

SECTION III RENDEZVOUS PROCEDURES

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GENERAL

The type of rendezvous will be dictated by mission requirements, type of airplanes involved, weather conditions, etc. When elements operate as a single-flight (buddy system), an on-course rendezvous should be utilized. However, if weather conditions for join-up at cruise altitude cannot be assured, a buddy departure should be employed.

If neither method is practical, each element should be assigned an ARCP and the point rendezvous and parallel orbit procedure used. When tanker and receivers operate as separate flights, the point rendezvous and parallel orbit will be primary with a head-on rendezvous as a backup method. After radio contact has been established, both tankers and receivers should be tuned to the same NAVAID, if possible, to improve rendezvous capability. The minimum flight visibility for a visual rendezvous is 5 NM. The minimum flight visibility for an electronic rendezvous is 1 NM.

TRACK

The inbound track of receivers to the ARCP has a definite bearing on the success of the rendezvous. Receivers should pass over the ARIP, if applicable, and make good the planned inbound track to the ARCP. If this is not possible due to weather, etc, tankers will be informed of the receivers' intentions as soon as practical. If radio contact between the tankers and receivers is not established prior to the ARCT, the tankers will be over the ARCP at the ARCT.

ALTIMETER SETTINGS

Unless otherwise directed, an altimeter setting of 29.92 inches Hg will be used for air refueling operations at or above transition altitude or when over water and operating in accordance with ICAO procedures. For all other air refueling operations, the briefed altimeter setting will be used.

TANKER RENDEZVOUS EQUIPMENT

Tanker rendezvous equipment consists of the following:

KC-97L

Automatic Direction Finder AN/ARA-25
Interrogator AN/APX-29A

KC-135

Automatic Direction Finder AN/ARA-25
Radar Beacon AN/APN-69
Tacan (A/A) AN/ARN-72 TCTO
676

RECEIVER RADIO/NAVIGATION/RENDEZVOUS EQUIPMENT

Receiver radio navigation/rendezvous equipment consists of UHF, TACAN, ADF, UHF/DF, IFF, and Tacan (A/A) AN/ARN-72 TCTO
555

KC-97L RENDEZVOUS PROCEDURES

After initial radio contact has been established between the tanker and receiver force commanders, the tanker lead navigator will assume radio control of the rendezvous and request the receiver force commander to squawk a specific mode on his IFF. Radar identification can be made by having the receiver alternately change modes or go to STANDBY upon command. When positive radar contact is established, the controlling tanker navigator will so inform the receiver force commander, Steers, given in magnetic course to tanker force, will be given to bring the receiver(s) into the tanker's 6 o'clock position. Receiver(s) will be provided

with range and course information at least every 20 NM until the receiver(s) to tanker range decreases to 70 NM; every 10 NM down to 20 NM; then range and course data will be given, when practical, at not more than 2-NM intervals until visual contact by the boom operator. In the event radar contact is not established, the UHF/DF will be utilized until positive radar contact or visual sighting by the boom operator is obtained. With radio contact established, and all required information relayed between the tanker and receiver commanders, the tanker force commander will forward position reports for the entire force. When the receiver force commander has all the tankers in sight, he will state, "Tally-Ho." When individual receiver pilots have their assigned tanker in visual contact, they will so state. The tanker lead navigator may direct the receiver(s) to go to STANDBY on their IFF, if required. When within 1 NM, receivers, when directed, will change to air refueling frequency, if required, and effect closure to the observation or precontact position, as applicable, on their respective tankers. If radio contact has not been established 100 NM from the ARCP, the receiver pilots will turn their IFF to normal, mode 2, or as assigned in the operations order. When the IFF signal is receiver before radio contact has been established, the tanker navigator will instruct the receiver pilot to change modes until the receiver complies, indicating receipt of instructions. This procedure will be continued until normal radio contact is established or a successful rendezvous is completed.

STATIC RENDEZVOUS

The tanker(s) normally establishes a left-hand race-track pattern anchored on an orbit point with 25-NM legs. The lead tanker will occupy the lowest altitude with 2000 feet vertical separation between tankers. In this operation, the actual rendezvous can be made at any point around the orbit with the air refueling done in the pattern. Length of the orbit legs can be adjusted as required. Receivers will normally be assigned an air refueling altitude.

HEAD-ON RENDEZVOUS

The tanker approaches the receiver(s) head-on and makes a procedure turn to roll out on the receiver(s) course with the receiver(s) approximately 5 NM in trail.

POINT RENDEZVOUS

The tankers will normally orbit over a designated point in a racetrack pattern to the left and parallel to the receivers' air refueling track upstream from the ARCP. Tankers will plan to arrive over the ARCP simultaneously with the receivers.

Receivers should depart the ARIP at an altitude higher than the tanker (weather permitting) to effect better radar contact and better fuel economy. The letdown point should be computed by the receivers to insure termination of letdown 5 NM behind the tanker formation, and 500 feet below. When receivers are 5 NM in trail, the tanker force will set air refueling power, lower booms, and prepare for hookup. A stowed boom indicates that the tanker is unable to transfer fuel.

