



# Elephants to the Rescue!

The EADS CASA (currently Airbus Military) C-295s of Esquadra 502 'Elefantes' are some of the Portuguese Air Force's most sought-after air assets for a variety of missions and roles, as

**Dirk Jan de Ridder and Menso van Westrhenen find out**



*Lt Col Bernardino, commanding officer of Esquadra 502, has been involved with the C-295 from the moment it was considered a possible candidate to replace the C-212 Aviocar.*

In 1978, 502 Squadron was established at Tancos and equipped with the CASA C-212 Aviocar. Its sister squadron Esquadra 401 'Cientistas' (scientists) had already operated the C-212 for three years in specialized missions such as aerial photography and reconnaissance, electronic warfare, fishery protection, maritime patrol and search and rescue. Both squadrons had operated the C-212 for over 30 years when the Portuguese Air Force started looking

for a replacement. After competing with the C-27J Spartan, seven C-295M transport aircraft and five C-295MP maritime patrol aircraft were delivered to the squadron's new home base Montijo, near Lisbon. The Elefantes' C-212s were retired in 2010 and in December of 2011 Esquadra 401 was disbanded and the Elefantes took over its missions. In 2014, with 3200 flying hours allocated for the whole year, the squadron logged its 17000th flying hour in total.

Being a member of 502 Squadron, whether flying or ground crew, is far from a nine-to-five job. Continuous two-week SAR deployments to the Azores or Madeira, daily 24-hour alert standbys at Montijo as well as day and night training flights add up to a busy work schedule. It is not uncommon for a pilot to leave the base on Friday afternoon for a regular weekend, only to be called back in the evening to fly spare parts to the Azores or Madeira the

next day. On weekdays often only a small handful of pilots are present in the squadron building, with the others flying, on alert, deployed to Italy for FRONTEX (EU border patrol), away for training or having a day off after working during the weekend. Due to its missions, it is impossible for the whole squadron to ever all be together.

Esquadra 502 is commanded by Lieutenant Colonel Miguel Oliveira Bernardino. He joined the Portuguese Air Force in 1991

*The C-295MP is easily distinguished from the C-295M by the electro-optical pod under the nose and the belly-mounted radar. This example carries a side-looking radar (SLAR) as well.*



less powerful, but very well tailored for this type of mission. Because the two aircraft complied with the requirements, the selection of the C-295 was not an operational choice, but it was based on our budget for the acquisition as well as 30 years of full in-service support.”

The squadron operates the C-295M in three variants. Seven C-295M aircraft, designated PG01, are purely used for tactical transport. The remaining five C-295MP maritime patrol aircraft comprise three PG02 and two PG03 variants, the latter of which also have provisions for photographic reconnaissance. An old Leica RC-30 camera is used for both vertical and oblique imagery from altitudes up to 30,000 feet. The Portuguese Air Force is in the process of selecting a new camera. The C-295M is capable of transporting up to 70 passengers, 45 paratroopers, 24 stretchers, ten small or five standard pallets or three vehicles. It can be configured with foldable (military) seats, civilian and VIP seats, although the latter are rarely used. The C-295M is very suitable for tactical missions. It can take off in 2200 feet or even land on a runway half as long. Pilots rely on a ground proximity warning system, secure communications, night vision goggles, radar warning receiver, missile warning system, as well as an armoured



and has flown the C-212 Aviocar with Esquadra 401, 502 and 711. From 2004 he formed part of the armed forces’ general staff team that defined the requirements for the C-212 replacement and he evaluated the C-27J and C-295M, both on paper as well as in-flight. No pilot can probably explain better the differences between the C-212 and the C-295M:

“The C-212 was an aircraft bought 40 years ago. It is incompatible. It was a good aircraft

in that time and for that mission, but going to the Azores we couldn’t take any persons on board and we had to refuel at Porto Santo. Now we easily take 40 people as well as cargo and fly much further. We have a range of up to 1000 nautical miles with one hour on-station for SAR or ISR missions. The C-212’s range was about 350 nautical miles and we didn’t have the radar, direction finding equipment or communication with the boats that we have today.”

He continues about the evaluation process: “The two aircraft meet all our requirements. They are similar, but also very different. The C-27J is a typical military aircraft, like a small C-130 with very strong engines and all the wires and pipes visible [in the cargo compartment]. It is better, for example, for missions in Iraq, but it does not have any windows and it is not the most comfortable space for surveillance, personnel and VIP transport. The C-295 is

**Above:** Major Carvalho and Captain Martins prepare for their upcoming flight.

**Left:** A loadmaster works his way through the procedures. The actual drop takes less than a minute, while preparation (loading the pallet and briefing the procedures) took almost two hours!

