircraft shelter (HAS) in which the aircraft is parked. Any work that needs to be done on the aircraft or special remarks is also mentioned on the chart.

Afterwards, personnel will receive other information regarding their work in a briefing from the line-chief (LC). Issues such as upcoming exercises, news, information, changes and feedback is provided to them.

On the first day of the week, the head of line maintenance (HLM) gives his personnel feedback on sorties flown the week before and the weekly planned fly (WPF) for the upcoming week. The WPF briefing covers the number of planned sorties, missions and configurations, this is done to give them an idea of what is taking place in the air with the aircraft(s), and to keep them informed and involved.

The entire 322 Squadron line maintenance consists out of one HLM with the rank of Captain,

a 1st. Lieutenant deputy HLM, one Warrant Officer LC, five FC that are Sergeant-Majors, 15 Sergeant CCs, six Corporal ACCs plus two de-briefers and one logistics coordinator all of whom are Sergeant-Majors. The squadron also has 14 people that are dedicated to F-16 weapons and 3 life support specialists.

## Flight line personnel duties

The only officers within line maintenance are the HLM and deputy HLM who are responsible for creating the long term staffing plan for squadron maintenance and weapons personnel. They also monitor and advise on decisions that are being made in line maintenance and attend the daily and weekly meetings that are related to line maintenance. They initiate, observe and implement proposals for working procedures and regulations and report directly on those matters to the squadron commander.

The LC has overall supervision of all maintenance tasks and is responsible for personnel planning. He ensures all maintainers are programmed for and attend the courses they need, approves leave requests and manages the daily availability of maintainers to match the squadron task as set out in the WPF.

The five FCs supervise the maintenance tasks performed on the flight line ensuring the correct use of the manuals, tools and that regulations are followed. One FC is

mobile around the flight line ensuring that the correctly qualified personnel are available for any maintenance tasks and that any specialist tools or additional spares and equipment are at hand. The mobile FC is in permanent contact with the squadron logistics (LOG) office where another FC and a weapon specialist keep a track on all flight line activity.

LOG keeps track of all maintenance tasks and schedules any additional tasks into the integrated maintenance data system (IMDS). A large board on the wall allows the monitoring of all squadron aircraft and displays their status and configuration with coloured labels. LOG is reliant on the mobile FC and CCs to keep them updated on the status of the aircraft on the line. Behind LOG sits the logistics coordinator (LOGCO) who coordinates between the flight line and hanger maintenance as well as organising ground support equipment. The LC, FCs and LOGCO are all former CCs with years of experience in their field.

Next to LOG is squadron Ops who are the link to the pilots on the squadron and need to know how many flyable aircraft they can use for the upcoming mission.

After each flight the pilot carries out a technical debrief with the squadron debriefer. Any problems with the aircraft are highlighted and recorded and the status of the aircraft determined. The debrief is a vital part of the system, any fault report could lead to and assist in fault isolation and eventual repair.

At debrief all job guides and manuals referring to the F-16 can be found. If you need anything that is F-16 related such as a part description or installation instruction etc you will find it here, it is the heart of technical advice and reference to all squadron maintainers.

## Walk-around and inspections

After the morning brief CCs and ACCs are taken to the HAS where the F-16 is located that they have been allocated.

On entering the HAS, the ACC checks for any emergency power unit (EPU) leakage on the aircraft, opens the HAS door, and the CC checks the aircraft technical log (ATL).

Inside the ATL are all the maintenance tasks that need to be done or have been completed. Regular inspections that need to be performed after a specific number of



flight hours or days are also specified inside the ATL alongside the total flying hours of the aircraft and engine, airworthiness certificate and special regulations etc.

The same (maintenance) information is also loaded into the IMDS. All maintenance tasks are scheduled in IMDS and needs to be signed off by the person who performs the scheduled maintenance. All maintenance action will also be written inside the ATL.

Before the first flight of the day a Walk around Inspection (WAI) is performed on the aircraft. A WAI inspection will be accomplished if the post/pre-flight inspection was accomplished more than 24 hours prior flight.

A pre, thru and post-flight inspection is performed on the aircraft everyday, unless the aircraft is not intended to fly. A pre-flight inspection will be performed before the first flight of the day; a thru-flight inspection between flights (if it will fly again the same day) and a post-flight inspection will be performed after the last flight of the day. On most occasions a combined post/pre-flight inspection is performed so it is already prepared for the next day.

During such inspections, the CC and ACC inspects the aircraft for all kinds of possible leakage, damage, scratches and electrical failures on external lights, anti-ice etc.

During a WAI all protective covers are removed, tires are inspected for the correct pressure and all pneumatic bottles for the correct pre-charge. If they discover any incorrect pressure or pre-charge, the CC and ACC will ensure the correct pressure/pre-charge is applied with the help of a nitrogen service vehicle, which will be brought to them by either a driver or the FC.

