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Flying Operations

**AIRCRAFT COCKPIT AND FORMATION
FLIGHT SIGNALS**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFR 11-2, *Flight Rules and Procedures*. It provides guidance and procedures for standard Air Force cockpit and formation flight manuals. It also indicates distress signals that have been standardized for use with North Atlantic Treaty Organization (NATO) forces (NATO STANAG 3379). It applies to the operation of US Air Force aircraft flown by Air Force pilots, pilots of other services or countries, and civilian pilots. It also applies to the Air National Guard and US Air Force Reserve units and members. It supplements International Civil Aviation Organization standard signals in the Flight Information Publication (FLIP) Enroute Supplement.

SUMMARY OF REVISIONS

This revision aligns the instruction with AFR 11-2.

1. Cockpit Signals for Multiple Aircraft:

- 1.1. Voice.** Voice is the primary method of communication between the pilot and other crew members. Crew members will repeat the pilot's instructions before executing them.
- 1.2. Hand Signals.** Hand signals are another method of communication between aircraft. Use of hand signals are authorized if all flight crew members understand their meaning.
- 1.3. Night Visual Signals.** Night visual signals should be used when an aircraft is in distress and unable to communicate using radios.
- 1.4. NATO Standardized Signals.** All signals standardized with NATO will appear in the attachments with an "*".

2. Standard Signals for Formation Flight. Standard signals for formation flight are described in **Attachment 1**. Since the signals required may vary for different types of aircraft, only those signals used in most aircraft are standardized.

2.1. These signals reduce radio communications and permit pilots to communicate with each other during periods of radio silence. Use the radios if the situation permits, when time is critical, or the visual signals are creating confusion.

2.2. Sun angle or sun glint on the canopy may make it impossible to either give or acknowledge a visual signal. With subdued helmets and gray or green gloves, most visual signals are more visible if given near the top of the canopy.

2.3. **Attachment 1** includes preparatory signals (if any) and the executing signals.

3. In-Flight Distress Signals:

3.1. The visual signals for distress described in **Attachment 2** should only be used if the radio fails or cannot be used due to the situational environment.

3.2. International flight distress signals described in **Attachment 2** also apply to USAF aircraft.

3.3. Night visual signals are described in **Attachment 3**.

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Attachment 1

STANDARD FORMATION SIGNALS FOR DAYTIME COMMUNICATION

Table A1.1. Standard Formation Signals for Daytime Communication (See Notes).

Action	Preparation	Execution
Afterburner in or out: <i>Note: Not required during formation takeoff.</i>	Move clenched fist inboard or outboard as appropriate.	Nod head.
Attention in the air:		Execute rapid shallow rocking of wings.
Battle Damage Assessment (BDA) Check:		Hold clenched fist with index finger and thumb extended, back of hand towards canopy. Wingman responds by executing prebriefed BDA check.
Change Lead:	Make several forward pointing motions, then hold up number of fingers to indicate present position of the point which is to assume the lead.	Pilot of aircraft assuming the lead nods head.
Echelon to the Right or Left:		Dip wing to the right or left, whichever is appropriate.
Echelon Turn:		Extend clenched fist with forefinger and little finger extended upward for each echelon turn performed.
*Flaps Up or Down; <i>Note: During a formation takeoff, preparatory or execution signals are not required for raising flaps.</i> Initial gear movement on the flight lead's aircraft may be used as the wingman's signal for gear and flap retraction.	Hand flat, fingers forward, downward motion of hand from wrist to lower flaps--reverse motion to raise flaps.	Nod head.

Fuel Check:		Close fist with the thumb extended and perform drinking motion with thumb touching the oxygen mask.
Fuel Remaining for like type aircraft.	In response to Fuel Check.	Extend one finger for each 1,000 lbs. of fuel board. Extend finger(s) vertically for 1,000 to 5,000 lbs; horizontally for 6,000 to 9,000 lbs. After signaling 1,000 lbs. increments, pull hand out of sight then signal 100 lbs increments in the same manner. Signal zero with closed fist. For example: To signal 6,300 lbs., extend one finger horizontally (indicating 6,000 lbs.); pull hand out of sight (indicating a change from thousands to hundreds); and extend three fingers vertically (indicating 300 lbs.).
*Fuel Remaining for dissimilar aircraft.	In response to Fuel Check.	<p>a. Less than 10 minutes remaining:</p> <p>Use the "Land Immediately" signal in Attachment 2 attachment 2.</p> <p>b. For more than 10 minutes, use up to five fingers to indicate each 10 minute increment of fuel as follows:</p> <p>1 finger = 10 to 19 minutes 2 fingers = 20-29 minutes 3 fingers = 30-39 minutes 4 fingers = 40-49 minutes 5 fingers = more than 50 minutes</p>

