1. **Introduction.** Turkey has one tanker type: the KC-135R, which is operated by the Turkish Air Force (TURAF).

2. **Tanker Aircraft Types.**
   

3. **Receiver Qualification and Currency – Non-TURAF Receivers.**
   
a. **Introduction.** Unless agreed otherwise, before attempting to qualify on Turkish tankers, foreign national aircrew must be receiver qualified within their own air force. Additionally, the receiver aircrew must have been briefed by a TURAF tanker qualified instructor on Boom/BDA operations as applicable. As a minimum, this briefing will include: closure limitations, lighting schemes, procedures, possible difficulties and emergency actions.

   b. **Obtaining Initial AAR Receiver Qualification on TURAF Tankers – Foreign National Aircrew.** Aircrew who are not receiver qualified within their own air force seeking for obtaining Initial AAR Receiver Qualification from TURAF tankers can only be undertaken after formal agreement between the participating nations.

   c. **Maintaining AAR Currency on TURAF Tankers – Foreign National Aircrew.** Details for the foreign national aircrew wishing to maintain AAR receiver currency from Turkish tankers will be made available on a case by case basis either as prescribed in the appropriate nation to nation Implementing Arrangement, published in theatre SPINS or other formal agreement between the participant nations.

   d. **Re-qualifying if AAR Currency has Lapsed.** If foreign aircrew AAR currency has lapsed, then, to become current, a qualified instructor (who may be in another aircraft) must monitor at least one requalifying flight to regain currency. If the receiver pilot has not tanked in the previous 6 months, the requalifying flight must be flown in a dual control aircraft (where the aircraft type has such a capability) with a qualified instructor on board.

4. **Source Documents.** See Annex B for details of source documents.

5. **POC for National SRD-Turkey**

   Primary:  
   
   **AAROPS@hvkk.tsk.tr**
   Turkish Air Force Headquarter
   06650 Bakanliklar/Ankara/Turkey
   Tel. (+90) 312 419 2208
Secondary: 10tanusops@hvkk.tsk.tr
10th Tanker Air Base 101 Squadron
01340 Incirlik/Adana/Turkey
Tel. (+90) 322 316 4250

6. Tanker/Receiver Technical Compatibility and POC.
   b. POC for Tanker/Receiver Technical Compatibility Reviews.

Primary: AAROPS@hvkk.tsk.tr
Turkish Air Force Headquarter
06650 Bakanliklar/Ankara/Turkey
Tel. (+90) 312 419 2208

Secondary: 10tanusops@hvkk.tsk.tr
10th Tanker Air Base 101 Squadron
01340 Incirlik/Adana/Turkey
Tel. (+90) 322 316 4250

7. POC for STANEVAL

Primary: AAROPS@hvkk.tsk.tr
Turkish Air Force Headquarter
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8. Turkey-National SRD Last Updated. 01 July 2010.


List of Annexes

Annex SUBJECT

Annex A Turkey Tanker/Receiver Technical Compatibility
Annex B KC-135R Stratotanker
Annex C Boom/BDA/Drogue Receiver
ANNEX A TO NATIONAL SRD-TURKEY

TANKER/RECEIVER TECHNICAL COMPATIBILITY

1A. TURAF Tanker and Receiver AAR Technical Compatibility with Commercial and Foreign Platforms.

a. Requirement for an AAR Technical Compatibility Assessment. Before a TURAF tanker or receiver conducts AAR with a platform from a commercial company or a foreign nation, a technical compatibility assessment must be performed to confirm that the two fuel transfer systems can mate and subsequently decouple safely. Para 3A provides details on the publication of technical compatibility assessments.

b. Nation-Specific AAR Technical Compatibility Assessment. Whilst one nation’s receivers or tankers may have been reviewed and assessed to be technically compatible for AAR with TURAF platforms, it does not automatically follow that another nation’s similar receiver or tanker is also technically compatible with TURAF platforms. Primarily, this is because nations with engineering authority over their platforms may introduce modifications that make them unrepresentative of the modification state of similar platforms from the same manufacturer, including those operated by the TURAF. Consequently, a technical assessment must be undertaken to determine if the changes adversely impact the AAR performance and envelope of the foreign platform when working with a TURAF platform. Importantly, a technical compatibility assessment is normally restricted to a single requesting nation because, if the technical compatibility review identifies the need for flight trials, the requesting nation picks up the associated cost. If a nation declares that its receivers or tankers has the same technical characteristics as a third nation’s receivers or tankers that are compatible with TURAF receivers or tankers and has not had any significant modifications that make them unrepresentative of the modification state of similar platforms from the same manufacturer, the authority to undertake AAR with TURAF receivers or tankers may be given by the appropriate Turkish Authorities.

c. Impact of Incorporating Modifications to a Non-TURAF Platform’s AAR System. A technical compatibility assessment remains valid only so long as the AAR associated markings on a tanker and the tanker and/or receiver AAR system remains unchanged from the condition it was in when the assessment was performed. Consequently, to mitigate risk to both the tanker and receiver, when modifications are made to AAR associated items the compatibility assessment must be revalidated. It is therefore incumbent on a tanker or receiver commercial company or nation to inform the other participants when such changes are planned or incorporated and request an updated technical compatibility assessment.

2A. Publication of Commercial and Foreign Receivers Technically Compatible with TURAF Tankers. Details of commercially or foreign operated receivers assessed to be technically compatible with TURAF tankers are published as follows:
a. **TURAF Tankers.** Annex XB contains details of commercial and foreign AAR receivers technically compatible with TURAF heavy jet tankers.

b. **Technical Compatibility Assessments Conducted Between Publishing Cycles.** AAR compatibility assessments of commercial and foreign platforms conducted between the publishing cycles of the TURAF National Annex will be released to crews through Flight Crew Information Files or single service equivalents.

3A. **TURAF Receiver AAR Technical Compatibility – Commercial and Foreign Tankers.** TURAF receivers planning to refuel from commercially or foreign operated tankers require a technical compatibility review of the tanker and receiver to ensure that it is safe to mate and decouple the two fuel transfer systems.

   a. **Obtaining a Technical Compatibility Review – TURAF Receiver and Commercial or Foreign Tanker.** For AAR against a commercially or foreign operated tanker, the users of the TURAF receiver platform must request that the platform’s Systems Group (SG) undertakes a technical compatibility review of the tanker and receiver combination. Using the guidelines in Para 4A below, the appropriate SG will work with the commercial or foreign tanker’s engineering support authority to determine if AAR is possible as well define any operating restrictions that must be imposed. The request to the operators of a commercial or foreign tanker should reference NATO STANAG 3971 (ATP 56), Chapter 5, SRD – Guide to Obtaining Air-to-Air Refuelling Compatibility Certification, and the applicable appendices therein.

4A. **Publication of Commercial and Foreign Tankers Technically Compatible with TURAF Receivers.** Details of commercial and foreign tankers assessed to be technically compatible with TURAF receivers are published as follows:

   a. **TURAF Tankers.** Annex C contains details of commercial and foreign tankers that have been assessed as technically compatible with TURAF receivers.

   b. **Technical Compatibility Assessments Conducted Between Publishing Cycles.** Assessments of a commercial or foreign tanker’s AAR compatibility conducted between the publishing cycles of the TURAF National Annex will be released to crews through Flight Crew Information Files or single service equivalents.

5A. **Requests for AAR Technical Compatibility Review.** It is the receiver operator’s responsibility to request a technical compatibility review for its aircraft to receive fuel from another nation’s tanker.

   a. **Action by Receiver Nation or Commercial Operator.** Normally, for a nation or commercial operator to obtain confirmation of technical compatibility between its receiver and a tanker of another nation, it must submit a technical compatibility request through the Technical Compatibility POC listed in the tanker’s national annex (see Chapter 5 to ATP-56). The technical compatibility request should be accompanied by a completed Technical Data Survey for the fuel transfer system under consideration. Survey templates are available in ATP-56, Chapter 5, SRD – Guide to Obtaining Air-to-Air Refuelling Compatibility Certification.
b. **Action by Tanker Nation or Tanker Commercial Operator.** To ensure that the receiver engineering support authority can conduct a receiver-based technical compatibility assessment of the tanker, when requested by the receiver nation, Turkey will provide all necessary tanker technical data.

6A. **Types of AAR Technical Compatibility – Commercial and Non-TURAF Receivers.** Upon receiving a technical compatibility request from a commercial operator or receiver nation, the appropriate TURAF technical authority will provide one of three types of approval.

a. **Interim Technical Compatibility.** Following a technical analysis of the information supplied by the receiver nation or commercial operator, the technical authority will determine if an interim technical compatibility can be issued. This will be based on a review of the receiver’s AAR equipment and its ability to mate successfully with the tanker’s equipment. On occasions, this analysis will be performed using information derived from another nation’s full technical compatibility assessment for the same or similar tanker/receiver combination (this is a read across compatibility). Normally, when an interim technical compatibility is offered, it is published with caveats/restrictions designed to mitigate potential risks that cannot be verified until flight trials have been performed and the results reviewed.

b. **Full AAR Technical Compatibility.** When flight trials have been conducted between TURAF military tankers and the receiver, a full AAR technical compatibility may be approved. Based upon the results of the trials, such approvals may contain restrictions to the operating envelope together with modified AAR procedures for either the tanker or receiver, or both, to ensure safe and effective AAR between the two platforms.

c. **Operational Emergency Technical Compatibility.** Where mission requirements dictate that it is imperative to conduct AAR but flight trials have not been possible and technical analysis indicates that AAR between the TURAF tanker and the foreign national receiver poses a significant potential risk of damage to the receiver or its AAR equipment, an Operational Emergency Compatibility (OEC) may be issued. Normally, OECs will specify the theatre or operation for which it applies, together with tanker and/or receiver restrictions that must be adhered to in order to minimize the risk of damage. Importantly, by operating a receiver under an OEC, the receiver operator accepts responsibility for the risks to the receiver associated with the AAR activity.

7A. **Receiver Restrictions.** Tanker and/or receiver restrictions will be published in the commercial or foreign receiver’s AAR technically compatibility letter. Tanker crews are to ensure that they are familiar with the pertinent receiver information published therein before conducting AAR operations with a specific platform.

8A. **Authority to Conduct AAR Activity.** The confirmation of AAR technical compatibility for a specific commercial or non- TURAF military receiver or a TURAF receiver engaging a commercial or non- TURAF military tanker verifies that the tanker and receiver are technically capable of safely pairing up, transferring fuel and decoupling. However, it does not constitute an authority to conduct AAR activity involving commercial or non- TURAF receivers and non- TURAF tankers. Authority to undertake AAR with commercial or foreign military aircraft (either as a tanker or receiver) is provided through a
theatre Air Tasking Order and/or Special Instructions, an Exercise/Operations Order, an Implementing Arrangement or other formal agreement between the participants.
<table>
<thead>
<tr>
<th>Subject</th>
<th>Paragraph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1B</td>
</tr>
<tr>
<td>Receiver Types Certified</td>
<td>2B</td>
</tr>
<tr>
<td>AAR Equipment</td>
<td>3B</td>
</tr>
<tr>
<td>AAR Equipment - Boom</td>
<td>3B a</td>
</tr>
<tr>
<td>Description</td>
<td>3B a (1)</td>
</tr>
<tr>
<td>Basic Operation</td>
<td>3B a (2)</td>
</tr>
<tr>
<td>Automatic Disconnect</td>
<td>3B a (3)</td>
</tr>
<tr>
<td>Boom Envelope</td>
<td>3B a (4)</td>
</tr>
<tr>
<td>Normal Disconnect</td>
<td>3B a (5)</td>
</tr>
<tr>
<td>Brute Force Disconnect</td>
<td>3B a (6)</td>
</tr>
<tr>
<td>Controlled Brute Force Disconnect</td>
<td>3B a (6) (a)</td>
</tr>
<tr>
<td>Inadvertent Brute Force Disconnect</td>
<td>3B a (6) (b)</td>
</tr>
<tr>
<td>AAR Boom Lighting</td>
<td>3B a (7)</td>
</tr>
<tr>
<td>Description</td>
<td>3B a (7) (a)</td>
</tr>
<tr>
<td>Basic Operation</td>
<td>3B a (7) (b)</td>
</tr>
<tr>
<td>Receiver Actions</td>
<td>3B a (7) (c)</td>
</tr>
<tr>
<td>Elevation</td>
<td>3B a (7) (c) (i)</td>
</tr>
<tr>
<td>Longitudinal Position</td>
<td>3B a (7) (c) (ii)</td>
</tr>
<tr>
<td>Radio Silent Procedures</td>
<td>3B a (7) (d)</td>
</tr>
<tr>
<td>Failure of PDLs to Illuminate</td>
<td>3B a (7) (e)</td>
</tr>
<tr>
<td>PDLs Fail to Illuminate When Making Contact</td>
<td>3B a (7) (e) (i)</td>
</tr>
<tr>
<td>PDLs Fail During Contact</td>
<td>3B a (7) (e) (ii)</td>
</tr>
<tr>
<td>Flashing PDLs</td>
<td>3B a (7) (f)</td>
</tr>
<tr>
<td>Other Illumination</td>
<td>3B a (7) (g)</td>
</tr>
<tr>
<td>AAR Equipment – BDA</td>
<td>3B b</td>
</tr>
<tr>
<td>Description</td>
<td>3B b (1)</td>
</tr>
<tr>
<td>Basic Operation</td>
<td>3B b (2)</td>
</tr>
<tr>
<td>Receiver Actions</td>
<td>3B b (3)</td>
</tr>
<tr>
<td>Fuel Transfer</td>
<td>3B b (4)</td>
</tr>
<tr>
<td>Fuel Transfer Failure</td>
<td>3B b (5)</td>
</tr>
<tr>
<td>Normal Disconnect</td>
<td>3B b (6)</td>
</tr>
<tr>
<td>Emergency Disconnect</td>
<td>3B b (7)</td>
</tr>
<tr>
<td>AAR Equipment Lighting - BDA</td>
<td>3B b (8)</td>
</tr>
<tr>
<td>Description</td>
<td>3B b (8) (a)</td>
</tr>
<tr>
<td>Radio Silent Procedures and Breakaway</td>
<td>3B b (8) (b)</td>
</tr>
<tr>
<td>Refuelling Heights and Speeds</td>
<td>4B</td>
</tr>
<tr>
<td>AAR RV Speed</td>
<td>4B a</td>
</tr>
<tr>
<td>Boom and BDA</td>
<td>4B b</td>
</tr>
<tr>
<td>Maximum Transferable Fuel</td>
<td>5B</td>
</tr>
<tr>
<td>Fuel Transfer Rate</td>
<td>6B</td>
</tr>
<tr>
<td>Boom</td>
<td>6B a</td>
</tr>
<tr>
<td>BDA</td>
<td>6B b</td>
</tr>
<tr>
<td>Regulated Fuel Pressure</td>
<td>7B</td>
</tr>
<tr>
<td>Fuel Types Available for AAR</td>
<td>8B</td>
</tr>
</tbody>
</table>
Annex B to National SRD-TURKEY

1B. Introduction. The TURAF has 7 KC-135R Stratotankers in service.

