



Ministry of Defence

Air Command Secretariat
Spitfire Block
Headquarters Air Command
Royal Air Force
High Wycombe
Buckinghamshire
HP14 4UE

Ref. 2020/07288

27 July 2020

Dear [REDACTED]

Thank you for your e-mail of 26 June 2020 asking for Tornado GR4 documentation:
Specifically, you requested:

*".....copy of the paragraph regarding the procedure used by Tornado GR4 pilot during
Take Off and Climb Out and OCU material about the procedures mentioned above of
Tornado."*

I am treating your correspondence as a request for information under the Freedom of Information Act 2000. A search for the information has now been completed within the Ministry of Defence and I can confirm that information within the scope of your request is held and I attach a copy of the relevant paragraphs.

If you have any queries regarding the content of this letter, please contact this office in the first instance.

If you wish to complain about the handling of your request, or the content of this response, you can request an independent internal review by contacting the Information Rights Compliance team; Ground Floor, MOD Main Building, Whitehall, SW1A 2HB (e-mail CIO-FOI-IR@mod.uk). Please note that any request for an internal review should be made within 40 working days of the date of this response.

If you remain dissatisfied following an internal review, you may raise your complaint directly to the Information Commissioner under the provisions of Section 50 of the Freedom of Information Act. Please note that the Information Commissioner will not normally investigate your case until the MOD internal review process has been completed. The Information Commissioner can be contacted at: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF. Further details of the role and powers of the Information Commissioner can be found on the Commissioner's website at <https://ico.org.uk/>.

Yours sincerely



Secretariat 3a1
Air Command

TAKE-OFF

26. **Emergency Brief.** Before take-off, the pilot in control is to give the take-off emergency brief. This is to include: VRotate (VR), VGo, VUnstick, VMax RHAG, EMBS, VStop, and VStop RHAG as appropriate. The pilot is to nominate the decision point and delegate duties in the event of an aborted take-off. The normal decision point for an abort would be VR and an abort should be completed following a major loss of thrust, including a reheat blow-out, a major emergency or red Caution Warning Panel (CWP) caption not including OXY, SPILS, AUTO P or TFR. The crew is to nominate which stores are to be pre-selected for jettison. The effect of crosswind on the use of single engine Thrust Reverse (TR) should be considered and briefed.

27. **Line-Up Checks.** Pilots are to check the HUD is operating normally when turning to line up. Line up checks should normally only be completed once cleared for take-off to ensure that the runway ahead is clear. For an ERA t/o the engines must be warmed up for at least 30 secs prior to t/o. The placard check may be combined with this warm up, but on completion, neither engine should be decelerated below MAX DRY before t/o. Once the engines are powered up, the fuel flow needles have trimmed back and the engines speeds have stabilised the pilot should read out the engine figures in the order: Left NH, Left TBT, Right NH, Right TBT, Left NL, Right NL. NH and TBT readings are compared with the temperature corrected datum figures displayed on the instruments. If the engines are outside of limits the take-off is to be cancelled. Having selected idle you should select ASM on prior to powering up to clear the runway. Failure to do so may lead to an engine surge, particularly when operating in hot/high environments.

28. **Take-Off.** Select min reheat on each engine individually and feel for the kick as each engine reheat lights. When the reheat is alight, the fuel flow indicators should be around 40kg/min for each engine. However, a subsequent indication of 20 kgs/min indicates a burner blow out, with the nozzle remaining open at up to 75% Aj. Release the brakes and select max reheat checking nozzles move to 100%. It is possible that the nozzle will respond to throttle movement up to 75% Aj even if the reheat has not lit. The pilot should call '100 kt' (HUD speed), and check both AOA gauges read below 10 units AOA. The WSO should call 'speed good' if the approach RHAG is crossed with at least 100 kt, depending on headwind and should continue to monitor the HUD on the FLIR. The pilot should maintain control column neutral until rotate speed, then rotate the aircraft smoothly but positively using 5 degrees/sec until airborne, using 13 AOA for a normal take-off and 15 AOA for a performance take-off. Once safely airborne, the pilot should select up to 2-4° climb in the HUD and clean the aircraft up as follows:

- a. Select gear up: check lights out by 235 kt.
- b. At 5 AOA: flaps up (not until gear lights out).
- c. 250 kt (300 kt if AUW > 26T or Hot/High): select min reheat; cancel reheat (one throttle at a time).
- d. Carry out Post-Takeoff Checks iaw FCCs.

5. **Climb Speed.** The SOP climb speed in 25° Wg is 300 kt, transferring to M0.7, which will occur at around FL170. On passing transition altitude, set 1013 hPa (HUD, HDD

and rear seat). If conducting a reheat climb, the SOP is: 45° Wg, 400 kt, transferring to M0.8.