Gear Down.	Downward motion with a closed fist, thumb extended downward.	Nod head.
Gear Up. <i>Note: During a formation takeoff, preparatory hand signals are not required for raising the gear.</i>	Upward motion with closed fist, thumb extended upward.	Nod head.
Jettison Stores:	Hold fist at top of canopy and make several pumping motions.	Nod head.
Lanyard Check:		Show hooked index finger.
Loosen Formation:		Fishtail the aircraft.
Oxygen Check: <i>Note: If the response is not an OK, use the radios or appropriate HEFOE signal.</i>		Cup hand over oxygen mask, followed by query in the form of an OK sign (circle formed by touching ends of thumb and forefinger, other fingers extended).
Pitchout:	Make a circular motion with vertically extended index finger	

Radio Frequency Change:	Tap helmet near ear with fingers extended.	Extend finger(s) vertically for digits 1 through 5, horizontally for digits 6 through 9, pulling hand down out of sight between digits. Signal zero with a clenched fist. Ensure signals are made against a visible background. For example: a. Present channel change--tap helmet, extend appropriate number of fingers for channel desired, pulling hand down out of sight between digits. b. Prebriefed manual frequency--tap helmet, hold up clenched fist next to helmet. c. Manual frequency not prebriefed--tap helmet, hold up clenched fist next to the helmet, extend appropriate number of fingers for frequency desired, pulling hand down out of sight between digits.
Ready for Takeoff:	After run up, the leader looks at the wingman.	Wingman nods head yes or no.
Reform or Tighten Formation:		Rock wings slowly.
Run up Engine for Takeoff:		Make a circular motion with vertically extended index finger.
*Speed Brake(s) in or out:	Biting motion with hand; fingers and thumb opening and closing.	Nod head.
Start Engines:		Extend arm over head and make a circular motion with the hand.

Start Takeoff Roll:	Lead places head back toward headrest.	Lead nods head for brake release. For aircraft equipped with afterburner, after the aircraft are rolling straight down the runway, a second head nod is a signal to light afterburner (unless after- burner light up is initiated simultaneously with brake release).
Tactical Formation:		Make a series of porpoising maneuvers, spacing as briefed.

NOTES:

1. Pilots in formation will relay visual signals; the leader must allow enough time for the relay of each signal after it is given.
2. The head nod is the signal to acknowledge understanding of preparatory signals.

Attachment 2

IN-FLIGHT DISTRESS SIGNALS

Table A2.1. In-Flight Distress Signals.

Intention/Problem	Signal
Approach End Cable Engagement	<p>a. Escorted: Extend tail hook. Escorting aircraft will relay intent.</p> <p>b. Unescorted: Fly parallel to the active runway at 1,000 feet above the field elevation with tail hook extended. Rock wings until reaching the departure end of the runway, turn to downwind and check tower or mobile control for light signals. If a straight-in cable engagement must be flown, flash landing light on final.</p>
*Bailing Out or Ejection	One or both clenched fists pulled downward across the face to simulate pulling an ejection face curtain.
Descend to Lower Altitude	Hold hand at top of canopy, palm down, fingers extended and joined, move hand forward and down.
*Desire to Land	Movement of the hand, flat, with palm down, forward and downward, finishing the movement in a simulated roundout. As an alternate signal, lower the landing gear.
Electrical Failure Landing (No Assist Aircraft Available)	Distressed aircraft will fly 500 feet over the tower or mobile control, then continue to the far end of the runway and pull up into a wide downward leg. Proceed with a landing and pattern approach for the type of aircraft being flown while watching the tower or mobile for signals. The control tower will clear the area of other aircraft and will call emergency crash equipment to the scene.
I Must Land Immediately	Close fist and hold it to top of canopy with thumb extended downward, then move arm up and down rapidly. (Do not confuse with "GEAR DOWN" signal, which is generally not used with altitude.)