2B. Receiver Types Certified. Details of receiver technical clearances together with AAR speeds and altitudes are published at Annex C. In addition, Annex C provides boom operators with receiver information essential to achieving safe AAR operations. For non-Turkish Armed Forces receiver aircraft, the publishing of information in Annex C does not constitute an automatic authority to undertake refuelling; such authority will be contained in theatre Air Tasking Order and/or Special Instructions, an Exercise/Operations Order, an implementing Arrangement or other formal agreement between the participants.

NOTE

TECHNICAL CLEARANCES PUBLISHED AT NATIONAL SRD-TURKEY, ANNEX B ARE GIVEN FOR NATO AND NON-NATO AIRCRAFTS.

FOR NATIONS THAT ARE NOT NATO MEMBERS, OR HAVE NOT RATIFIED STANAG 3971, AIRCRAFTS TECHNICALLY AUTHORIZED TO REFUEL ON TURAF TANKERS IMPLY THAT PILOTS WILL APPLY ATP-3.3.4.2 (ATP-56) PROCEDURES

3B. AAR Equipment. There is one centreline mounted flyable boom for boom-type refuelling. The boom can be modified to refuel probe-equipped aircraft by fitting a Boom Drogue Adapter (BDA); the BDA can only be fitted/removed on the ground.

a. AAR Equipment - Boom.

(1) Description. The boom is approximately 8.5m (28 ft) long with an additional 5.6 m (18.5 ft) of inner fuel tube which can be extended or retracted by the boom operator. The boom is equipped with a Boom Interphone System which permits direct communication with suitably equipped receivers.

(2) Basic Operation.

(a) When ready to refuel, the boom is lowered from its stowed position and about 3 m (10 ft) of the retractable portion is extended by the boom operator.

(b) When cleared, the receiver moves from a stabilized (zero rate of closure) astern position to a steady boom contact position.

(c) Closure to contact will be slow and stable (approximately 1 foot per second) with the receiver stabilizing in the contact position.
(d) When this is achieved, the boom operator flies the boom to the receiver aircraft’s receptacle and extends the boom to make contact. Locking toggles in the receptacle operate to hold the boom nozzle in contact.

(e) The receiver then maintains its position within the boom operating envelope.

**WARNING**

THE RECEIVER WILL STABILIZE IN THE ASTERN POSITION AND ATTAIN A ZERO RATE OF CLOSURE. IF THE RECEIVER FAILS TO ATTAIN STABILIZED POSITION, OR IT BECOMES APPARENT THAT A CLOSURE OVERRUN WILL OCCUR, BREAKAWAY PROCEDURES WILL BE INITIATED. FAILURE TO DO SO COULD RESULT IN A MID-AIR COLLISION.

EXCESSIVE CLOSURE RATE COULD CAUSE THE TANKER TO DESCEND INTO THE PATH OF THE RECEIVER. THE TANKER PILOT MUST BE PREPARED TO DISCONNECT THE AUTOPILOT TO PREVENT ALTITUDE DEVIATIONS. INITIATE A BREAKAWAY AT THE FIRST INDICATION OF A CLOSURE OVERRUN.

(3) Automatic Disconnect. Provided the receiver remains within the envelope, contact is maintained; however, if the receiver moves beyond the limits, a disconnect will automatically occur provided the tanker’s system is operating normal.

(4) Boom Envelope. The envelope is defined by automatic limit switches connected to the boom; the envelope permits a limited amount of fore and aft movement and some freedom of maneuver in the pitching, rolling and yawing planes. The envelope limits are set well within the mechanical limitations of the boom; therefore, provided the envelope limits are not exceeded too rapidly, disconnect will occur before the boom is damaged. The full boom envelope is illustrated in Figures B1-1 and 2 in Appendix B1 to this Annex; however, the freedom of maneuver in boom elevation is reduced for some receiver aircraft because of their receptacle characteristics.

**CAUTION**

APPROACHING BOOM LIMITS AT RELATIVELY HIGH VELOCITY CAN CAUSE STRUCTURAL DAMAGE AS A RESULT OF AN INABILITY TO DISCONNECT DUE TO BINDING ACTION OF THE BOOM NOZZLE.
NOTE

WHEN THE TANKERS AIR REFUELING SYSTEM IS IN OVERRIDE, BOOM LIMIT SWITCHES ARE INACTIVE, THE BOOM OPERATOR MUST INITIATE DISCONNECTS BEFORE THE RECEIVER EXCEEDS LIMITS.

(5) Normal Disconnect. To make a normal disconnect, the boom operator or the receiver releases the receptacle toggles and the receiver remains stabilized in the contact position until a receiver crew member or the boom operator visually confirms that a disconnect has been achieved; the receiver then moves to the astern position.

(6) Brute Force Disconnect. There are two types of brute force disconnect, controlled tension (coordinated) and inadvertent.

(a) Inadvertent Brute Force Disconnect. An inadvertent brute force disconnect is defined as any unplanned disconnect which is the result of the following:

(i) The receiver aircraft moving rapidly to the aft limit, causing mechanical tanker/receiver separation

(ii) Boom nozzle pullout occurs at 38 degrees elevation or below

CAUTION

FOLLOWING AN INADVERTENT BRUTE FORCE DISCONNECT, AAR WILL BE TERMINATED EXCEPT DURING FUEL EMERGENCIES OR WHEN CONTINUATION OF AAR IS DICATED BY OPERATIONAL NECESSITY.

(b) Controlled Tension Brute Force Disconnect. A controlled tension brute force disconnect is defined as an intentional coordinated disconnect occurring above 38 degrees elevation, accomplished by gradual aft movement of the receiver aircraft, (approximately 1 foot per second) until the boom is fully extended, and ending with a controlled tension boom pullout. Coordination between the receiver pilot and boom operator is required to ensure as smooth a disconnect as possible. Following a controlled tension brute force disconnect, AAR may be continued with other receivers, provided the results of the following checks are satisfactory.

(i) Visual inspection of the receiver receptacle area and AAR boom.

(ii) Operational check of the boom for binding or uncontrollability.

(iii) Test of the tanker signal coil.
A CONTROLLED TENSION BRUTE FORCE DISCONNECT WILL BE ACCOMPLISHED ONLY AS A LAST RESORT, AFTER ALL OTHER NORMAL AND EMERGENCY METHODS OF DISCONNECT HAVE FAILED.

AAR FOR THE RECEIVER THAT REQUIRED A CONTROLLED TENSION BRUTE FORCE DISCONNECT WILL BE TERMINATED EXCEPT DURING FUEL EMERGENCIES OR WHEN CONTINUATION OF AAR IS DICTATED BY OPERATIONAL NECESSITY.

(7) AAR Boom Lighting.

(a) Description. Pilot Director Lights (PDL) provide positioning information to receiver pilots during boom type refueling. The PDLs are located on the bottom of the fuselage, aft of the nose landing gear; they consist of 2 panels of lights. The left panel gives boom elevation information and the right panel gives boom telescoping information; see Annex B, Appendix B1, and Figure B1-1.

(b) Basic Operation. The lights are controlled by movement of the boom in elevation and by the in and out movement of the telescoping portion. The PDLs will remain illuminated and follow boom movements in both contact made and disconnect conditions. These lights indicate the position of the boom in relation to the boom operating envelope and command the direction of receiver movement required to bring the boom to the ideal refueling position.

(c) Receiver Actions.

(i) Elevation. At one end of the elevation panel is the illuminated letter U (for up); at the other end is the illuminated letter D (for down); see Appendix B1 to this Annex. Adjacent to the letters are red arrowheads. If a receiver is in contact with the boom near the upward elevation limit, the red arrowhead next to the D will be illuminated; this indicates a downward movement is required. As the receiver moves down, the red light extinguishes and a green arrowhead illuminates, indicating the boom is approaching the ideal elevation. When the ideal elevation is reached, the green light extinguishes and 2 parallel green bars illuminate.

(ii) Longitudinal Position. Longitudinal position is verified using similar indications to those described above for the vertical position. The right-hand telescoping panel is similar in function, although the display is slightly different. The ends of the panel have the illuminated letters F and A (forward and aft); see Appendix B1 to this Annex. The position information and movement commands are given by illuminated horizontal bars with red leading into green, with the ideal position shown...
by 2 parallel green bars illuminating. The command indications are separated by illuminated vertical white bars to give contrast. The telescoping part of the boom is in colored segments, which duplicate PDL indications; at night these segments are illuminated by boom marker lights. Lights are not provided for azimuth positioning; however, a fluorescent yellow stripe on the undersurface of the tanker fuselage is provided for centerline reference. See Annex B, Appendix B4, Figure B4-1

(iii) Radio Silent Procedures. During radio silence, the PDLs can be used to give positioning commands to direct a receiver into the boom contact position. A steady red PDL light commands a large movement in the direction indicated, and a flashing red light commands a small correction. The PDL lights can also be extinguished to signal a request for disconnect or flashed to signal for “BREAKAWAY”.

(d) Failure of PDLs to Illuminate.

(i) PDLs Fail to Illuminate When Making Contact. If the PDLs do not illuminate when making contact, the receiver should inform the boom operator if she/he wishes to continue refuelling operations and await instructions. If refuelling is continued, verbal corrections from the boom operator may be requested.

(ii) PDLs Fail During Contact. If the PDLs go out during contact, the receiver is to initiate a disconnect and return to the astern position. If refuelling is continued, verbal corrections from the boom operator may be requested.

(e) Flashing PDLs. Flashing PDLs and tanker lower strobe light on command a breakaway; the receiver will disconnect immediately and move back and down to clear the tanker as described in Part 1, Chapter 4, Para 407.

(f) Other Illumination. During night AAR, the AAR floodlight, and boom nozzle light will also be used to illuminate the boom and receiver receptacle.

ATTEMPTS TO AFFECT A CONTACT DURING LOSS OF ANY AIR REFUELING LIGHTING THAT RESULTS IN LESS THAN DESIRED ILLUMINATION WILL BE AT THE DISCRETION OF THE BOOM OPERATOR.

b. AAR Equipment – Boom Drogue Adapter (BDA).

(1) Description. The BDA is 2.74 m (9 ft.) of hose attached to the end of the telescoping part of the boom by a swivelling coupling; the hose terminates in a hard,
non-collapsible drogue. The telescoping part of the boom is kept fully extended whilst the BDA is in use. The boom will be trailed at the pre-determined boom elevation and azimuth settings for that particular receiver type.

(2) Basic Operation. The boom operator will hold the boom as motionless as possible, at the proper trail position, from the time the receiver reaches astern until completion of refuelling. The ideal astern position for the receiver is to be stabilized 1.52 m (5 ft.) behind the drogue. When cleared, the receiver moves forward to make contact; slight oscillations of the drogue are normal, and can be expected in even ideal weather conditions. The boom operator will not move the boom except to avoid striking the receiver airplane (the drogue is never “Locked down”).

(3) Receiver Actions. Extreme caution is required when operating on the BDA because, unlike hose drum systems, hose slack is not wound in. Contacts made with closure rates greater than about 2 kts will cause the hose to whip, with a consequently high probability of probe damage. Having made contact, the probe should be positioned slightly offset from the boom to make the hose adopt a U shape to one side; the ideal in-contact position is illustrated in Appendix B2 to this Annex. This position permits about 1.52 m (5 ft.) of forward and aft movement. Care must be taken to prevent the hose from looping around the probe, or touching the receiver’s fuselage; this can be avoided by the receiver approaching no closer than one half hose length.

(4) Fuel Transfer. When the receiver has made contact, the tanker will transfer a small quantity of fuel to check the integrity of the system; if there are no fuel leaks, normal fuel transfer will continue. If possible, the tanker air refuelling pumps will be switched off 5 seconds before the scheduled disconnect; this is to minimize fuel spray on disconnect.