*A C-295M speeds down the Montijo runway with Europe's longest bridge, leading directly to Lisbon, in the background.*



cockpit and chaff and flares for self protection. An AN/ALQ-131 electronic countermeasures pod can be installed under the wing.

The C-295M takes a large amount of 'unnecessary' workload off the C-130 and P-3 fleet by filling the gap between the C-212 and those two aircraft. A C-295M burns about the same amount of fuel in two hours as a C-130 or P-3 does in one hour and it requires less maintenance, thus making it more reliable and a lot cheaper to operate. According to Lt Col Oliveira Bernardino however, the C-295 cannot completely replace either the C-130 or P-3, not even with the anti-submarine warfare equipment offered by Airbus Military:

"No aircraft can replace the

P-3 in terms of range, not even the P-8. A lot of countries buy the P-3 second-hand or third-hand and try to extend its operational lifespan. We have a very big area of responsibility, the second largest after Canada, and for extreme long range SAR you still need the P-3. There is space for two aircraft, one for patrol and another for surveillance. I think countries such as Australia and New Zealand are thinking about that as well. For patrol, I don't know of any aircraft like the P-3. You can employ the P-3 when you need it for extreme long range and keep it on the ground for daily missions up to 1000 nautical miles by using the C-295M or a similar aircraft. For the C-130 it is the same. The

Portuguese Air Force didn't really have a medium transport capability before the C-295 arrived. If you needed to transport 1 ton of cargo, the C-212 couldn't do it and you had to employ the C-130. At this moment we can perform 60 to 70 percent of the C-130's missions. If you need to deploy 30 or 40 people, you can use the C-295M. For transporting a larger number of passengers or more than five tons of cargo directly to a place like Iraq, you must employ the C-130."

### Maritime patrol

Maritime patrol missions are flown with the C-295MP and a minimum crew size of five, consisting of a pilot in command, co-pilot, tactical coordinator, systems operator

and cabin operator. The squadron itself prefers to name this role surveillance or ISR (Intelligence, Surveillance and Reconnaissance), probably to distinguish it from the maritime patrol mission carried out by the P-3 Orion which has an attack capability. The C-295MP can easily be distinguished from the C-295M by the electro-optical turret under its nose and the ELTA 2022 surveillance radar below the cockpit, the same as found in the P-3 Orion, capable of scanning 200 nautical miles and up to 1000 targets at a time. The port wing contains a search light. This is not normally used, because by doing so the target will realize that he is being investigated. The MPAs are busy enough with local surveillance



**Right: Loadmasters load a 1300 kg (2870lb) cargo pallet, to be dropped from the air with a parachute, onto the aircraft.**

flights and FRONTEX missions, so they are based at Montijo, and not normally used for SAR. The C-212 used to have a search light and the Portuguese therefore requested it for the C-295, but the imagery provided by the electro-optical and infrared sensor has proven to be more than sufficient. The MPA is further equipped with a side-looking radar on each side of the cabin and three bubble windows for observers.

Inside the aircraft, there is not much difference apart from some palletized workspaces and a video screen in the cockpit duplicating imagery looked at by the tactical coordinator. Behind the cockpit, the Fully Integrated Tactical

System (FITS) is the workspace for the tactical coordinator and systems operator. The system collects, classifies and displays sensor data gathered during a mission and processes and presents that information to let the crew act on it. FITS is a modular system allowing a C-295MP to be adapted into transport configuration in a matter of hours. Between the fleet of five maritime patrol aircraft there are three FITS systems. It is the exact same system as fitted to the Brazilian and Spanish P-3 Orions.

