

Air to Air Refuelling (AAR)

What is Air to Air Refueling (AAR)?

AAR is a procedure established to refuel aircraft midflight and thus enable longer flight time. AAR can be either done on a specified air refuelling anchor or en-route on previously coordinated routes or standard AAR routings. For Germany, Air Refuelling Anchors are published in GEMIL FLIP MAP, publicly available here: <https://www.milais.org/publications.php>.

What are the roles for an AAR?

Tanker: The aircraft used to refuel the receiver(s).

Receiver: The aircraft being refueled by the tanker.

AAR within a published air refuelling anchor.

Air refuelling anchors are predefined procedures, often located within an ED-R/TRA and similar to a civil holding procedure. The conduct of air refuelling within a published air refuelling anchor normally requires four flight levels on top of each other. The lateral and vertical dimensions of the anchor are defined on the respective anchor chart in GEMIL FLIP MAP. Let's look at the GRETCHEN anchor, located within ED-R 207 (TRA Allgäu) as an example:

[CHART NOCH EINFÜGEN]

Laterally, the anchor is defined by the means of four anchor points (AP/TP 1 and 2). Vertically, the anchor extends from FL270 up to FL300.

Use of flight levels within the anchor.

The flight levels within a defined air refuelling anchor shall be used as described here:

FL A: Alternate flight level

The FL above the tanker shall be kept clear for safety actions or exit possibility.

FL B: Refuelling base level

The FL actually used for the refuelling, actual FL of the tanker.

FL C: Entry level of the first receiver(s)

FL below refuelling base level. Used as entry level for the first receiver(s) if no other aircraft is in formation with the tanker. This FL shall be kept clear as long as receiver(s) are in formation with the tanker, used by receivers to descend in an emergency situation.

FL D: Entry level of further receiver(s)

FL below entry level of the first receiver(s). Used as entry level for further receiver(s) if other receiver(s) are already in formation with the tanker.

Separation to and within air refuelling anchor.

Other traffic shall be separated by the applicable radar or vertical separation from the tanker. During tanker formation (tanker and receiver), the radar separation shall be increased by 1 NM. The vertical separation minima shall be maintained above FL A and below FL D.

Within the anchor, the required separation between tanker and receiver shall be maintained until the receiver reports the tanker in sight and has been cleared to change to refuelling frequency (also called "boomer" frequency).

If the anchor is located within an ED-R/TRA, further missions in the area shall be vertically separated by 2000 ft above FL A and below FL D.

Control Procedures for Tanker and Receiver aircraft.

Following control procedures shall be applied for the conduct of AAR:

Tanker aircraft.

After initial contact has been established with the tanker aircraft, the tanker shall be cleared to enter the anchor area:

"(Callsign), cleared to enter GRETCHEN anchor FL290."

When tanker is within the anchor area, the tanker pilot shall inform ATC about flight conditions (IMC/VMC), possible contrails, refuelling frequency and refuelling speed:

"(Callsign), report flight conditions."

"(Callsign), are you trailing?"

"(Callsign), request boomer / refuelling frequency."

"(Callsign), report fuelling speed."

The tanker shall be informed about the number, type and callsign of the receiver(s) as well as the estimated beginning of the rendezvous manoeuvre as soon as possible:

"(Callsign), you receivers are (number) (type), (callsign of receiver), expect rendezvous in (time) minutes."

Receiver aircraft.

If no other receiver are in formation with the tanker, first receivers shall be guided to the tanker at FL C. Further receivers at FL D.

After initial contact, receivers shall be informed about callsign, position, refuelling speed and frequency of the tanker. Additionally, they shall be instructed to check the armament safety (switches safe = all weapon switches set to SAFE/OFF) and air pressure setting.

"(Callsign), tanker call sign is (callsign of tanker), refuelling speed (speed)."

"(Callsign), tanker position is (position), squawking (squawk of tanker), he is (not) trailing."

"(Callsign), check switches safe and altimeter settings standard."

While approaching the anchor area, the receiver shall be instructed to report radar contact with the tanker:

"(Callsign), report radar contact."

Position information about the tanker shall be given at intervals of 10 NM until receiver reports radar contact (also called "Judy").

If radar contact is not reported, the receiver shall be instructed to report visual contact with the tanker:

"(Callsign), report tanker in sight."

As soon as the receiver reports radar or visual contact, he shall be instructed to:

- squawk standby,
- obtain ATC clearance before leaving the refuelling level block,
- in case of visual contact: check nose cold (radar of receiver set to standby),
- establish radio contact with tanker on boomer frequency.

"(Callsign), squawk standby, (check nose cold), for clearance call back on (this) frequency, contact boomer on (boomer frequency)."

Enroute refuelling on standard AAR routings

For the purpose of connecting military aerodromes and exercise areas, enroute AAR routings have been established and are published in ENR 5.2 MILAIP Germany.

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These routes are only available in FL210 or FL220, depending on the definition in ENR 5.2 which is complying with the semicircular level assignment rule. The rendezvous points shall be indicated by STAY indicator in FPL, additionally a RMK/ENR REFUELING shall be added in Field 18.

Merging tanker and receiver aircraft shall be handled like a formation joinup.

Refuelling shall not take place before the formation is following the respective AAR routing.

The tanker pilot shall:

- obtain approval before refuelling starts ("request approval to start refuelling.",
- provide information about the actual refuelling status ("currently refuelling"/"currently not refuelling") each time he establishes radio contact with a new sector,
- inform when the actual refuelling is finished ("refuelling finished").

Changes to the route of the refuelling formation shall only be made on request or with the consent of the tanker. Exceptions shall only be made for safety reasons or to give way to flights with higher priority.

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