(5) Fuel Transfer Failure. If fuel does not transfer, the receiver will be instructed to disconnect; the receiver should drop back to the astern position and check that the correct fuel system selections have been made. The boom operator will cycle the boom system by retracting the boom to approximately 6.5 m (15 ft.) extension and then fully re-extend it. The receiver will then be re-cleared for a further contact.

(6) Normal Disconnect. When cleared, the receiver should disconnect by dropping back, remaining aligned with the boom and aim to separate leaving the drogue aligned to its free trail position. The boom operator does not retract the boom for a normal disconnect. To avoid the drogue striking the aircraft, the receiver pilot must not stray away from the correct lateral alignment.

NOTE
AS SOON AS THE RECEIVER IS IN A SAFE POSITION, THE BOOM OPERATOR WILL CYCLE THE BOOM BY RETRACTING TO APPROXIMATELY 6,5M (15FT), THEN FULLY EXTENDING TO SIGNAL “READY FOR CONTACT”. FAILURE TO CYCLE THE BOOM COULD PREVENT SUBSEQUENT CONTACTS.

(7) Emergency Disconnect. In an emergency the boom operator may retract the boom, in which event the drogue will whip violently as contact is broken.
(8) AAR Equipment Lighting - BDA.

(a) Description. The elevation background lights and letters (PDLs described above in para 3B a (7)) will be on during BDA AAR, but will not be used to direct receiver positioning. During night AAR, the AAR floodlight, boom nozzle light, and boom marker lights will also be used to illuminate the boom and BDA.

(b) Radio Silent Procedures and Breakaway. The elevation background lights and letters are used during radio silence to signal a routine disconnect (lights going out), or command a breakaway (flashing lights and tanker lower strobe light on).

4B. Refuelling Heights and Speeds.

a. AAR RV Speed. The standard KC-135R tanker orbit speed is 275 KIAS or 0.78M, whichever is lower. The tanker will normally adjust to AAR speed when rolled out towards the RVCP.

b. Boom and BDA AAR. Boom and BDA AAR height band is sea level to heights in excess of 30,000 ft; speed range is 200 to 320 KIAS.

5B. Maximum Transferable Fuel. Total fuel load is 92,060 kg (203,000 lb) for the KC-135R (CFM 56 engines). Maximum fuel available for offload changes depending on the mission.

6B. Fuel Transfer Rate. The tanker can transfer fuel at the following rates:

a. Boom. Exceeding 2722 kg/min (6000 lb/min) through the boom.

b. BDA. Exceeding 1270 kg/min (2800 lb/min) through the BDA.

7B. Regulated Fuel Pressure. Fuel is delivered to the receiver at the regulated pressure between 45 and 50 psi depending on the boom length, elevation, and fuel flow rate.

8B. Fuel Types Available for AAR.

a. Primary Fuel. The primary fuel is F34 (JP-8).

b. Alternate Fuels. The alternate fuels are F35(Jet A-1), F40 (JP-4) and F44(JP-5).

9B. Mark Facilities. In response to a receiver request to “Mark” the tanker can dump fuel from the boom. “Mark” should only be used if a receiver low fuel state or other similar circumstance requires the rendezvous be expedited. If required, the tanker will dump fuel in 500 to 1000 pound increments until positive visual contact can be maintained.

10B. Tanker Dimensions. The KC-135R is 39.27 m (128 ft 10 inches) long with a wingspan of 39.88 m (130 ft 10 inches).

11B. RV Aids. The KC-135R has the following radio, navigation and RV aids:

a. UHF, VHF, and HF radios.
b. VOR, TACAN, INS, GPS, and search/weather radar.

c. A/A TACAN (DME only), TCAS, IFF.

12B. List of Source Documents.

T.O. 1C-135(K)-1
T.O. 1C-135(K)R(I)-1
T.O. 1-1C-1
T.O. 1-1C-1-3

List of Appendices.

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix B1</td>
<td>Boom</td>
</tr>
<tr>
<td>Appendix B2</td>
<td>BDA</td>
</tr>
<tr>
<td>Appendix B3</td>
<td>Exterior Lighting</td>
</tr>
<tr>
<td>Appendix B4</td>
<td>Refuelling - Visual References</td>
</tr>
</tbody>
</table>
APPENDIX B1 – ANNEX B TO NATIONAL SRD-TURKEY

KC-135 STRATOTANKER - BOOM

Figure B1-1 - KC-135R Pilot Director Lights Illumination Profile and Boom Limits.
Figure B1-2 - KC-135R Boom Limits.
APPENDIX B2 – ANNEX B TO NATIONAL SRD-TURKEY

KC-135R STRATOTANKER - BOOM DROGUE ADAPTER (BDA)

Figure B2-1 – BDA

Figure B2-2 – BDA with S-Bend
APPENDIX B3 – ANNEX B TO SDR-TURKEY

KC-135R STRATOTANKER - EXTERIOR LIGHTING

Figure B3-1 – KC-135R Exterior Lighting

1. Nose landing and taxi light
2. Nacelle illumination light (typical) (2 places)
3. Taxi light (2 places)
4. Landing light (fixed) (2 places)
5. Navigation light (7 places)
*6. Underwing illumination light (typical)
7. Rotating beacon lights (2 places)
*8. Underbody illumination light (typical)
9. Terrain light (retractable)
*10. Receiver pilot director light
11. Boom marker lights (fluorescent)
12. Boom nozzle light
13. AAR flood lights

*Designates Adjustable Lighting
APPENDIX B4 – ANNEX B TO NATIONAL SRD-TURKEY

KC-135R STRATOTANKER REFUELLING – VISUAL REFERENCES

B4.1 Refueling Position - Visual References. When moving forward from the astern position to the contact position, the visual references used by heavy aircraft receiver pilots permit them to position their aircraft so that they remain within the tanker’s AAR envelop. The following paragraphs provide guidance to help pilots achieve the correct position.

B4.2 Position - Elevation. Determination of correct elevation is best achieved by comparing the alignment of the lower UHF antenna with the white line painted on the lower fuselage of the tanker. This antenna is easily seen on Block 30 KC-135R aircraft, but may be hidden by the significantly larger Block 40 VHF Data Link (VDL) antenna installed between the UHF antenna and the white line.


(1) Upper Limit. The upper limit is reached when the UHF antenna moves through the white line changing the inverted “T” to a “t”. In addition, there will be more sky visible above the tanker’s wing to the top of the receiver pilot’s window.

(2) Lower Limit. When the lower limit is reached, there will be gap between the white line and the tip of the UHF antenna. This gap will be approximate one third of the length of the antenna.

Figure B4-1. Lower UHF Vertical Visual Reference

Contact Position – Lower UHF Inverted T
Figure B4-2. Upper and Lower Limits - Lower UHF Reference

Upper Limit

Lower Limit
1C. Introduction. This Annex provides data essential for safe boom and drogue AAR operations between TURAF jet tanker and appropriately equipped receiver aircraft. Importantly, for boom AAR, as well as offering information about the location of the UARRSI, it lists receiver aircraft equipment in close proximity to the receiver receptacle that must be avoided to prevent damage during AAR operations. Due to common boom and BDA systems between TURAF KC-135R and USA KC-135R tankers, most of the information registered below is extracted from the National SRD-United States, Annex E. It is the responsibility of TURAF 101st Air Refuelling Squadron to verify the last updates of the National SRD-United States, Annex E before performing AAR operations.

2C. TURAF Heavy Jet Tanker/AAR Receiver Mission Planning and Inflight Data. AAR planning data for all receiver aircraft with a technical clearance to conduct AAR operations with the KC-135R tankers provided in Figure C-1 and Figure C-2.
Figure C-1. KC-135R AAR Mission Planning and Inflight Data (Boom)
Figure C-2. KC-135R AAR Mission Planning and Inflight Data (Boom Drogue Adapter - BDA)

### KC-135R AAR Mission Planning and Inflight Data (BDA)

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<th>OPTIMUM AAR ALT/IAS/MACH</th>
<th>OVERRUN IAS</th>
<th>CLOSURE RATE</th>
<th>PROBE LIMIT MACH</th>
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<th>BOOMTRAIL POSITION</th>
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</thead>
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</table>

**NOTES:**

1. Due to probe weakness, attempt contact at lower airspeed/closure rate. If required, increase airspeed in 5 knot increments, closure rate as necessary, up to indicated limits.

2. Daylight AAR under VFR conditions only.

3. Probe limit MACH is based upon the aerodynamic loads on the receiver’s probe while in contact.

4. No AAR operations shall be conducted with the F-5’s Stability Augmentation System inoperative unless an emergency fuel quantity condition exists in the receiver.

5. Turn range is 15 NM or 18 degrees ADF.

6. Boom trail position for Tornado F-3 ADV is 4L.
3C. Common WARNINGS, CAUTIONS, and NOTES. The following WARNINGS, CAUTIONS and NOTES are common to all receiver aircraft and must be read in conjunction with the receiver-specific information published in the appropriate paragraph below.

**WARNING**

FOR ALL FOREIGN AIRCRAFT AARS, DO NOT TRANSMIT ON THE HF RADIO WHEN THE RECEIVER IS WITHIN 1/2 NM; THIS INCLUDES DATA LINK.

FOR ALL BOOM RECEIVER AARS, DO NOT TRANSMIT ON HF RADIO WHEN RECEIVER IS IN CLOSE PROXIMITY OR IN CONTACT WITH THE AAR BOOM, UNLESS OTHERWISE SPECIFIED.

TANKER AIRSPEED AND ALTITUDE CHANGES MUST BE MADE SMOOTHLY AND CAUTIOUSLY WHILE THE RECEIVER IS IN OR NEAR THE CONTACT POSITION. ANY AIRSPEED OR ALTITUDE ADJUSTMENTS REQUIRED BY THE TANKER DUE TO AERODYNAMIC EFFECT OF RECEIVER CLOSURE SHOULD BE ACCOMPLISHED AFTER THE RECEIVER IS STABILIZED IN THE CONTACT POSITION.

THE BOOM OPERATOR MUST BE CONSTANTLY AWARE OF THE RECEIVER’S POSITION AND RATE OF MOVEMENT. THE RECEIVER’S RATE OF MOVEMENT TOWARD AN ENVELOPE LIMIT WILL DictATE THE NEED TO INITIATE A DISCONNECT. IF THE MOVEMENT IS TOWARD THE INNER LIMIT, BOOM OPERATORS WILL EXERCISE SOUND JUDGMENT IN INITIATING A DISCONNECT OR BREAKAWAY PRIOR TO THE RECEIVER EXCEEDING THE LIMIT OR OVERRUNNING THE TANKER.

**CAUTION**

FOR ALL FIGHTER AND C-130 AIRCRAFT, THE TELESCOPE-AT-DISCONNECT SWITCH WILL BE IN MANUAL DURING AAR OPERATIONS.

FOR ALL FIGHTER AIRCRAFT, AVOID EXCESSIVE RETRACTION RATES TO PREVENT PULLING THE RECEIVER FORWARD IF A BOOM RELEASE IS NOT OBTAINED.

WHEN ANY SYSTEM MALFUNCTION OR CONDITION EXISTS WHICH COULD JEOPARDIZE SAFETY, AIR REFUELING WILL NOT BE ACCOMPLISHED, EXCEPT DURING FUEL EMERGENCIES, OR WHEN CONTINUANCE OF AIR REFUELING IS DictATED BY OPERATIONAL NECESSITY.

CONTACT WILL NOT BE ATTEMPTED UNTIL THE FIGHTER TYPE RECEIVER HAS STABILIZED 2 TO 3 FEET FROM THE CONTACT POSITION.
FOR UARRSI AND ALL FIGHTER RECEPTACLES, TO MINIMIZE NOZZLE COCKING WHEN MAKING CONTACT WITH THE RECEIVER, THE BOOM NOZZLE SHOULD BE INSERTED STRAIGHT INTO THE RECEPTACLE WITHOUT AID OF THE SLIPWAY; USING THE SLIPWAY MAY CAUSE THE NOZZLE TO COCK, PREVENTING CONTACT.

DURING AAR OPERATIONS, EXERCISE CAUTION TO AVOID STRIKING ANY ANTENNA IN THE VICINITY OF THE AAR RECEPTACLE.

ATTEMPTS TO AFFECT A CONTACT DURING LOSS OF ANY AIR REFUELING LIGHTING THAT RESULTS IN LESS THAN DESIRED ILLUMINATION WILL BE AT THE DISCRETION OF THE BOOM OPERATOR.

NOTE


EXCEPT WHEN SECURITY WOULD BE COMPROMISED, A VERBAL HOT ARMAMENT CHECK WILL BE ACCOMPLISHED BETWEEN THE TANKER AND RECEIVERS CARRYING FORWARD FIRING ORDNANCE DURING THE 15 MINUTES PRIOR TO ARCT CALL. THE VERBAL HOT ARMAMENT CHECK ACCOMPLISHED BETWEEN THE TACTICAL AIR CONTROLLER AND THE RECEIVER DURING ANCHOR RENDEZVOUS WILL SATISFY THIS REQUIREMENT.

NIGHT IS DEFINED AS THE PERIOD OF TIME BETWEEN OFFICIAL SUNSET AND SUNRISE TIMES.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA)

4C. AAR Data A-10A/C

A-10 on KC-135

a. General Information. 4XB AAR Data A-10A

(1) The A-10 has a UARRSI receptacle located 26 inches AFT of the nose on centerline, and is 32 inches in front of the pilot's windscreen. Receptacle slipway lights are rheostat controlled.

b. AAR of Deployment Configured A-10s.