In 2014, for a period of four months, the squadron deployed a C-295MP to Naval Air Station Sigonella in Italy and Malaga in Spain as a contribution to

Operations Aeneas, Hermes and Indalo. The main purpose of these operations, which are managed by FRONTEX (the European Union's border control agency), is to monitor the flow of illegal migration and smuggling from Africa to Europe. Between 2010 and 2013 the Portuguese Air Force conducted 274 missions for FRONTEX, comprising about 1400 flying hours. In 2014, a total of 78 missions, comprising 420 flying hours, were flown for FRONTEX. One aircraft and 18 personnel were deployed, rotating every two weeks. An average week would see the detection of around four targets of interest. Signs that might indicate illegal migration include not only vessels with an unusually high amount of people onboard, but also ships moving strangely in the water – a sign that it may be overloaded. Often up to several hundred refugees try to reach European shores in small, unseaworthy boats so search and rescue is a secondary mission for which the aircrews are always prepared. During four months of FRONTEX operations in 2014, missions had to be changed on

other about mission elements and discuss final details before takeoff. Once the aircraft is airborne and it reaches the area of operations, ships initially detected by radar are one by one, inspected visually with the electro optical sensors. Their data (among others - the ship's name, coordinates, course and speed) is entered into a database and sent to the ICC for analysis, either after landing or immediately via radio or satellite communications so that a ship or helicopter can have a closer inspection. During this whole process, imagery is recorded and the C-295M will usually continue its journey once a helicopter or ship has arrived. The sortie is concluded with a post-flight debrief which again includes ICC personnel and intelligence officers.

Major Carvalho, the squadron's operations officer, explains:

“For us the FRONTEX missions have been very good operations since 2010. It enabled us to develop our tactical and flight procedures and I think FRONTEX is also satisfied, because they are always trying to convince us to go back. Our aircraft have a medium to long range. We can go 800 nautical miles and stay in the operations area for about two to three hours. We can leave from Sicily and go almost to Egypt. That is what they need.”

## Medevac & SAR

Over the last ten years the Portuguese Air Force has made an incredible leap forward in its medical evacuation and search and rescue capability by replacing the C-212 Aviocar and SA330 Puma with the C-295M and AW101 Merlin. The Merlin's range of up to 350 nautical miles enables it to cover a much larger area and has thus triggered an increase in the amount of SAR sorties for the C-295M as well. Both types are on alert 24 hours per day, 7 days per week at three locations: Lajes (Azores), Montijo and Porto Santo (near Madeira). Lajes tends to get the most alert calls, due to tropical storms and its position astride major shipping lanes between Europe and the Americas. The C-295M has flown some 190 medevac/SAR missions over the first three quarters of 2014 and more than 850 missions since it entered service. Some days comprise up to two or three sorties per day. Missions regularly start around midnight and could end up to nine hours later. In the SAR role, the aircraft is equipped with an MA-1 SAR kit, containing two 7-person dinghies and two

three or four occasions to come to the rescue of boats in trouble.

FRONTEX sorties are managed by an International Coordination Centre (ICC). The ICC prepares the mission order, which includes data such as takeoff time, mission length, area of operations and mission objectives. Based on the mission order, pilots prepare their flight plan, systems operators prepare the tactical systems and the most efficient route to fly, ground crew refuels the aircraft and make them ready for flight, while an intelligence officer assesses possible threats and areas where 'detections' are most likely. The mission briefing brings them all together to inform each

*Whereas the C-295MP maritime patrol aircraft is used for surveillance flights, the C-295M tactical transport aircraft is used for medevac and SAR, so both types frequently operate over the Atlantic Ocean.*





## Difficult times

Although Portugal is one of only three countries in Europe to still spend over two percent of its Gross National Product on defence, the air force has had a tough few financial years with cuts on flying hours and even salaries.

This summer a very serious result of these budget cuts came to light. So many pilots are leaving the air force, that a man who was attacked by a bull on the remote island of São Jorge could not be transported to hospital because 751 Squadron (flying the AW101 Merlin) did not have a captain available to take charge of the helicopter and the C-295 does not operate to and from São Jorge outside of daylight hours. Only four days previously, the chief of the air force had informed the Defence Committee of Parliament about the situation, saying "I hope that nothing bad happens".

The problem is not that there are not enough pilots, in fact there are plenty, but due to reduced flying hours it takes them longer to become a pilot in command. Every flying hour they are called upon on SAR duties is subtracted from their training flights, making it more and more difficult to get qualified for specific missions and become an aircraft commander.

This summer the Merlin squadron only had six pilots in command to man three SAR locations. Pilots can get at least a double salary flying with the Portuguese national airline TAP and after having served the air force for 12 years, they can leave at virtually a moment's notice.

Many 24-hour SAR shifts on their home base and frequent deployments away from the family, totalling between 4 and 6 months per year, do take their tolls after all so many years.