KC-135 RENDEZVOUS PROCEDURES

ON-COURSE RENDEZVOUS

On-course rendezvous is preferred under the cell cruise concept. Weather conditions must be such that join-up at cruise altitude can be assured.

Departure And Climb

Tactical receiver formation and climb procedures will be as directed within the applicable operational procedures manual. All airplanes will maintain Flight Manual climb schedules until reaching a computed level-off position. The receiver departure time will be adjusted to place him at altitude in trail of the tanker. The tanker will level off, on course, at the programmed cruise altitude and establish 260 KCAS to permit receiver overtake. The receiver will level off, on course, 2000 feet below the tanker's base altitude and establish a closing airspeed. After visual contact is established, the receiver will request the tanker to accelerate to enroute or air refueling KCAS.

WARNING

All airplanes will use a standard altimeter setting with altimeter correction properly applied.

Note

Receivers will establish radio contact with the tanker on the assigned cell frequency at the earliest possible time. When air or ground radar control is available, it should be used to effect tanker/receiver closure until visual contact is made.

Early Arrival Of Receivers

In the event receiver(s) arrive at the ARCP ahead of the tanker(s), the following procedures will apply: Receivers will orbit over the ARCP in the same pattern and timing prescribed for tankers, maintaining 2000 feet below the assigned air refueling altitude. Upon arrival of the tanker(s) and after visual contact has been established, the receiver(s) will join in orbit to precontact position and will accomplish contact after rolling out on the air refueling track.

Join-Up

Receivers will call "Tally-Ho" when they have visual contact.

WARNING

All airplanes will apply the proper corrections to obtain KCAS.

If weather conditions preclude join-up, altitude separation and planned cruise airspeed will be maintained until join-up can be effected or an abort point is reached.

POINT RENDEZVOUS/PARALLEL ORBIT

The tanker will establish an orbit pattern with 2-minute legs and 30-degree bank turns to the left with the ARCP at the downstream end of the leg that coincides with the receiver's intended air refueling track. The tanker will orbit at Mach 0.78 or 270 KCAS, whichever is lower. Tankers will arrive at the orbit 15 minutes before the planned ARCT. Tankers will monitor the designated radio frequency a minimum of 30 minutes prior to the ARCT. The appropriate air refueling airspeed will be assumed upon request of the receiver commander. Receivers will monitor the air refueling frequency and will attempt to establish contact as soon as possible but in no case later than arrival at the ARIP. As soon as reliable radio contact has been established between the tanker and receivers, DME/radial information from a common TACAN/VORTAC station will be exchanged if available. Receivers will depart the ARIP, maintaining buddy cruise speed at 2000 feet below the tanker base altitude and will maintain this altitude until visual contact is made with the tanker(s). When the receivers call departing the ARIP, the tanker(s) will fly the reciprocal of the receiver's inbound track, offset 10 miles to the receiver's left. The tanker forces will turn to the receiver's track upon determining the 26-degree relative bearing position to the receivers. After the tanker completes his 180-degree turn to the refueling heading, he will give UHF/DF steers and if available, TACAN/VORTAC DME and radial information. The receivers will continue to respond with TACAN/VORTAC correlation to facilitate the join-up. UHF/DF steers to the tanker will only be given when the receiver is in a tail chase position or if the initial rendezvous fails. The receiver will be requested to use the tone button or depress mike button without talking. If radar contact has been established by the receivers, additional guidance from the tanker is not necessary. Upon achieving

visual contact with each other, the tanker and receiver forces will initiate the precontact procedure.

Note

If radio and radar contact between the tanker and receiver have not been established prior to the ARCT, the tanker will maintain orbit over the ARCP until 15 minutes after the ARCT, unless otherwise briefed. During daylight hours, fuel will be dumped in 1000-pound increments during each turn away from the ARCP. This dumping will commence 10 minutes prior to the ARCT and will be discontinued 15 minutes after the ARCT. For EWO operations, unless otherwise briefed, the tanker orbit will be maintained until fuel is expended to the amount required to reach the scheduled landing base with minimum fuel.

AIR-TO-AIR TACAN RENDEZVOUS PROCEDURES
 (See Section III, T.O. 1-1C-1-3.)

**POINT RENDEZVOUS/PARALLEL ORBIT
BETWEEN ORBITING TANKERS AND TANKER
ESCORTING FIGHTERS**

The orbiting tanker(s) will establish an orbit pattern at the ARCP at the downstream end of the leg that coincides with the receiver(s) intended air refueling track. Both tanker(s) and receiver(s) will monitor the designated radio frequency at a minimum of 30 minutes prior to the ARCT. The escorting tanker will establish radio contact with the orbiting tanker at the earliest possible time. At 200 NM from the ARCP, or after completing last enroute air refueling, the entire receiver cell will formate on the lead tanker, who now becomes the escorting tanker. After receiver assembly with the escorting tanker, the other tanker(s) in the cell may reduce airspeed and, when clear of the escorting tanker/fighter formation, execute a left turn and proceed enroute to destination. If the tanker cell is to remain intact, the following tanker(s) will assume a 1-NM intrail formation stacked up 500 feet on the escorting tanker.