The F-16 has two Jet Fuel Starter (JFS)/ Brake bottles that are used to start the engine, and to apply emergency braking power. If the pre-charge is incorrect these two bottles can be serviced by using a T-handle to manually charge the bottles. It's a nice free morning exercise as the pumping starts to get heavier and heavier with each strike as the pressures get closer to the correct pre-charge.

After external electrical power is applied to the aircraft, the CC or ACC performs a cockpit check to ensure all internal and external lightning is working properly, aircraft heaters and anti-ice probes are functioning and a couple of gauge tests are performed such as fuel indication.

A FC enters the HAS to load the aircraft with codes that is used for its Mode-4 IFF and Link-16. If the aircraft wasn't refuelled the day before, the aircraft will also be refuelled from big yellow fuel bowsers that enter the HAS and fill the aircraft with roughly 10.000 pounds of fuel.

Once all inspections are performed, the CC and ACC wait inside a small cabin inside the HAS until the pilot arrives at his aircraft. Once the pilot has arrived, the CC and ACC will each have their own duties when it comes to the launch procedure.

### Launch and recovery

While the ACC puts in the digital video recorder (DVR) cassette into the recorder (that records Head Up Display and radar images) the CC walks along with the pilot during his walk-around on the aircraft and they go through the ATL together.

Once the pilot has taken his seat in the cockpit the ACC connects the G-hose of the G-suit to the G-hose connector in the F-16; he also connects the parachute risers to the pilot harness, starting with the right side first. After the pilot puts his Joint Helmet Mounted Cueing System (JHMCS) over his head the left riser can be connected to the harness ensuring that the cable that runs from the back of the helmet over the pilots shoulder routes underneath the left riser.

Once everything is connected, the ACC does a quick check before removing the stairs away from the aircraft.

In the mean time, the CC has connected his communication cable into the aircraft as he will be talking to the pilot during start-up.

At start-up the CC stands on the left side of the aircraft and the ACC on the right side.

When the pilot is all set to start-up the F-16, he or she will say "Ready for start 2-60", meaning the use of two JFS/Brake bottles, and letting the JFS run for 60 seconds before putting the throttle to idle allowing fuel to flow to the engine.

As soon as the engine is running the ACC will pull out the safety pin of the right wing external wing tank (if applied) and check the "six greens". With a thumbs-up he acknowledges to the CC that all "six greens" are ok. The "six greens" indicate if all the F-16 fuel pumps are working correctly.

Numbers one to five are fuel pumps in the F-16 reservoir, and number six is the fuel flow proportioner (FFP) that regulates the

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fuel flow to the engine, based on the throttle setting given by the pilot.

The ACC continues his way into the right-hand wheel bay, where he pulls out the main landing gear safety pin and folds it together with the external fuel tank safety pin.

The CC does the same on the opposite side and places the safety pins in a storage compartment that is located in the left-hand main landing gear bay.

At the same time the pilot starts the flight control (FLCS) self-test that goes through 54 various steps, ensuring the FLCS is functioning correctly.

While in the main landing gear wheel bay, both CC and ACC are checking for leakage on hydraulic pipes and connectors, and popped delta-p indicators from the F-16 hydraulic filters.

A delta-p indicator is a small magnetic pin that pops outboard if a filter is polluted. Normally the oil runs through the filter, but if the oil becomes polluted the oil will bypass the filter resulting in a pressure differential, that causes the delta-p to pop.

Continuing to check for leakages on various hydraulic and fuel lines behind hatches, both CC and ACC meet again at the rear of the aircraft.

As the FLCS self-check is finished, the pilot will ask the CC to confirm his FLCS control movements. With the trims initially disconnected, no movement should be observed.

The pilot then connects the FLCS and starts to give inputs by moving his trim up, down, left, right as well as rudder trim left and right.

The CC will acknowledge trim movement by calling "nose up, nose down, left roll, right roll, rudder left, rudder right".

The same will be done for side-stick inputs and the manual pitch override (MPO).

When then control checks are done the CC and ACC will walk underneath the nozzle ending on the opposite side from where they started.

"Call me ready for the brakes" will sound through the CC's headset as the next step will be a functional check of the aircraft's brakes. Both CC and ACC kneel down at the main landing gear with their fingers touching the outside of the brake, as the CC calls "Channel 1 right, left" and "Channel 2 right, left" they check and with a thumbs up acknowledge proper brake function.

Next a secondary engine control (SEC) check for the aircraft engine is performed, meaning the nozzle will close to its smallest opening, and back again to its largest. SEC is a hydro-mechanical system which provides engine control in event of a system malfunction.

As the ACC kicks away the chocks from the left wheel and places them in front of the HAS, the CC and pilot perform an emergency power unit (EPU) check. Once the pilot has set his oxygen to 100%, he tells the CC "you are clear to pull the pin". The CC pulls out the EPU safety pin holding it up in the air, so it is visible to the pilot that it has been removed. The EPU check is performed on bleed-air coming from the engine to see if the EPU system is working properly. The EPU is a self-contained system which simultaneously

provides emergency hydraulic pressure and electrical power.