## To the other side of the world

In February 2014, 502 squadron flew a C-295M to Singapore, for display at the Singapore Airshow, as well as to East Timor (a former Portuguese colony) and New Zealand for capability demonstrations.

The whole trip included additional stops for fuel and crew rest consecutively in Greece, Abu Dhabi, the Maldives, Singapore, East Timor and Australia before ending at Whenuapai, New Zealand. Airbus Military is pitching the A400M and C-295 to New Zealand to replace its fleet of C-130 tactical transport aircraft. The aircraft could additionally, take over some medium-range surveillance missions from the P-3 Orions which are starting to show their age.

The Portuguese Air Force is one of the primary users of the C-295 in both roles (and the first to fly the C-295MP), contributing greatly by developing innovative solutions to improve capabilities, and was thus the most logical operator to be asked by Airbus Military to perform these overseas demonstrations. •

survival packs. The kit is secured on the cargo ramp and dropped from low altitude. It is also among the standard equipment during FRONTEX missions. In 2014 during a FRONTEX deployment, they were fully prepared to drop a SAR kit for a boat that was sinking, but when they arrived at the operations zone Italian coast guard boats had already come to the rescue. It would have been the first time for the SAR kit to be dropped by the C-295M in a real emergency.

The cooperation between 751 Squadron, flying the EH101, and 502 Squadron is very close during long-range SAR missions.

Lt Col Oliveira Bernardino: "We have a very good relation with 751 Squadron. It dates back to a mixed squadron we had, Esquadra 711 in the Azores when we had four crews flying the SA330 [Puma] and four crews flying the C-212. We tried to cooperate as we do now, although the C-212 didn't have the capabilities, but the spirit and the concept already existed at that time. Our main purpose then was to be there in case the Puma went down into the ocean. Today, on missions over 100 nautical miles or if the helicopter commander asks for support, we go in front of them to make all the weather calculations, communications relay and give the ship's last position to the helicopter. We do all the briefings to the boat crew regarding security measures, the heading and speed they should maintain, the best area for the recovery. We

feel that with this preparation, the boat's crew are better prepared and with less adrenaline. If they have questions, we have half an hour to give them the comfort and confidence they need so that they are prepared for the recovery."

During long-range missions of up to 350 miles off shore, the Merlin crew sometimes only has ten minutes to perform the rescue, so perfect cooperation between the two crews and preparation of the boat crew can mean the difference between success and failure of a mission.

A mission isn't over for the C-295M crew as soon as the Merlin recovers a person. On the way back they often escort the helicopter, as Lt Col Oliveira Bernardino explains: "Depending on the conditions and the distance, we stay with the helicopter until 100 nautical miles off the coast. If something happens to the Merlin, we can launch the SAR kit. If the intention is to transport the person from the helicopter to the C-295, we land and prepare the aircraft to receive the recovered person. This happens in several situations, for example when the helicopter is low on fuel. In extreme long-range missions to the north-west of the Azores, they must refuel at Flores before and after the mission. The time it takes us to go from Flores to Ponta Delgada, the main island in the Azores, is a lot shorter, so the patient, the doctors and their equipment then come with the C-295. Our

aircraft is bigger, it is faster and it offers better conditions for the medical team to do their job."

With an average of just 1400 flying hours on each airframe and at least 25 years of service left, the C-295M will continue to remain one of the Portuguese Air Force's most employed aircraft. The C-295M, first flown in 1997, is far from fully developed. Although no customer has actually purchased or upgraded their aircraft with these capabilities as yet, Airbus Military already offers an airborne early warning radar and anti-submarine warfare equipment for the C-295M. The company also revealed the C-295W with winglets in 2013. Some of Esquadra 502's pilots confirmed their interest in these winglets, which can be mounted on their current aircraft, because they will improve the aircraft's performance at low speed while offering a fuel saving at the same time. It is a costly upgrade though, as large parts of the wings have to be replaced and strengthened.

The cost and benefit of this modification are currently under evaluation by the Portuguese. While countries such as Canada are looking for new search and rescue support aircraft and Airbus Military is offering the C-295 MPA to New Zealand and even the United Kingdom, the Portuguese Air Force may well have set the standards for how other countries could fulfill their maritime ambitions and obligations at reasonable costs. •



Above: Major Carvalho, the squadron's operations officer and second in command, on the right wearing a C-295W patch. The squadron acknowledges the advantages of the C-295W's winglets, but there currently is no budget (and no real need) for an upgrade.