The escorting tanker will home on the orbiting tanker(s) when the closure rate is at a minimum (orbiting tanker/cell is on the air refueling track leg of the orbit) to establish a basic heading for rendezvous. At 80-NM range the escorting tanker/cell will initiate a 1000 FPM descent to 2000 feet below the base air refueling altitude. (For a formation, the highest tanker in the escorting cell will descend to 1000 feet below the base air refueling altitude.) When the cell has leveled off, the cell will be in an intrail formation, stacked up with 500 feet vertical separation, 1 NM in trail. The escorting tanker navigator will monitor the range and will begin a countdown in 10-NM increments from the 100-NM range to the 70-NM range. This will prepare the orbiting tanker/cell for the

turn to the reciprocal of the air refueling track at the 70-NM range call.

If the orbiting tanker/cell is flying on the air refueling track, it will immediately execute a left turn, (30-degree bank) to the reciprocal track, and will maintain that heading. After the orbiting tanker has departed the orbit on the reciprocal of the air refueling track, proper lateral separation must be maintained by the escorting tanker. The escorting tanker navigator will continue to monitor the range and begin a countdown from the 50-NM range to the 30-NM range in 10-NM increments. After the 30-NM call, the countdown will be continued in 1-NM increments to the computed turn range, to prepare the orbiting tanker/cell for the turn to the air refueling track. The orbiting tanker/cell will turn to the air refueling track at the computed range call.

After the orbiting tanker/cell has rolled out on the air refueling track and visual contact is established, the escorting tanker/cell may reduce airspeed to 280 KCAS and, when clear of the fighter formation, execute a left turn and proceed to destination. Clearance from track by the escorting tanker/cell must be accomplished prior to receivers starting to climb.

If the escorting tanker is scheduled to join the refueling (orbiting) cell, it will accelerate to 300 KCAS and climb into the top cell position with its assigned receivers.

HEAD-ON RENDEZVOUS

The head-on rendezvous should be used only as a backup method. The tanker is not on an established orbit. As soon as reliable UHF contact is established, the receiver and tanker will alter to a head-on course, and the receiver will establish and maintain 2000 feet separation below the tanker and maintain buddy cruise airspeed. The tanker will offset approximately 10 NM to the right by altering 90 degrees right and then 90 degrees left.

Note

Ground radar assistance should be utilized to the maximum for this type of rendezvous.

STATIC RENDEZVOUS

The tanker(s) will establish a left-hand racetrack pattern anchored on an orbit point with 15-degree bank, 25-NM legs. For aid in making the rendezvous, the track will be divided into four sectors as shown in figure 3-1. This will permit the tanker to give his location to the receiver to facilitate rendezvous.

ORBIT TRACK SECTORS

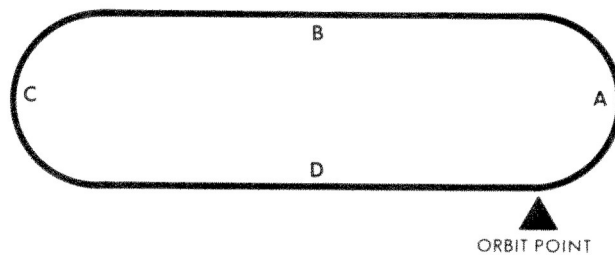


Figure 3-1

Positions will be given as "Entering C sector" or "Leaving B sector." In this operation, the actual rendezvous and refueling will be accomplished in the orbit pattern. Length of the orbit legs can be adjusted as required for a specific operation. Single or tanker formations may be used in static orbit. Single tankers will be separated by 4000 feet altitude; tanker formations will have 4000 feet between cell leaders. Receivers will remain at an altitude 2000 feet below the assigned tanker until visual contact is established. Tankers will orbit at standard orbit airspeed and will adjust to air refueling airspeed upon request of the receiver leader.

RENDEZVOUS OVERRUN

Note

If, during normal or alternate rendezvous procedures, the receiver has overrun the tanker, the tanker may direct the receiver to maneuver in order to decrease closure time, provided visual or electronic contact can be maintained or multiple control point patterns are not utilized.

In the event of an overrun by fighters, the receiver(s) will pass 2000 feet below the tanker to insure positive vertical separation. The receiver will decelerate to 290 KCAS or onset of buffet, whichever occurs first, and maintain air refueling heading. The tanker will accelerate to 355 KIAS (350 KCAS) or Mach 0.90, whichever is lower, and maintain air refueling heading. When the tanker is in positive visual contact ahead of the receiver, the receiver pilot will so indicate. The tanker will decelerate to air refueling airspeed, and normal forming procedures will be employed to establish contact.