(1) For AAR of deployment configured A-10's (two external tanks and two ECM pods) use the following guidelines.

   (a) AAR altitude: 15,000 MSL (Max).
   
   (b) Buddy cruise altitude: 20,000 MSL (Max).
   
   (c) AAR airspeed: 210 KCAS (Min).
(d) Buddy cruise airspeed: 230 KCAS (Max)

c. Rendezvous Procedures.

(1) Modified Overtaking RV Delta (Point Parallel Rendezvous). The KC-135R uses a modified Overtaking RV Delta (point parallel rendezvous) (Chapter 2, Annex 2D, para 2.D.3) where the tanker plans to roll out 1/2 NM in front of the receiver.

(a) Tanker Speed Reduction. The tanker then slows to air refuelling airspeed.

(b) Overrun. If an overrun occurs, maintain overrun airspeed until reaching 1/2 NM in front of the receiver or until directed by the receiver pilot, whichever occurs first.

(2) RV Golf (Enroute Overtaking) Rendezvous.

(a) An RV Golf (enroute overtaking) rendezvous is used when tanker(s) and receiver(s) arrive from the same general direction.

(b) Each airplane will fly individual flight plans to a common RVIP/RV and join-up enroute to the RVCP.

(c) The receiver(s) will plan to arrive at the RVIP/RV one minute prior to the RVCT.

(d) This procedure makes use of the tanker’s increased overtake ability to compensate for the A-10’s lower airspeed.

(e) To be effective, tanker(s) and receiver(s) must arrive at the RVIP/RV at their respective times.

(f) Tanker(s) and receiver(s) will adjust enroute airspeed/flight path to make the rendezvous control time.

(g) Tanker(s) and receiver(s) should communicate as soon as possible (in no case later than 15 minutes prior to the rendezvous control time) to update ETAs.

(h) Receiver(s) and tanker(s) must be at their assigned altitude prior to reaching the RVIP/RV.

(i) These altitudes will provide at least 1000 feet separation between the highest receiver and the lowest tanker with the receiver always at the lower altitude.

(j) The receivers will not depart their designated altitude until the tanker has passed abeam the receivers.
(k) The receiver will proceed down track from the RVIP/RV at 220 KIAS, and the tanker will overtake the receiver at 275 KIAS.

(l) Once visual/radar contact is established with the receiver, the tanker will maneuver to pass overhead the receiver.

(m) The pilot not flying will call when the tanker passes overhead the receiver.

(n) After the receiver passes under the tanker glare shield (1/2 NM on TCAS), the tanker will maintain 275 KIAS for another 30 seconds, decelerate to stabilize on air refueling airspeed with the receiver(s) approximately 1/2 NM in trail.

d. Restrictions.

(1) **Tanker Gross Weight.** The tanker’s gross weight at the beginning of AAR operations will not be greater than 250,000 pounds.

(2) **Bank Angle.** The tanker’s angle of bank during AAR will be limited to 15 degrees.

(3) **Tanker Aircraft Response - Low Airspeed.** Airspeed must be monitored closely, as aircraft response to power adjustment for lost airspeed is slower than normal.

(4) **Power Control.** Judicious power control is critical at the relatively low airspeeds required during refuelling.

(5) **Fuel Spray.** The boom operator is to immediately notify the receiver pilot of any fuel spray from the boom nozzle or receiver receptacle during contact.

(6) **Fuel Configuration.** Consider establishing the fuel configuration prior to slowing to refuelling airspeed.

(7) **Fuel Drain.** Draining fuel from the centre wing tank to the forward body tank with certain fuel loads may be slower than normal.

---

**CAUTION**

DURING BOOM RETRACTION, THE RECEIVER SLIPWAY DOOR FORWARD AREA MAY BE DAMAGED BY THE BOOM NOZZLE CATCHING ON A GAP IN THE FORWARD END OF THE SLIPWAY. RETRACT THE BOOM SLOWLY AND RAISE IT TO CLEAR THE DOOR AREA.

DURING AAR, DO NOT ALLOW THE AIRSPEED TO DECREASE BELOW 190 KIAS OR .6 AOA, WHICHEVER IS HIGHER, DUE TO DECREASED BOOM CONTROL AT LOWER AIRSPEEDS.
DURING ANY AAR WHICH REQUIRES THE INDICATED AIRSPEED TO BE LESS THAN 220 KIAS, KEEP THE A/R LINE VALVE CLOSED FOR DRY CONTACTS TO PRECLUDE FUEL SIPHONING FROM THE FORWARD BODY TANK AND CAUSING UNEXPECTED CG CHANGES.

TURN THE LINE VALVE TO THE CLOSED POSITION APPROXIMATELY 15 SECONDS PRIOR TO PLANNED DISCONNECT; THIS IS TO PREVENT FUEL SPRAY FROM IMPAIRING THE VISION OF THE RECEIVER PILOT.

AT THE DISCRETION OF THE BOOM OPERATOR, NIGHT AAR MAY BE ACCOMPLISHED IF EITHER THE BOOM NOZZLE LIGHT OR TMF IS INOPERATIVE, SO LONG AS THE RECEIVER RECEPTACLE LIGHTS ARE OPERATIVE. IF THE RECEIVER RECEPTACLE LIGHTS ARE INOPERATIVE, BOTH THE BOOM NOZZLE LIGHT AND TMF MUST BE OPERATIVE.

NOTE

WITH CERTAIN GROSS WEIGHTS AND AIRCRAFT CONFIGURATION, THE TANKER RATE OF ACCELERATION ON A BREAK-AWAY MAY EXCEED THE RATE OF ACCELERATION FOR THE RECEIVER AIRCRAFT IN THE OBSERVATION POSITION.

e. **Enroute Formation Join-Up.** When join-up involves one tanker with one or more receivers, the tanker will level off at the highest altitude in the formation with receivers stacked down at 500 feet intervals with 1 NM in trail separation. Airspeeds at level-off will be adjusted as necessary to close the formation.

f. **RV Procedures.** The AAR formation will be 30 degrees right echelon, 2 NM separation, stacked up at 500 foot intervals. Adjust to refuelling speed when rolled out toward the RVCP.
**IMPORTANT:** Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA)

5C. AAR Data B-1B

![B-1 Close-up on KC-10](image1.png) ![B-1 on KC-10](image2.png)

a. General Information

(1) The B-1B has a UARRSI receptacle located 8 feet from the nose of the aircraft and 18 inches in front of the crew compartment windshield.

**NOTE**

THE NOZZLE TIP MAY HANG-UP ON THE LEADING EDGE OF THE DROP-DOWN RECEPTACLE DOOR. TO ASSURE SUCCESSFUL CONTACT, PRECISE POSITIONING OF THE BOOM STRAIGHT INTO THE RECEPTACLE IS REQUIRED.

b. Rendezvous Procedures

(1) The AAR formation will be 30 degrees right echelon, 2 NM separation, stacked up at 500 foot intervals.

(2) Adjust to refuelling speed when rolled out toward the RVCP.

c. Restrictions.

(1) **Bank Angle.** Limit the bank angle to 15 degrees for turns while in contact unless the receiver requests otherwise.
(2) **A/R Pumps.** Four A/R pumps may be used for offload; however, if a pressure disconnect occurs, two pumps should be used.

(3) **Boom Handling.** Exercise extreme caution while flying and extending the boom into the receptacle prior to contact and at disconnect.

![](image)

**CAUTION**

THE B-1 CENTERLINE WINDSHIELD IS LOCATED 18 INCHES DIRECTLY AFT OF THE AIR REFueling RECEPtaCLE. EXERCISE UTMOST CAUTION WHILE FLYING AND EXTENDING THE BOOM INTO THE RECEPtaCLE PRIOR TO CONTACT AND DISCONNECT.

NIGHT AAR IS PERMITTED IF EITHER THE BOOM NOZZLE LIGHTS OR TAIL-MOUNTED FLOODLIGHT ARE INOPERATIVE, SO LONG AS THE RECEIVER’S RECEPtaCLE LIGHTS ARE OPERATIVE; IF THE RECEIVER’S RECEPtaCLE LIGHTS ARE INOPERATIVE, BOTH THE NOZZLE LIGHTS AND FLOODLIGHT MUST BE OPERATIVE.

CLOSE THE LINE VALVE APPROXIMATELY 15 SECONDS PRIOR TO PLANNED DISCONNECTS; THIS REDUCES FUEL SPRAY WHICH IMPAIRS THE RECEIVER PILOT’S VISION.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA)

6C. AAR Data B-2A

a. General Information.

(1) The B-2 AAR receptacle is located 24 ½ feet aft of the nose, 16 feet aft of the crew compartment windshield.

(2) The receptacle rotates along the aircraft centerline.

(3) Slipway lights are inside the receptacle.

(4) AAR lead-in lights are in front of the receptacle at 12, 9, and 6 feet.

(5) The area aft of the AAR receptacle is lit by three floodlights.

(6) Slipway lights and flood lights are rheostat controlled.

(7) B-2 performance data is estimated.

WARNING

BOOM OPERATORS MUST AGGRESSIVELY ADVISE THE RECEIVER TO SLOW THE CLOSURE RATE TO 1 FOOT PER SECOND. AN EXCESSIVE CLOSURE RATE COULD CAUSE THE TANKER TO DESCEND INTO THE RECEIVER. THE PILOT MUST BE PREPARED TO DISCONNECT THE AUTOPILOT AND PREVENT ALTITUDE DEVIATIONS. INITIATE A BREAKAWAY AT THE FIRST INDICATION OF A CLOSURE OVERRUN.
WARNING

TANKER AIRSPEED AND ALTITUDE ADJUSTMENTS SHALL BE MADE SMOOTHLY AND SLOWLY WHEN THE B-2A IS IN OR NEAR THE CONTACT POSITION. ADJUSTMENTS REQUIRED BY THE TANKER TO COMPENSATE FOR RECEIVER CLOSURE SHOULD BE ACCOMPLISHED AFTER THE RECEIVER IS IN THE CONTACT POSITION.

CAUTION

AT TRUE AIR TEMPERATURES COLDER THAN APPROXIMATELY -45 DEGREES C, THE BOOM LATCHING TOGGLS MAY TAKE UP TO 1 SECOND TO ENGAGE AND 2 SECONDS TO RELEASE.

FOR NIGHT AAR, THE TMF (S) AND BOOM NOZZLE LIGHT (S) SHALL BE OPERATIONAL.

CONTACT WITH THE SURFACE OUTSIDE OF THE RECEPTACLE MUST BE AVOIDED. THE RECEIVER PILOT WILL BE INFORMED OF BOOM CONTACTS OUTSIDE THE RECEPTACLE.

NOTE

THE ABSENCE OF DIRECT LIGHTING FROM THE AFT AAR LEAD-IN LIGHT TO THE AAR RECEPTACLE (6 FEET) MAY CAUSE ERRORS IN DEPTH PERCEPTION DURING NIGHT AAR.

b. Rendezvous Procedures.

(1) The type of rendezvous will be a Modified Overtaking RV Delta (point parallel) or RV Golf (enroute).

(2) Receiver closure shall not continue inside 1/2-NM range (1 NM for multiple tanker formations and 2 NM for multiple receiver formations) unless visual contact is established with the tanker.

c. AAR Procedures.

(1) Closure Procedures.

(a) The receiver initiates descent to 1000 feet below assigned AAR base altitude at the RVIP.

(b) The receiver descends at approximately 2000 to 3000 FPM at 0.76 Mach.
(c) The receiver maintains 450 KTAS (0.80 Mach maximum) after level off until rendezvous is complete.

(d) If the receiver is more than 3 NM in trail from the tanker after completion of descent and closure, the receiver airspeed may be increased up to 0.80 Mach to expedite join-up.

(2) **Receiver Visual Closure.**

(a) The receiver maintains 1000 feet below AAR base altitude until 1 NM in trail and visual contact is established.

(b) The receiver does not exceed 30 KCAS above AAR airspeed inside of 1 NM from the tanker.

(c) After safe closure is ensured, receiver airspeed is reduced as necessary to AAR airspeed.

(d) If a closure overrun occurs and visual contact is lost, the receiver establishes a positive rate of descent to 1000 feet below AAR base altitude.

(3) **Receiver Radar Closure.**

(a) If visual contact is not established by 1 NM, the receiver slows to AAR airspeed and maintains 1 NM.

(b) Once established on AAR airspeed, the receiver climbs to 500 feet below the AAR base altitude, closing to 1/2 NM while maintaining radar contact with the tanker.

(c) The receiver does not exceed 20 KCAS above AAR airspeed when closing from 1 NM to 1/2 NM without visual contact.

(d) If radar contact is lost without visual contact inside of 1 NM, the receiver descends to 1000 feet below AAR base altitude.

(e) The receiver does not close inside of 1/2 NM without tanker visual contact.

(4) **Overrun.**

(a) If a rendezvous overrun occurs, the receiver reduces airspeed to no less than 230 KCAS, as required, and maintains track and altitude.

(b) The tanker increases airspeed to 300 KCAS, maintains AAR base altitude, adjusts track as required, and overtakes the receiver.

(c) After passing the receiver, the tanker reduces AAR airspeed.