I Must Land on Your Wing	Pat shoulder, palm down. To prevent confusion with other signals, use right hand and left shoulder or vice versa. To acknowledge, other pilot must give the OK signal; the basic signal indicates a jet approach speed of 130 knots. If the distress aircraft desires a higher approach speed, the pilot must raise one finger for each 10 knot increase desired. The distressed aircraft lands and the escort executes a go around.
Intercepting Signals	The intercepting aircraft positions itself in front of and usually to the left of the intercepted aircraft and rocks its wings. This is a signal that the interceptor wishes the other aircraft to follow it. A responding irregular flashing of all available lights in this case indicates distress.
Radio Failure	Tap microphone or earphone of helmet and signal as appropriate: <ul style="list-style-type: none"> a. Receive Failure: With palm of hand over the ear position, move hand forward and backward. b. Transmitter Failure: With palm of hand toward and in front of the face, move hand up and down.
Radio Inoperative Landing (No Assist Aircraft Available)	Fly aircraft along the side of the landing runway, 1,000 feet above the field elevation, rocking wings until reaching end of the runway. Turn to downwind and check the tower or mobile control for green light on base leg and final approach for landing clearance.
System Failures (HEFOE System)	Clench fist and hold it at top of canopy, then hold up the required number of fingers to denote which system is involved (see a through e below). If the clenched fist signal is seen but no finger signal is seen or the intercepting pilot is unable to understand the signal given, the pilot will assume the aircraft in distress has one or more systems inoperative and should proceed with caution.

System Failures (HEFOE System) (Continued)	<p>The receiving pilot acknowledges the signal by repeating it:</p> <ul style="list-style-type: none"> a. Hydraulic--one finger b. Electrical--two fingers c. Fuel--three fingers d. Oxygen--four fingers e. Engine--five fingers <p><i>Note: For multi-engine aircraft, point to the side, left or right, that corresponds with the engine failure.</i></p>
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NOTES:

1. For use only when radio is inoperative or not available.
2. Day visual signals.

Attachment 3

NIGHT VISUAL SIGNALS

Table A3.1. Night Visual Signals.

Intention/Problem	Signal
Aircraft Emergency (Must Land As Soon As Possible)	<p>Signal escort aircraft by repeated intermittent flashes with a flashlight, then assume the wing position. This signal indicates a jet approach speed of 130 knots. If a higher approach speed is desired, the pilot must pause after the basic signal, and then blink flashlight at the top of the canopy, once for each 10-knot increase desired. The escort pilot will lead to the nearest suitable field, declare an emergency with the controlling agency, then fly a straight-in approach with the distressed aircraft on the wing. The distressed aircraft lands and the escort executes a go around.</p> <p><i>Note: On a straight-in approach, the escort aircraft turns the position lights to bright, or dim and steady as appropriate, to alert the wingman to prepare to lower flaps and landing gear.</i> The corresponding signal of execution will be for the lead aircraft to return position lights to the original setting. However, if the aircraft is equipped with only a steady-bright light position, the lead aircraft will blink lights for the alerting signal of execution.</p>
Approach End Cable Engagement	Fly parallel to the active runway at 1,000 feet above field elevation with gear down and flash landing light. Turn downwind and check tower or mobile control for light signal. If a straight-in cable engagement must be flown, flash landing light on final.
Attention	Attract attention by switching on the landing light, or other means of illumination.
Change Lead	Pilot of distressed aircraft holds flashlight parallel with canopy rail and sends a steady light while making a straight line from rear toward the front of the canopy.

Descend to Lowest Practical Altitude	Make a rapid vertical movement with a flashlight.
Electrical Failure Landing (No Assist Aircraft Available)	Procedure same as prescribed for day visual signal in Attachment 2 .
Radio Inoperative	Make a large circular motion with a flashlight.
Radio Inoperative Landing	Same as day signal procedures in Attachment 2 .
Signal Acknowledgment	Point a steady light from the flashlight at the signaling aircraft.