The EPU uses bleed air and/or hydrazine (H-70) to operate. When the EPU is in use, the pilot has approximately 10 to 20 minutes to land his aircraft in case of an in flight emergency.

Once the check is performed, the pilot will say "Check for flow" and the CC checks for bleed air leakage from its exhaust. If aerial refuelling will be performed during a mission, the CC will also check if the aerial refuel door opens and closes.

Once all checks are performed the CC will disconnect his communication cord from the aircraft and kick away the chocks from the right main wheel as the ACC removes any protective missile covers. They then walk onto the HAS platform waiting for the aircraft to taxi.

The pilot indicates he is ready to taxi by selecting the anti-collision light to flash, the CC marshals the F-16 out of the HAS and position it on the platform. By holding his hands up in the air the CC tells the pilot to keep his hands clear of any (flight) controls, when the pilot puts his hands up the ACC pulls any additional safety pins such as chaff and flare.

As the aircraft holds on the platform, the CC stays with the aircraft in case the pilot needs technical assistance. The ACC pulls out the winch cable with which the aircraft will be pulled back into the HAS when it returns from its mission.

When the aircraft has taxied out, the FC picks-up the CC and ACC and brings them back to their crew room.

When the F-16 returns from its mission the CC marshals the F-16 onto the HAS platform.

Once the F-16 is in the correct parking position the CC puts in the EPU and chaff/flare safety pin as the ACC puts in chocks for the main wheels. Then the external fuel tank and landing gear pins are replaced and a fuel spill basket is positioned underneath the F-16. Every time an F-16 shuts down, fuel comes out of a drain that is caught and disposed of for environmental reasons.

Once the F-16 is safe the CC gives the pilot the signal to shutdown its engine. At the nose landing gear, a steering bar is attached allowing the CC to steer the aircraft into the

HAS. With two hooks, attached to the winch rope, connected to the main landing gear the aircraft can be pulled back inside the HAS.

Once the F-16 is back inside the pilot and CC talk through any malfunctions the pilot may have noticed during flight. The ACC disconnects both hooks and takes an oil sample from the engine. After each flight a Joint Oil Analyse Program (JOAP) is done by engine specialists to detect any pieces of metal in the oil, which may indicate engine damage.

The CC and ACC can now both start their thru-flight inspection, meaning they check the entire aircraft for leakage, damage, missing parts etc. If the CC inspected the left-side during the pre-flight, and the ACC the right-side, they now change sides to help exclude any errors that may have been missed by one another.

If it was the last flight of the day a post or combined post/pre-flight inspection will be performed to ensure the aircraft is ready to fly again the next day.

Once the CC and ACC have performed their inspections this is again reported in the aircraft form and IMDS. At the end of the day all maintainers gather again in their crew room for a well deserved refreshment before they all go home.

### Secondary Tasks

Beside their main job as a maintainer all CCs and ACCs have secondary tasks they fulfil on the squadron.

One of these tasks is providing Flight Crew Technical Licence (FCTL) training to the squadron pilots ie. providing basic technical information on maintenance procedures. A CC first conducts the theoretical training by briefing the pilots on items that should be inspected when they land their aircraft on an airfield that is not an F-16 base. Afterwards the pilots are assessed on a practical demonstration of the procedures they have been taught. If successful they are qualified to conduct a single inspection on their aircraft if they land away from homebase.

There are many other secondary tasks within the squadron including;

Environment representatives who are responsible for the correct disposal of all chemical waste material such as fuel, oil and contaminated cloths from within the HASs.

Squadron bar reps that take care of ensuring that snacks and drinks are available to be purchased.

Squadron PR source patches, caps, T-shirts, stickers and attend air shows if the squadron is present.

Polly keepers take care of the squadron mascot, 'Polly Grey' an African grey parrot that lives in a large aviary inside the crew room. They make sure she is fed and watered and has regular visits to the veterinarian.

On the job training (OJT) is the largest secondary duty that maintenance personnel fulfil. Many CCs are involved in training new personnel that have just finished their F-16 course from the Air Force Technical School at Woensdrecht Airbase. Not only new CCs come to the squadron but also future avionic, engine and system specialists.

In accordance with maintenance regulations within the RNLAf called Militaire Luchvaart Autoriteit (Military Aviation Authority) all personnel that are going to work on aircraft in the future need to have a basic level of knowledge in all areas that are related to the aircraft on which they will work. They learn this knowledge on the job as a CC in a 5 week period. Future CCs come back to the squadron after a 1 year OJT period and receive dedicated training to become a maintainer on the oldest squadron in the RNLAf, 322 Squadron. •



Caption to come



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