(d) If positive position of the receiver is established, the tanker may direct the receiver to maneuver to decrease closure time.
(5) **Buddy Join-up.**


(ii) Lead holds 325 KCAS until reaching 0.75 Mach and maintains 0.75 Mach until level at assigned altitude.

(iii) Lead should limit bank angle to 25 degrees during departure to allow wingmen to use cutoff as required.

(iv) At final altitude, formation lead slows to 0.71 Mach to expedite closure. Following aircraft close at 0.75 Mach to join up.

(v) After join up, the formation accelerates to 0.76 Mach or maintains briefed airspeeds and altitudes until reaching the RVIP or a point 100 NM from the RVCP.

(vi) Lead shall level off at the lowest altitude in the formation with the trailing aircraft stacked up at 500-foot intervals with 1-NM separation.

(6) **Abnormal Procedures**

(i) Because of the restrictive inner boom envelope limit, the boom will be extended to 12 feet for the astern position.

(ii) There is considerable bow-wave effect from the receiver during closure to the contact position.

(iii) The effect has a steeper gradient and is similar in magnitude to a C-5 receiver.

(iv) Up to 3 units of boom trim may be used.

(v) The bow-wave effect increases as receiver gross weight increases; as tanker gross weight decreases, and during approach to the upper limit of the boom envelope. The effect causes the tanker to experience large trim changes, depending on the rate of receiver movement.

(vi) Rapid closure adversely affects the pitch trim of both aircraft; a slow closure rate permits smaller adjustments to stabilize in the proper AAR position.

(vii) The receiver should use a slow closure rate of approximately 1 foot per second.

(viii) When the tanker CG is 30% MAC or greater, the autopilot pitch control may become unstable, causing slow oscillations and resulting in altitude deviations of approximately 100 to 200 feet.

(ix) B-2 receivers have manual boom latching capability.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA)

7C. AAR Data B-52H

a. General Information.

(1) The receptacle doors on the B-52 rotate up, forming a large slipway 2.5 feet long and located 14.5 feet AFT of the nose and 7.5 feet behind the centre windows on fuselage centerline.

(2) Lead-in stripes are located in front of the receptacle at 5, 4 and 3 foot intervals.

(3) Receptacle lights are located on the inside of each door illuminating the slipway and receptacle and are rheostat controlled.

(4) During night AAR, the floodlight may cause a momentary reflection from the receiver's centre windscreen as the receiver moves from astern to the contact position.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA)

8C. AAR Data C-5A-C/M

![C-5 on KC-135](https://via.placeholder.com/150)

a. General Information.

(1) The receptacle on a C-5 has a drop-down door which forms a small slipway 2.5 feet long.

(2) The receptacle is located 36.5 feet AFT of the nose slightly to the right of centerline. The distance from cockpit windows is approximately 12 feet.

(3) Lead-in stripes are located in front of the receptacle at 5, 4 and 3 foot intervals.

(4) Receptacle lights are located inside the slipway on both sides of the receptacle and are rheostat controlled by the pilot.

(5) There is also an override if the lights fail to come on normally.

b. AAR Procedures.

(1) There is considerable bow-wave effect on the ruddervators when the C-5 reaches approximately 10 to 20 feet depending on receiver closure rate.

(2) The faster the closure rate, the greater the effect of the bow-wave.

(3) Too rapid a closure rate adversely affects the pitch trim of both airplanes and can cause pitch trim forces in excess of autopilot capability.
(4) Receiver closure rate from astern position must be made smoothly and slowly (approximately 1 foot per second).

**WARNING**

TANKER AIRSPEED AND ALTITUDE CHANGES MUST BE MADE SMOOTHLY AND CAUTIOUSLY WHILE THE RECEIVER IS IN OR NEAR THE CONTACT POSITION. ANY AIRSPEED OR ALTITUDE ADJUSTMENTS REQUIRED BY THE TANKER DUE TO AERODYNAMIC EFFECT OF RECEIVER CLOSURE SHOULD BE ACCOMPLISHED AFTER THE RECEIVER IS STABILIZED IN THE CONTACT POSITION.

EXCESSIVE CLOSURE RATE COULD CAUSE THE TANKER TO DESCEND INTO THE PATH OF THE RECEIVER. THE PILOT MUST BE PREPARED TO DISCONNECT THE AUTOPILOT TO PREVENT ALTITUDE DEVIATIONS. INITIATE A BREAKAWAY AT THE FIRST INDICATION OF A CLOSURE OVERRUN.

THE BOOM OPERATOR MUST BE CONSTANTLY AWARE OF THE RECEIVER’S POSITION AND RATE OF MOVEMENT. THE RECEIVER’S RATE OF MOVEMENT TOWARD AN ENVELOPE LIMIT WILL DICTATE THE POINT TO INITIATE A DISCONNECT. IF THE MOVEMENT IS TOWARD THE INNER LIMIT, BOOM OPERATORS WILL EXERCISE SOUND JUDGMENT IN INITIATING A DISCONNECT OR BREAKAWAY PRIOR TO THE RECEIVER EXCEEDING THE LIMIT OR OVERRUNNING THE TANKER.

THE BOOM OPERATOR MUST AGRRESSIVELY ADVISE THE RECEIVER TO SLOW THE RATE OF CLOSURE TO APPROXIMATELY 1 FOOT PER SECOND.

(5) If boom instability is experienced while attempting contact, the boom should be moved out of the bow wave and allowed to stabilize prior to re-attempting contact.

(6) The Boom Operator will hold sufficient down pressure on the ruddervator control stick during contact to ensure the nozzle will clear the receptacle when a disconnect occurs.

(7) When accomplishing the astern call during EMCON 1 or EMCON 2, advise the receiver of the boom trim setting and subsequent lower elevation limitation; also notify the receiver when changing the trim setting if it affects the elevation limits.

(8) During EMCON 3 and above, use 5 units of trim to maximize the refueling envelope.

(9) Five units of boom trim is the preferred setting for the C-5 because it expands the lower envelope limit to 40 degrees and affords the boom operator or
receiver a greater chance of effecting a disconnect before boom nozzle binding or the boom envelope limit is reached.

(10) As the receiver approaches the contact position, a slight amount of upward control stick force is required to maintain the boom at 30 degrees elevation.

(11) When the boom nozzle reaches approximately 20 feet from the receptacle, the bow-wave begins to neutralize the stick force; complete neutralization occurs as the nozzle reaches approximately 10 feet from the receptacle.

(12) As ruddervator trim increments are increased, upper elevation boom travel will be reduced proportionally.

(13) Upper elevation control improves as the receiver’s bow-wave effect increases.

**WARNING**

PILOTS MUST BE AWARE THAT SITUATIONS THAT INDUCE SUDDEN LARGE OUT-OF-TRIM CONDITIONS (LARGE THRUST OR AIRSPEED CHANGES, RAPID MOVEMENT OF LARGE RECEIVER AIRCRAFT ETC) MAY EXCEED AIRCRAFT TRIM CAPABILITY. IN THESE SITUATIONS, THE “FAIL PASSIVE” DESIGN OF THE DIGITAL AUTOPILOT MAY RESULT IN LARGE VARIATION IN AIRCRAFT ATTITUDE/ALTITUDES PRIOR TO AUTOMATIC DISENGAGEMENT OF THE AUTOPILOT. PILOTS MUST BE PREPARED TO ASSUME AIRCRAFT CONTROL IMMEDIATELY AND SHOULD EXPECT SIGNIFICANT OUT OF TRIM CONTROL FORCES TO EXIST FOLLOWING MANUAL/AUTOMATIC AUTOPILOT DISENGAGEMENT.

**CAUTION**

THE TANKER MUST CLOSELY MONITOR THE FUEL FLOW WHEN REFUELING TO FULL TANKS, AS THE C-5 DOES NOT CONTAIN A PRESSURE DISCONNECT SWITCH. WHEN FUEL FLOW STOPS OR WHEN THE BRIEVED OFFLOAD HAS BEEN TRANSFERRED, TURN THE A/R PUMPS OFF.

DUE TO ADVERSE TRIM CHANGES ON BOTH THE TANKER AND RECEIVER, MACH/AIRSPEED DURING CONTACT SHALL IN NO CASE BE MORE THAN 0.64M OR 265 KCAS, WHICHEVER IS LOWER.

NIGHT AAR IS PERMITTED IF EITHER THE BOOM NOZZLE LIGHT OR TMF ARE INOPERATIVE, SO LONG AS THE RECEIVER’S RECEPTACLE LIGHTS ARE OPERATIVE; IF THE RECEIVER’S RECEPTACLE LIGHTS ARE INOPERATIVE, BOTH THE NOZZLE LIGHT AND TMF MUST BE OPERATIVE.
9C. AAR Data C-17A

a. General Information.

(1) The C-17A has a UARRSI receptacle, located 15 feet AFT of the nose, and 10 feet AFT of the centre windows, on the fuselage centerline.

(2) Lead-in stripes are located in front of the receptacle at 1 foot intervals.

(3) The receptacle is illuminated by lead-in perimeter lights and slipway lighting.

(4) There is a 6 inch tall blade type antenna located approximately 6 feet aft of the UARRSI on the aircraft centerline.

(5) Except when mission requirements dictate, do not attempt contacts at night with the receiver lead-in perimeter lights and the tanker TMF failed, or with the receiver slipway light and tanker boom nozzle light failed.

(6) A formation of C-17’s will use SKE procedures during AAR.

b. AAR Procedures.

NOTE

DO NOT ACCOMPLISH REVERSE FLOW AAR EXCEPT IN AN ACTUAL FUEL EMERGENCY.
Annex C to National SRD-TURKEY

(1) The receiver bow wave effect is more pronounced than the C-5 due to the rapid movements that the receiver is capable of performing.

(2) Bow wave effects are accentuated when the receiver is above 25 degrees elevation.

(3) During receiver closure from, or backing out to, approximately 40 feet, pilots must anticipate elevator trim changes of approximately ±2 units.

(4) Pilots should monitor the elevator trim wheel for excessive trim cycling.

(5) Autopilot elevator trim authority may be exceeded.

WARNING

EXCESSIVE CLOSURE RATE MAY CAUSE THE TANKER TO DESCEND INTO THE PATH OF THE RECEIVER. THE PILOT MUST BE PREPARED TO DISCONNECT THE AUTOPILOT TO PREVENT ALTITUDE DEVIATIONS. INITIATE A BREAKAWAY AT THE FIRST INDICATION OF A CLOSURE OVERRUN.

TANKER AIRSPEED AND ALTITUDE CHANGES MUST BE MADE SMOOTHLY AND CAUTIOUSLY WHILE THE RECEIVER IS IN OR NEAR THE CONTACT POSITION. ANY AIRSPEED OR ALTITUDE ADJUSTMENT REQUIRED BY THE TANKER DUE TO AERODYNAMIC EFFECTS OF THE RECEIVER SHOULD BE ACCOMPLISHED AFTER THE RECEIVER IS STABILIZED IN THE CONTACT POSITION.

PILOTS MUST BE AWARE THAT SITUATIONS THAT INDUCE SUDDEN LARGE OUT-OF-TRIM CONDITIONS (LARGE POWER OR AIRSPEED CHANGES, RAPID MOVEMENT OF THE RECEIVER AIRCRAFT, ETC.) MAY EXCEED AIRCRAFT TRIM CAPABILITY. IN THESE SITUATIONS, THE FAIL-PASSIVE DESIGN OF THE AUTOPILOT MAY RESULT IN A LARGE VARIATION OF AIRCRAFT ATTITUDE/ALTITUDES PRIOR TO AUTOMATIC DISENGAGEMENT OF THE AUTOPILOT. PILOTS MUST BE PREPARED TO ASSUME AIRCRAFT CONTROL IMMEDIATELY, AND SHOULD EXPECT SIGNIFICANT OUT OF TRIM CONTROL FORCES TO EXIST FOLLOWING MANUAL/AUTOMATIC AUTOPILOT DISENGAGEMENT.

(6) Due to the ability of the C-17 to move rapidly within the refueling envelope, consider setting the telescope-at-disconnect switch to AUTO.

CAUTION

BOOM OPERATORS MUST BE ALERT TO THE RECEIVER’S CAPABILITY OF RAPID MOVEMENT IN BOTH PITCH AND ROLL AXES WITHIN THE AAR
ENVELOPE. MONITOR THE RECEIVER’S RATE OF MOVEMENT AND USE SOUND JUDGMENT IN DETERMINING WHEN TO INITIATE A DISCONNECT, TO ENSURE THAT THE NOZZLE DisconnectS FROM THE RECEPtACLE PRIOR TO GETTING INTO A POSITION WHERE NOZZLE BINDING CAN OCCUR. IF RECEIVER MOVEMENT IS TOWARD THE INNER LIMIT, BOOM OPERATORS WILL EXERCISE SOUND JUDGMENT IN INITIATING A DISCONNECT OR BREAKAWAY PRIOR TO THE RECEIVER EXCEEDING THE LIMIT OR OVERRUNNING THE TANKER.

(7) The optimum boom trim setting is 5 units; this setting expands the lower envelope to 40 degrees, and affords the boom operator and receiver a greater chance of effecting a disconnect before boom nozzle binding occurs or the boom envelope limit is reached.

(8) As the amount of boom trim is decreased, boom control authority is significantly degraded to the point that 0 units of boom trim may not allow boom control authority below 35 degrees elevation, regardless of boom operator input.

(9) During EMCON 1 or EMCON 2 AAR operations, when accomplishing the astern call, advise the receiver of the boom trim setting and subsequent lower elevation limitation; also notify the receiver when changing the trim setting if it affects the elevation limits.

