

Although not in the same league as today's fighters, the Phantom is no slouch in the air, and its speed, climb and turning performance make it a worthy adversary for modern missile systems. It can also carry a variety of electronic and mechanical countermeasures.

"The self-destruct sequence will only be set in motion if communication is lost or the aircraft is damaged due to a hit. Attempts are then first made to restore communications, or stabilise the flight. However, if this cannot be accomplished, the destruction sequence is activated and the Sidewinder warhead will explode, breaking the QF-4 in two parts and making it fall to the ground.

"If the drone survives the test, the chase aircraft rejoins and performs a Battle Damage Check. If the drone received any severe damage, it is landed by the mobile controllers at Space Harbor. The White Sands Space Harbor/Northrup Strip is located on the gypsum flats between Big Salt Lake and Lake Lucero and is used year-round for NASA shuttle training missions, as well as an emergency landing strip for drone operations. It also acts as a standby landing area for the NASA Space Shuttle. If the drone has sustained little or no damage it will be recovered at Holloman AFB with the auto-land feature, with the chase pilot advising the controller on the drone's performance. Once landed, the drone is disarmed and towed off the runway back to the ramp."

Det 1 routinely flies two ship NULLOs, meaning that two unmanned aircraft are flown



remotely over the test area. The DFCS system is designed to handle up to six aircraft simultaneously for which the control van is also equipped with six consoles. However, White Sands Missile Range not only uses DFCS for full-scale fixed-wing drone operations, but also to control ground vehicles and sub-scale drones (SSATs). The DFCS can track and control up to 48 ground vehicles or six aerial targets simultaneously in formation or in precise synchronised flight patterns, while

tracking four additional targets.

The DFCS can provide a 90-second interval between target launches to maximise on-station time for multiple target formations. The system is capable of manual or automatic track and the control of single or multiple aerial or ground target presentations. The DFCS can currently control domestic and foreign ground vehicles, BQM-34 and MQM-107 SSATs and QF-4 FSATs, with Time-Space-Position-Information available in real-time on all targets.

The landing gear's hydraulic parts are then checked, as the delay in delivery of the replacement parts is considerable. On the 20th day of the process the aircraft is de-panelled to gain access to all the interior parts that need inspection, revision or replacement.

Once the aircraft is inspected and parts have been revised or replaced where necessary, the aircraft is meticulously checked and tested on the ground during so-called 'green runs' to ensure all systems work properly. This is followed by an extensive maintenance pre-flight brief before it goes out for its first Functional Check Flight (FCF), performed by the two-man crew of the AFMC Maintenance Flight Test unit.

Flown by air force reservist Lt Col Jon Wendell and the last F-4 Phantom weapon system officer (WSO) flying in the United States, Rick Nelson, these FCFs are performed to ensure aircraft are airworthy and components are functioning according to predetermined specifications. During this FCF, the F-4 is taken for a full-afterburner climb to be levelled off at 15,000 ft (4572 m) where the landing gear is lowered. Once this works satisfactorily, the aircraft is taken up to 40,000 ft (12192 m) where a run at between Mach 1.5 to 1.7 is executed. This takes place at the Tombstone military operating area, east of Tucson.

If all is still working properly the throttles are put back to idle at around 35,000 ft (10668 m) and the crew starts working the checklist, giving special attention to all the hydraulic and electrical systems. Aileron alignment and wing-banding are checked, after which the jet descends to around 25,000 ft (7620 m) where several manoeuvres are made to check stability. Then it is brought close to a stall to see how the aircraft reacts to inputs from the cockpit. At 10,000 ft (3048 m) landing approach characteristics are verified.

The back-seater is of great importance as he has access to all the circuit breakers located in the rear cockpit, and is the only one who can put them back in when they pop or redirect the circuitry in case of malfunction during the flight. He also provides an important second opinion on the aircraft's handling and, in case of emergencies, will take care of communications with the ground. The check flight results are accurately documented and communicated between the different organisations involved in the regeneration and modification programme. Normally, two or three FCF sorties are flown before the aircraft is ready to be sent for conversion. The final FCF is important as, from that moment, the clock once more starts ticking for the rejuvenated Phantom.

Serviceability restrictions

Two factors restrict remaining life: four years by the calendar and 300 hours flight time (based on a depot-level inspection at the time they are pulled from the 'boneyard'). The calendar life starts right after the FCF sortie when the pilot of AFMC Maintenance Flight Test signs the document that all works according to specifications and that the aircraft is acceptable.

The four years can be extended, if required, but this period begins before the aircraft go to Mojave for drone modification. The aircraft may very well sit in California until that lot has been modified. Although modification normally takes four months, before the aircraft are ready for delivery in some cases they may wait for six to eight months, sometimes even close to a year. This depends on when the contract options are being exercised and other factors. The 82nd may get a newly modified drone, but already a big part of the four-year lifetime has been used up.

The 82nd ATRS and Det 1 both also perform 100-hour inspections. When the FSAT hits the 300-hour mark, the aircraft is de-manned (ejection seat removed) and becomes a NULLO drone. Some jets that come out of the AMARC after their inspection are classified as 'restricted' jets. Although acceptable for drone modification, they have minor imperfections and have undergone a less extensive inspection. They are restricted to 3.5g and no 'touch and goes'. Consequently, they will become shooting targets much sooner than the 'unrestricted' jets.

AMARC output

As a consequence of the increased demand for QF-4s, the output of the regeneration programme has doubled from 12 to about 24 Phantoms annually and, since November 2004, a two-shift working cycle has been implemented. AMARC's internal goal is to have the Phantoms ready for delivery to BAE Systems in a cycle of 80 days, whereby AFMC has a target of 109 flow days to have the aircraft ready.

Before the implementation of the double shift, this goal of 109 days was hardly ever met, but since then nearly all are well within the 109-day limit. In order to keep up with the increased work pace, the F-4 Drone Regeneration Program currently employs around 120 people. All of them are Civil Service Employees, mostly technicians retired from the military with a vast experience in their field.



An F-4E that last saw service in the early 1990s with the 35th Fighter Wing undergoes the restoration programme to bring it back into useful service. Having spent a decade in the open, the main thrust of the programme is to ensure that the systems remain functional. Here the Phantom has many panels removed to allow detailed inspection of its internal workings.