(10) During EMCON 3 and above, use 5 units of trim to maximize the refuelling envelope.

(11) As the receiver approaches the contact position, a slight amount of upward control stick force may be required to maintain the boom at 30 degrees elevation.

(12) During approach to contact, a bow wave similar to, but more intense than that encountered with the C-5, becomes evident the last 10 to 20 feet prior to contact.

(13) The boom operator must ensure that the receiver has stabilized at the astern position (zero rate of closure) before clearing the receiver to the contact position.

(14) The C-17 rate of closure from the astern position must be made smoothly and slowly (approximately 1 foot per second).

(15) If the rate of forward movement is excessive or continues past the contact position, the boom operator will exercise sound judgment in initiating a breakaway prior to the receiver overrunning the tanker.

**WARNING**

THE BOOM OPERATOR MUST AGGRESSIVELY ADVISE THE RECEIVER TO SLOW THE RATE OF CLOSURE TO APPROXIMATELY 1 FOOT PER SECOND.
(16) Contact should not be attempted until the receiver has stabilized in the contact position.

(17) When initiating fuel transfer, the aft pump in the forward body tank or the forward pump in the aft body tank must be energized on and providing positive fuel pressure within five seconds following a boom contact made signal.

(18) If either of these pumps cannot be energized in that time frame, perform a disconnect and reaccomplish a contact.

(19) It is normal for fuel transfer to indicate zero flow for up to fifteen seconds after the first pump is energized.

(20) Additional A/R pumps may be energized following fifteen seconds of stabilized fuel flow to the receiver.

(21) A maximum of 4 A/R transfer pumps may be used.
10C. AAR Data C-32B

a. General Information.

(1) The C-32B has a UARRSI receptacle located approximately 15 feet aft of the nose and 9 feet behind the cockpit windows on the aircraft's centerline.

(2) There are no external floodlights to illuminate the receptacle area but the receptacle has adjustable integral lighting.

**NOTE**

THE C-32B DOES NOT HAVE LEAD-IN STRIPES OR RECEPTACLE MARKINGS ON TOP OF THE AIRCRAFT. DURING NIGHT AAR, THE NOSE SECTION OF THE AIRCRAFT APPEARS TO BE A FLAT SURFACE WHILE IN REALITY IT IS RAISED. THIS ILLUSION MAY CAUSE DEPTH PERCEPTION ERRORS PRIOR TO MAKING CONTACT.

PRIOR TO REFUELING THE C-32B AT NIGHT, THE BOOM OPERATOR SHOULD REFUEL THE C-32B DURING DAYLIGHT TO BECOME FAMILIAR WITH THE C-32B UARRSI.

DURING NIGHT REFUELING MISSIONS, BOTH TANKER AND RECEIVER AIRCRAFT WILL USE ALL AVAILABLE EXTERNAL LIGHTING. AS A MINIMUM, ONE OF THE FOLLOWING EXTERNAL LIGHT CONDITIONS MUST BE MET:

<table>
<thead>
<tr>
<th>Boom Nozzle Lt (BNL) – INOP/Off</th>
<th>BNL - On</th>
<th>BNL - INOP/Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tail Mounted Floodlight (TMF)-On</td>
<td>TMF – On</td>
<td>TMF - INOP/Off</td>
</tr>
</tbody>
</table>
EXCEPT FOR EMERGENCY CONDITIONS, AAR OPERATIONS SHOULD NOT BE CONDUCTED WHEN OTHER SINGLE AND DUAL FAILURE COMBINATIONS ASSOCIATED WITH THESE LIGHTS EXIST. WHEN REFUELLING WITH LESS THAN OPTIMAL LIGHTING, EXTREME CARE SHOULD BE TAKEN DUE TO REDUCED DEPTH PERCEPTION AND LACK OF VISUAL CUES ON THE C-32B AIRCRAFT.

(3) Four units of boom trim are preferred, as it expands the lower envelope. During EMCON 1 or 2, notify the receiver of the boom trim setting and lower elevation limit. Notify the receiver any time boom trim settings are changed. During EMCON 3 and above, use 4 units of boom trim.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

11C. AAR Data AC/EC/MC/C-130E/H/J/P/U

a. General Information.

(1) The C-130 has a UARRSI receptacle located 12 feet AFT of the nose and 5.5 feet behind centre window on fuselage centerline.

(2) Distance lead-in stripes are located in front of the receptacle at 1-foot intervals.

(3) Approximately 17 inches forward of the receptacle is a set of lights offset on both sides to illuminate the area around the receptacle.

(4) There is additional lighting in the slipway area.

b. Rendezvous Procedures

(1) En-Route Overtaking Rendezvous.

(a) An overtaking enroute rendezvous will be normally used for all C-130 operations.
(b) When executing an overtaking rendezvous with more than one tanker, delay adjusting airspeed, lowering the flaps, or maneuvering to AAR formation until all aircraft are established on the AAR heading.

(c) Tanker(s) and receiver(s) arrive from the same general direction; each aircraft will fly individual flight plans to a common RVIP/RV and join-up enroute to the RVCP.

(d) The receiver(s) will plan to arrive at the RVIP/RV 1 minute prior to RVCT.

(e) This procedure makes use of the tanker’s increased overtake ability to compensate for the receiver’s lower airspeed.

(f) To be effective, tanker(s) and receiver(s) must arrive at the RVIP/RV at their respective times.

(g) Tanker(s) and receiver(s) will adjust enroute airspeed/flight path to make the rendezvous control time.

(h) Tanker(s) and receiver(s) should communicate as soon as possible (in no case later than 15 minutes prior to the rendezvous control time) to update ETAs.

(i) Receiver(s) and tanker(s) will be at their assigned altitude prior to reaching the RVIP/RV.

(j) These altitudes will provide at least 1000 feet separation between the highest receiver and the lowest tanker with the receiver always at the lower altitude.

(k) The receiver will proceed down track from the RVIP/RV at 215 KIAS, and the tanker will overtake the receiver at 275 KIAS.

(l) Once visual/radar contact is established with the receiver, the tanker will maneuver to pass overhead the receiver.

(m) The pilot not flying will call when the tanker passes overhead the receiver.

(n) After the receiver passes under the tanker glare shield, the tanker will maintain 275 KIAS for another 30 seconds (15 seconds for KC-10), then reduce power to idle and begin slowing to 200 KIAS (190 KIAS for AC130H).

(o) Flaps.

(i) Weight 210K lbs or Less. AAR may be accomplished with either flaps up or flaps 20 degrees at gross weights up to 210,000 lbs.

(ii) Weight Greater than 210K lbs. At gross weights above 210,000 lbs, AAR must be accomplished with flaps 20 degrees.
(iii) **Extending Flaps.** If AAR is to be accomplished with flaps 20 degrees, then extend the flaps when passing through 220 KIAS.

(iv) **Pitch Change.** Be prepared for a pitch change and continue to slow to 200 KIAS for AAR.

(v) **Autopilot Axis Altitude Hold.** With airspeed stabilized at 200 KIAS, the autopilot elevator axis altitude hold may be engaged if desired.

**NOTE**

DUE TO ENGINE SPOOL-UP TIME AND RAPID AIRPLANE DECELERATION WHEN FLAPS ARE LOWERED TO 20 DEGREES, PILOTS MUST BE PREPARED TO ADVANCE THROTTLES SIMULTANEOUSLY WITH EXTENSION OF FLAPS.

(p) **Failure to make R/T Contact.** If radio communications between airplanes have not been established by the rendezvous control time, airplanes will depart the RVIP/RV to make good the ARCT at the RVCP.

(q) **Delaying at RVCP.** Use normal orbit procedures when delaying at the RVCP.

(r) **Formation Procedures.** Once join-up has been accomplished, normal formation procedures apply.

(s) **Overrun.** If the tanker has overrun the receiver during the final phase of the rendezvous, the following procedures are recommended:

(i) The tanker will reduce airspeed to 200 KIAS (0.6 AOA minimum) with flaps set for AAR and maintain track at the assigned AAR altitude.

(ii) The receiver will adjust airspeed, maintain an altitude 1000 feet below assigned base AAR altitude, adjust track as required, and close on the tanker.

(2) **Overtaking RV Delta (Point Parallel Rendezvous)**

(a) The overtaking RV Delta (point parallel rendezvous) uses normal RV Delta procedures except the tanker plans to roll out behind the receiver.

(b) The tanker than overtakes the receiver using the speed schedule and procedures outlined in the Enroute Overtaking Rendezvous.

(c) For formation operations, the tanker will adjust to refuelling formation (stacked up 500 feet, 1 NM nose-to-nose, 60 degrees echelon) after completing the turn to the AAR heading.

(3) **Overtaking Modified Point Parallel Rendezvous**
(a) The modeled point parallel rendezvous with C-130 receivers is standard with the exception that the tanker will utilize overtaking procedures.

c. Closure Procedures

(1) The receiver will maintain 215 KIAS until 1/2 NM in trail, then slow during closure to reach the astern position at 200 KIAS.

d. AAR Procedures.

**WARNING**

DO NOT RAISE OR LOWER FLAPS WHILE THE RECEIVER IS CLOSER THAN THE ASTERN POSITION BECAUSE OF THE RESULTANT PITCH CHANGE OF THE TANKER

DURING AN ACTUAL/PRACTICE EMERGENCY SEPARATION, DO NOT RAISE OR LOWER THE FLAPS UNTIL THE RECEIVER IS WELL CLEAR.

IF IN A TURN WHEN A BREAKAWAY IS INITIATED, MAINTAIN THE ESTABLISHED BANK ANGLE WHILE ADDING POWER. DO NOT ROLL WINGS LEVEL AND DOES NOT RAISE OR LOWER FLAPS UNTIL THE RECEIVER IS WELL CLEAR.

THE MAXIMUM TANKER GROSS WEIGHT BEGINNING AAR OPERATION WITH C-130 RECEIVERS WILL NOT BE GREATER THAN 250,000 POUNDS.

DURING AAR, DO NOT TO ALLOW THE AIRSPEED TO DECREASE BELOW 190 KIAS OR 0.6 AOA, WHICHEVER IS HIGHER, BECAUSE OF DECREASED BOOM CONTROL AT LOWER AIRSPEEDS.

DURING AAR WITH THE FLAPS EXTENDED, EXERCISE EXTREME CAUTION TO ENSURE THAT THE FLAP PLACARD SPEED IS NOT EXCEEDED.

DURING ANY AAR WHICH REQUIRES THE INDICATED AIRSPEED TO BE LESS THAN 220 KIAS, KEEP THE A/R LINE VALVE CLOSED FOR DRY CONTACTS TO PRECLUDE FUEL SIPHONING FROM THE FORWARD BODY TANK AND CAUSING UNEXPECTED CG CHANGES.

**CAUTION**

BOOM NOZZLE POSITION SHALL BE MONITORED CLOSELY PRIOR TO CONTACT AND FOLLOWING DISCONNECT AS RECEPACLE TO PROPELLER LINE DISTANCE IS ONLY 15.5 FEET.
NOTE

THE MC-130H COMBAT TALON II (CTII) HAS AN ELONGATED TEAR SHAPED ANTENNA LOCATED APPROXIMATELY 5 FEET IN FRONT OF THE RECEPTACLE, PROTRUDING OUT FROM THE FRONT OF THE RECEPTACLE AND AIRCRAFT.

EC-130J AIRCRAFT REFUELING ENVELOPE IS 190 TO 230 KIAS AT 0 TO 20,000 FEET MSL. OPTIMUM IS 210 KIAS/10,000 FEET MSL.

ON EC-130J AIRCRAFT, FUEL MAY BE SEEN SWIRLING WITHIN THE UARRSI PRESSURE BOX DURING AAR.

BANK ANGLE DURING AAR WITH C-130 RECEIVERS WILL BE LIMITED TO 15 DEGREES.

(1) For formation operations, aircraft will be stacked up at 500 foot intervals from the leader with 1 NM nose-to-nose separation along the 60-degree echelon line.

(2) Consider establishing the fuel configuration prior to slowing to refueling airspeed; draining fuel from the centre wing to the forward body tank with certain fuel loads may be slower than normal.

(3) Power control is critical at the relatively low airspeeds required by the receiver.

(4) Airspeed must be monitored closely as the airplane response to power adjustments for lost airspeed is slower than normal, especially at gross weights approaching 250,000 pounds.

(5) Boom operators must be aware of changes in boom flight characteristics when refuelling the C-130 at slower airspeed in combination with tanker flap setting of 20 degrees.

(6) Control of the boom becomes heavier and the boom tends to trail at 35 to 37 degrees when flaps are lowered to 20 degrees.

(7) When the receiver stabilizes in the astern position, the boom operator will hold required up pressure on the ruddervator control stick to maintain a 30-degrees trail position.

(8) Increased force is required to fly the boom to effect contact and to maintain boom-to-receptacle alignment.

(9) To minimize nozzle cocking when making contact below 33 degrees elevation, the boom must be inserted straight into the receptacle without aid of the slipway; using the slipway may cause nozzle to cock, preventing contact.
(10) For night AAR, if the receiver’s nose section cannot be seen or the boom operator is having depth perception problems, fly the boom around the receiver’s fuselage nose section as the receiver approaches the contact position.

(11) This procedure will also avoid directing the boom nozzle light into the eyes of the receiver pilot.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

12C. AAR Data KC/OC/RC/TC/WC-135B/R/T/S/U/V/W

a. General Information.

(1) The receptacle doors on all models of -135’s rotate up forming a large slipway 2.5 feet long.

(2) Location distance from radome to receptacle will vary depending on aircraft model.

(3) From centre windows to receptacle is approximately 7 feet.

(4) Receptacle lights are on the inside of each door illuminating the slipway and receptacle area and are rheostat controlled.

NOTE

REVERSE FLOW AAR CAN ONLY BE ACCOMPLISHED WITH AIRCRAFT NOT RESTRICTED FOR REVERSE FLOW AAR.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

13C. AAR DATA E-3A-D/F/E-6B/CT-49A (NTCA) /E-8C

![E-3 on KC-135R](image)

a. General Information.

(1) The receptacle doors on the E-3 rotate up forming a large slipway 2.5 feet long and are located approximately 15 feet aft of the nose section and 7 feet behind the centre windows on aircraft centerline.

(2) Receptacle lights, located on the inside of each door illuminating the slipway and receptacle area are rheostat controlled.

NOTE

PROVIDE E-3 RECEIVERS WITH TYPE OF FUEL TO BE OFFLOADED. IF JP-4 (NATO F-40) OR JET B (NATO F-45) FUEL IS BEING OFFLOADED INFORM E-3 RECEIVER OF FUEL TEMPERATURE. E-3 FUEL BOOST PUMPS ARE NOT CERTIFIED FOR FLIGHTS USING JP-4 OR JET B FUEL WITH FUEL TEMPERATURES EXCEEDING 85°C. ANY FUEL MIXTURE CONTAINING MORE THAN 0.1% JP-4/ JET B IS TO BE CONSIDERED JP-4.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

b. E-3D/F

(1) The United Kingdom’s E-3D and French E-3F are identical to the U.S. E-3B/C aircraft except for the installation of high bypass fan engines and a refueling probe located 30 inches forward and 3 feet to the boom operators left of the receptacle.

(2) The probe is approximately 10 feet in length and has electroluminescent outline lighting except for the last 1.5 feet of the probe tip. E-3F may or may not be equipped with AAR probe.

CAUTION

THE BOOM MAY BLOCK THE PROBE FROM VIEW DURING APPROACH TO CONTACT IF THE RECEIVER IS OFFSET APPROXIMATELY 5 DEGREES TO THE LEFT.
THE E-3D/F AIRCRAFT IS CLEARED FOR BOOM AAR ONLY. PROBE/DROGUE AAR IS NOT PERMITTED.

REVERSE FLOW AAR IS PROHIBITED.

NIGHT AAR WITH E-3D/F RECEIVERS WILL NOT BE ATTEMPTED IF THE PROBE ELECTROLUMINESCENT LIGHTING, BOOM NOZZLE LIGHT (S), AND TMF (S) ARE INOPERATIVE.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

C. E-6B Data.

(1) The Navy E-6B is a B-707 airframe with CFM-56 engines and a standard-135 AAR receiver receptacle.

(2) The refueling functions are essentially the same as the E-3.

(3) All data remains the same except the E-6B does not have mission radar and IFF rendezvous equipment.

d. CT-49A NATO Trainer/Cargo Aircraft (NTCA).

(1) The NATO Trainer/Cargo Aircraft (TCA) is equipped with a UARRSI receptacle that has boom interphone capability.

(2) The NTCA provides dry contacts only for NATO E-3 pilot training.

(3) It is approved for dry contacts only (day and night).

(4) (KC-135) To drain trapped fuel from the boom, ensure the A/R line valve is closed and accomplish the boom draining steps (except stowing the boom) contained in the FUEL DUMPING checklist of the applicable flight manual.

(5) When boom draining is complete, close the boom marker and nozzle lights circuit breakers.

NOTE

ONLY DRY CONTACTS WILL BE ACCOMPLISHED. DO NOT PRESSURIZE THE AR MANIFOLD WITH BOOM VALVE.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

e. E-8C.

(1) The E-8A is a B-707 airframe with a UARRSI receptacle located approximately 15 feet aft of the nose section and 7 feet behind the centre windows on the aircraft centerline.

(2) A blade antenna is located 18 inches aft of the receptacle.

(3) The E-8A is boom interphone equipped.

CAUTION

NIGHT AAR WILL NOT BE ATTEMPTED IF THE RECEIVER’S RECEPACLE LIGHTS ARE INOPERATIVE OR THE TANKER DOES NOT HAVE EITHER AN OPERABLE BOOM NOZZLE LIGHT OR TMF.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

14C. AAR Data E-4B/VC-25A

a. General Information.

(1) The E-4 has a UARRSI receptacle which is located on the nose section 8 feet aft of the radome.

(2) The aircraft is provided with a receptacle "spoiler", 1 foot high and 2 feet across, located just aft of the AAR receptacle. It is designed to reduce/normalize receiver pilot pitch control problems.

(3) With the spoiler retracted, receiver pilot workload is greatly increased to control E-4 pitch oscillations encountered when closing from 10 to 2 feet and when contact is made.

NOTE

DURING NIGHT AAR, THE NOSE SECTION OF THE AIRCRAFT APPEARS TO BE A FLAT SURFACE WHILE IN REALITY, IT IS RAISED. THE ILLUSION MAY CAUSE DEPTH PERCEPTION ERRORS PRIOR TO MAKING CONTACT.

b. Rendezvous.

(1) Radar/beacon will be the primary rendezvous means.

(2) Differential DME from a common ground TACAN may be used during EMCON 1 or alternate rendezvous.

c. VC-25A Data.

(1) The VC-25A AAR installation is externally exactly like the E-4 except for the lack of reference markings in front of the receptacle/slipway and the nose, upper
fuselage (including the AAR receptacle, slipway and spoilers being painted with a glossy blue paint.)

(2) All data remains the same.

(3) Normal autopilot trim changes occur when the receiver closes from the astern position.

CAUTION

AAR WITH THE RECEIVER’S A/R SPOILER RETRACTED SHALL ONLY BE ACCOMPLISHED WITH A MINIMUM OF THE TANKER AUTOPILOT ELEVATOR AXIS AND ALTITUDE HOLD ENGAGED, AND THE YAW DAMPER ON.

NIGHT AAR IS PERMITTED IF EITHER THE BOOM NOZZLE LIGHTS OR TAIL-MOUNTED FLOODLIGHT ARE INOPERATIVE, SO LONG AS THE RECEIVER’S RECEPTACLE LIGHTS ARE OPERATIVE; IF THE RECEIVER’S RECEPTACLE LIGHTS ARE INOPERATIVE, BOTH THE NOZZLE LIGHTS AND FLOODLIGHT MUST BE OPERATIVE.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

15C. AAR Data RF-4E, F-4E/F, F4-E/2020

a. General Information.

(1) All models of the F-4 have a small receptacle with no slipway that is located on the fuselage centerline 2.5 feet behind the AFT canopy.

(2) Depending on the model, the receptacle is approximately 25 feet from the nose of the aircraft.

(3) There is a 3 inch high antenna located 1.5 feet forward of the receptacle approximately on fuselage centerline.

(4) Depending on the model, additional antennas may be located AFT of the receptacle.

(5) For night refueling, lights are located in the receptacle.

(6) The receiver pilot has the capability to position the lights to bright or dim only.

(7) When using the TMF, a momentary reflection from the receiver's windscreen may occur as the receiver moves in from astern position.
b. AAR Procedures.

CAUTION

FOR NIGHT AAR, IF THE BOOM NOZZLE LIGHT FAILS BUT THE TMF IS OPERATIVE, ATTEMPTS TO EFFECT A CONTACT WILL BE AT THE DISCRETION OF THE BOOM OPERATOR. SHOULD THE RECEIVER’S RECEPTACLE LIGHT BECOME INOPERATIVE, THE BOOM OPERATOR MAY REQUEST THE RECEIVER PILOT TO TURN ON THE ANTI-COLLISION LIGHT.

NOTE

SOME MODELS OF THE F-4 DO NOT HAVE MANUAL BOOM LATCHING (MBL) CAPABILITY.

RF-4E, F-4E AND F-4E/2020 RECEIVERS OF TURKISH AIR FORCE HAVE MODIFIED RECEPTACLES WITH INTERPHONE CAPABILITY.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

16C. AAR Data F-15A-E/I/J/DJ/S/SG

a. General Information.

(1) The receptacle on the F-15 has a fold down door which forms a small slipway. It is located 30 feet from the nose and 3 feet left of centerline in the aircraft wing root area.

(2) Lights for the slipway are in the receptacle and on the aft portion of the canopy which illuminates the area around the receptacle.

b. AAR Procedures.

CAUTION

DO NOT ATTEMPT CONTACT IF THE FORWARD AAR DOOR IS VIBRATING. CONTACT WITH THE BOOM MAY CAUSE LOSS OF THE AAR DOOR.

NOTE

TO ASSURE SUCCESSFUL CONTACT, PRECISE POSITIONING OF THE BOOM STRAIGHT INTO THE RECEPTACLE IS REQUIRED. THE NOZZLE TIP MAY HANG-UP ON A GAP IN THE FORWARD END OF THE RECEPTACLE SLIPWAY. THE TIP MAY ALSO HANG-UP ON THE RECEPTACLE FORWARD ROLLERS IF ATTEMPTING CONTACT FROM EITHER SIDE OF THE SLIPWAY.

c. F-15E Data.

(1) To aid in determining the approximate deck angle and closure rate, a tail floodlight has been added.
NOTE

DURING NIGHT AAR, EXERCISE EXTREME CARE DUE TO REDUCED DEPTH PERCEPTION AND LACK OF VISUAL CUES ON THE F-15E DARKER PAINT SCHEME.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

17C. AAR Data F-16A-F/I

a. General Information.

(1) The F-16 has a UARRSI receptacle which is located 27 feet from the nose on aircraft centerline, 6.5 feet aft of the canopy.

(2) The F-16B/D/F/I model (two-seater) receptacle is slightly closer to the canopy.
(3) There is a 2-inch high antenna on the upper fuselage centerline, 3 feet forward of the receptacle.

(4) On F-16B/D/F/I models, the antenna is 8 inches higher due to being mounted on the aft portion of the raised panels that blend the canopy to the fuselage.

(5) F-16C/D/F/I (single-/two-seater) models are modified with a tapering fillet at the base of the vertical stabilizer approximately 9 inches aft of the UARRSI.

(6) A single antenna on the fillet is approximately 2 feet aft of the receptacle.

(7) On F-16B/D/F/I models, the area forward and aft of the receptacle is reduced.

(8) Lighting for the receptacle is of fixed intensity.

(9) The floodlight on the upper fuselage, which illuminates the AAR markings around the receptacle, can be varied in intensity.

(10) The receivers may be equipped with conformal fuel tanks (CFTs); receivers with CFTs will be refueled using standard F-16 procedures with the following exceptions:

   (a) The AAR altitude is restricted to 15,000 to 30,000 feet MSL with optimum altitude being 20,000 feet MSL.

   (b) Tanker A/R airspeed is 310 ±10KCAS (no slower than 300 KCAS)

(11) On airplanes with CFTs installed, the top of the CFT is above the level of the AAR receptacle; the tanks are especially high toward the forward end. The highest point of the tanks are forward of the receptacle, along the normal path used to swing the boom around the canopy. There are no adverse effects on the boom as it maneuvers around the CFTs.

(12) Airplanes with CFTs may have a green receptacle light that is visible during night AAR.

(13) CFT configured aircraft are limited to gross weights of 48,000 lbs.

(14) Limit bank angle while in contact to 30 degrees maximum.

b. AAR Procedures.

WARNING

WHEN REFUELING AN AIRPLANE WITH CFTS, IMMEDIATELY INFORM THE RECEIVER OF ANY FUEL VENTING IN THE AREA OF THE ENGINE EXHAUST;
THERE IS A POSSIBILITY THAT VENTED FUEL COULD BE IGNITED DURING AFTERBURNER OPERATION.

CAUTION

F-16B/D MODEL - AVOID STRIKING THE PANELS THAT BLEND THE AFT PORTION OF THE CANOPY WITH THE FUSELAGE DURING CONTACT AND AFTER DISCONNECT. THESE PANELS ARE APPROXIMATELY 18 INCHES FROM SLIPWAY DOORS.

DURING AAR WITH AN AIRPLANE WITH CFTS, DO NOT ALLOW THE BOOM TO CONTACT THE CFT; A BOOM STRIKE ON EITHER CFT COULD LEAD TO TANK FAILURE AND A CATASTROPHIC FUEL LEAK. IMMEDIATELY INFORM THE RECEIVER OF ANY STRIKE TO A CFT.

SOME F-16B/D/F/I (TWO-SEATER) MODELS ARE MODIFIED WITH A RAISED AVIONIC HUMP ON THE SPINE OF THE AIRCRAFT WHICH RAISES THE RECEPTACLE APPROXIMATELY 1 FOOT.

NOTE

F-16’S DO NOT HAVE MBL CAPABILITY.

DURING F-16 REFUELING, BE AWARE THAT PRESSURE DISCONNECTS MAY OCCUR.

BOOM OPERATORS REFUELING F-16S WITH CONFORMAL TANKS MUST HAVE AT LEAST 300 HOURS OF FLIGHT TIME. NO STUDENT QUALIFICATION TRAINING WILL BE ACCOMPLISHED WITH THIS CONFIGURATION.
**IMPORTANT:** Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

18C. AAR Data F-22A

1. **General Information**

   1. The F-22A has a UARRSI receptacle located 33.5 feet from the nose of the aircraft, 14.8 feet aft of the canopy, on centerline.

   2. The receptacle is flanked by doors that articulate outward and lay flat against the top of the fuselage.

   3. The door hinges are protected by a metal shroud that presents a possibility of the boom nozzle catching and damaging the door assembly.

   4. For visibility, the hinge covers are painted with red and white stripes.
b. Rendezvous

(1) Expect a receiver turn on rendezvous. Normally the tanker will orbit at 275 KIAS and wait for a receiver directed "push it up" call.

(2) The F-22A may or may not have an A/A TACAN.

(3) Normally test crews will not coordinate an A/A TACAN for rendezvous; however inflight coordination can be done.

c. AAR Procedures

WARNING

RECEIVERS WITH SPECIAL INSTRUMENTATION ARE CLEARED FOR DAYLIGHT OPERATIONS ONLY, USING VFR CONDITIONS AND VFR CLOUD COVER. TEST AIRPLANES ARE NOT IFR CAPABLE AND HAVE NOT UNDERGONE ICING TESTS; THE SPECIAL INSTRUMENTATION COULD BE DAMAGED.

CAUTION

WHEN CLEARED TO CONTACT POSITION, ENSURE THE RECEIVER MAINTAINS CENTERLINE TO MINIMIZE POTENTIAL FOR DAMAGE TO RECEPTACLE AREA.

CONTACT WITH THE SURFACE OUTSIDE OF THE RECEPTACLE MUST BE AVOIDED. THE RECEIVER PILOT WILL BE INFORMED OF BOOM CONTACTS OUTSIDE THE RECEPTACLE OR DAMAGE TO THE RECEPTACLE DOOR HINGE COVERS.

AT NIGHT, THE FORWARD EDGE OF THE RECEIVER'S RECEPTACLE MAY NOT BE VISIBLE, INCREASING THE CHANCE OF BOOM STRIKES OUTSIDE THE RECEPTACLE; TO IMPROVE VISIBILITY, HAVE THE RECEIVER DECREASE THE INTENSITY OF THE RECEPTACLE LIGHT.

WHEN THE TANKER TMF (S) ARE INOPERATIVE, THE RECEIVER NOSE AND ENGINE INLETS MAY NOT BE VISIBLE. CLOSELY MONITOR THE RECEIVER'S ELEVATION DURING CLOSURE TO ENSURE ADEQUATE BOOM CLEARANCE. VISIBILITY OF THE BOOM AND BOOM NOZZLE WILL IMPROVE IN THE VICINITY OF THE RECEIVER'S EXTERNAL SPOTLIGHT LOCATED BEHIND THE CANOPY.

IF ANY TANKER LIGHTING FAILS, BUT THE RECEIVER EXTERNAL SPOTLIGHT IS OPERATIVE, CONTACT WILL BE AT THE DISCRETION OF THE BOOM OPERATOR.

NOTE
WITH TWO PUMPS, THE F-22 MAY EXPERIENCE A PRESSURE DISCONNECT WHEN FUEL QUANTITY IS WITHIN 1,500 POUNDS OF FULL TANKS. THE RECEIVER MAY ASK TO DECREASE TO ONE PUMP DURING FUEL TRANSFER OR AFTER AN INADVERTENT DISCONNECT.

FOR NIGHT AAR, THE BOOM OPERATOR WILL NOTIFY THE RECEIVER IF EITHER THE TMF OR BOOM NOZZLE LIGHT IS INOPERATIVE.

F-22’S DO NOT HAVE MBL CAPABILITY.

d. Airspeed / Altitude/External Stores

(1) The Maximum Bank angle during refueling is 30 Degrees.

(2) F-22A aircraft configured with two external tanks in the inboard positions is the only external tank configuration certified for AAR. No other external tank configurations are permissible.

CAUTION

F-22A AIRCRAFT CONFIGURED WITH A MIX OF EXTERNAL TANKS AND EXTERNAL ARMAMENT ARE NOT CLEARED FOR AAR.
19C. AAR Data F/RF-111C

a. General Information.

(1) The receptacle on the F-111’s is a pop-up type receptacle which forms a small target. It is located 8 feet from the canopy 18 inches off centerline to the left.

(2) From the nose to the receptacle is 33 feet.

(3) Lights in the receptacle illuminate the area.

(4) There is an antenna located 2 feet AFT of the canopy on centerline 8 inches high.

NOTE

F-111'S MAY REQUIRE HOLDING SLIGHT EXTEND PRESSURE MOMENTARILY TO ALLOW TOGGLES TO ENGAGE.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

20C. AAR Data KC-10A

a. General Information.

(1) The KC-10 has a UARRSI receptacle located 12 feet aft of the nose and 6 feet behind cockpit windows on aircraft centerline.

(2) AAR receptacle floodlights are located on both sides and just forward of the leading edge of the receptacle. Red lead-in stripes in front of the receptacle are 4 inches wide and 1 foot apart.

(3) The AAR area is outlined with a 4 inch wide black stripe.

(4) Modified aircraft have electroluminescent (EL) light strips that replace the red lead-in stripes. Each light strip is 3 inches wide.

(5) The EL light strips form a forward perimeter, lead-in stripes, and aft left and right perimeters.

(6) During AAR with less than optimum lighting, extreme care should be exercised due to reduced depth perception and lack of visual cues on the camouflaged aircraft.

(7) The aerodynamic effects on the tanker aircraft during refuelling are similar, but to a lesser degree, than those experienced with the C-5 receiver. The effects are particularly noticeable during rapid receiver separations.
WARNING

PILOTS MUST BE AWARE THAT SITUATIONS THAT INDUCE SUDDEN LARGE OUT-OF-TRIM CONDITIONS (LARGE THRUST OR AIRSPEED CHANGES, RAPID MOVEMENT OF LARGE RECEIVER AIRCRAFT, ETC) MAY EXCEED AIRCRAFT TRIM CAPABILITY. IN THESE SITUATIONS, THE “FAIL PASSIVE” DESIGN OF THE DIGITAL AUTOPILOT MAY RESULT IN LARGE VARIATION IN AIRCRAFT ATTITUDE/ALTITUDES PRIOR TO AUTOMATIC DISENGAGEMENT OF THE AUTOPILOT. PILOTS MUST BE PREPARED TO ASSUME AIRCRAFT CONTROL IMMEDIATELY AND SHOULD EXPECT SIGNIFICANT OUT OF TRIM CONTROL FORCES TO EXIST FOLLOWING MANUAL/AUTOMATIC AUTOPILOT DISENGAGEMENT.

CAUTION

AAR RECEPTACLE FLOOD LIGHT DOORS ARE LOCATED ON BOTH SIDES AND JUST FORWARD OF THE LEADING EDGE OF THE RECEPTACLE. IF AAR RECEPTACLE FLOOD LIGHTS ARE TURNED ON, CAUTION MUST BE EXERCISED TO PREVENT STRIKING THE DOORS.

NOTE

DURING NIGHT AAR, THE NOSE SECTION OF THE AIRCRAFT APPEARS TO BE A FLAT SURFACE WHILE IN REALITY, IT IS RAISED. THE ILLUSION MAY CAUSE DEPTH PERCEPTION ERRORS PRIOR TO MAKING CONTACT.

FOR NIGHT AAR, IF THE BOOM NOZZLE LIGHT, TMF, OR RECEIVER’S RECEPTACLE LIGHTING FAILS, ATTEMPTS TO EFFECT CONTACT WILL BE AT THE DISCRETION OF THE BOOM OPERATOR.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

21C. AAR Data TA/A-4AR; AMX; JAGUAR B/S; MIRAGE 2000/F-1

Mirage on Boom/Drogue Adapter

a. General Information

(2) The tanker pressure regulation system and MA-3/4 coupling pressure regulators will be fully functional. The Mirage F-1 should be equipped with a flex-tip probe nozzle. If the Mirage F-1 is not equipped with a flex-tip probe nozzle, then the F-1 pilot will be advised to avoid off center disconnects when conducting AAR from the BDA.

(3) During AAR with Jaguar B/S airplanes, a ground-fit check of the probe and drogue is required.

(4) Night AAR with the AM-X and Jaguar S is prohibited unless the receiver is equipped with a probe nozzle light. For KC-135 night AAR, the AM-X is restricted to using the BDA. The tanker must have all AAR lights, including tail-mounted floodlight when using BDA, operable in addition to the AM-X and Mirage 2000 probe nozzle light.
b. AAR Operations

(1) AAR shall not occur in turbulence greater than light with the Mirage 2000/F-1 and AM-X.

(2) The receiver pilot shall be informed by the tanker of the type fuel being transferred.

(3) The maximum capacity that the receiver shall be refueled to is 80 percent. No receiver valve closures are permitted which would terminate fuel flow to the receiver.

WARNING

DO NOT AAR WITH AM-X RECEIVERS HAVING A DEGRADED ELECTRONIC FLIGHT CONTROL SYSTEM UNLESS Dictated BY A FUEL EMERGENCY; IF A FUEL EMERGENCY EXISTS, WARP/MPRS IS THE PREFERRED METHOD OF AAR BECAUSE IT ENSURES MAXIMUM TANKER/RECEIVER SEPARATION.

AFTER AN A-4 RECEIVER ENGAGES THE DROGUE, THE TANKER SHALL TRANSFER 300 POUNDS, THEN CEASE TRANSFER TO ENSURE THAT FUEL IS NOT LEAKING FROM THE DROGUE. IF NO LEAKAGE IS REPORTED, CONTINUE NORMAL TRANSFER. IF SUBSEQUENT REFUELLING THE A-4 PILOT OR BOOM OPERATOR OBSERVES FUEL ESCAPING AT THE COUPLING, A BREAKAWAY WILL BE CALLED.

AAR FROM THE BDA IS PROHIBITED WHENEVER THE ELECTRONIC FLIGHT CONTROL SYSTEM (EFCS) IS DEGRADED. WHENEVER ASYMMETRIC WING LOADING CONFIGURATION EXISTS, EVEN WITH EFCS FUNCTIONING PROPERLY, AAR SHALL BE PERFORMED ON THE MPRS ONLY.
**IMPORTANT:** Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

### 22C. AAR Data Tornado (F-3 ADV, GR-4/-4A, IDS/ECR/PA-200)

![Tornado on Boom/Drogue Adapter](image)

**a. General Information**

1. Only Tornado IDS/ECR/PA-200 airplanes equipped with the J.C. Carter flexible-tipped nozzle or an Aeronautical Systems Division (ASD)-approved alternate nozzle will be refueled with the boom drogue adapter (BDA).

2. The Tornado is equipped with a receptacle probe mast located on the right side of the cockpit for GR-4, GR-4A, IDS, ECR, PA200 types, and on the left side for E-3 and ADV types.

3. Per Tornado technical orders, no AAR operations are to be conducted with the receiver aircraft in degraded Command and Stability Augmentation System modes.

**b. AAR Operations**

1. Limit the bank angle to 15 degrees for turns while in contact unless the receiver pilot requests different angles.
(2) The receiver pilot shall be informed by the tanker of the type fuel being transferred.

(3) AAR using the BDA is restricted to day only with all tornado variants.
IMPORTANT: Read in conjunction with 3C Common Warnings, Cautions and Notes and Figure C-1 / C-2. KC-135R AAR Mission Planning and Inflight Data (Boom / BDA).

23C. AAR Data Rafale

a. **General Information**

   Night AAR with the Rafale is prohibited unless the tanker has all AAR lights, including tail mounted floodlight when using the BDA, operable.

b. **AAR Operations**

   (1) AAR shall not occur in turbulence greater than light.

   (2) The maximum capacity that the receiver shall be refueled to is 90 percent. The receiver pilot shall terminate fuel flow by disconnecting when the 90 percent capacity has been attained.

   (3) All electronic stores, radar, and electronic counter measures must be turned off prior to AAR.

   (4) The receiver pilot shall be informed by the tanker of the type fuel being transferred.
C1.1 Requirement for an AAR Compatibility Review. All AAR participants, whether a tanker or receiver, must be reviewed by a competent technical authority to ensure that they are technically compatible with the other participant. Importantly, commercial and foreign military receivers require the issue of a technical compatibility letter.

C1.2 AAR Compatibility Criteria. Compatibility reviews include, but are not limited to: an assessment of the impact that each platform has on the fuel system of the other (fuel flow rates, backpressures, safety features etc.) as well as other features that impact AAR (e.g. aircraft lighting/markings, addition or removal of aircraft aerials (antennas), use of aircraft communication, especially HF and Satellite Phones).

C1.3 Request for AAR Compatibility Review. Receiver operators requesting an AAR compatibility review should comply with the instructions in ATP 3.3.4.2 (ATP-56), Chapter 5, National SRD-Turkey, Annex A.

C1.4 Publication of Information Resulting from an AAR Compatibility Review. Confirmation that a technical compatibility assessment has been conducted and found to be satisfactory is published by the appropriate TURAF tanker technical authority. Through this, the technical authority confirms that the combination of a commercially or foreign military operated receiver platform and a TURAF tanker has been reviewed, including any receiver modification significant to AAR, and, where necessary, recommends procedural or technique changes that are necessary to ensure safe AAR. The relevant information is incorporated into the receiver-specific data published in Annex C. Additionally; Annex C provides information about the date of the review and the technical authority that conducted the review.