*BY ORDER OF THE*
*SECRETARY OF THE AIR FORCE*

*AIR FORCE MANUAL 11-218*

*5 APRIL 2019*

*Flying Operations*

# *AIRCRAFT OPERATIONS AND MOVEMENT ON THE GROUND*

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OPR: AFFSA/XOF

Certified by: AF/A3O
(Mr. Steven A. Ruehl)

Supersedes: AFI11-218, 28 October 2011

Pages: 43

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This manual implements Air Force Policy Document 11-2, *Aircrew Operations*, by prescribing rules for the operation, movement, and control of aircraft on the ground. This instruction applies to the ground operations of all Air Force aircraft operating on an aircraft apron, ramp, or movement area at any airfield, whether military, civilian, or foreign; it applies to individuals at all levels who operate Air Force aircraft on the ground, whether military, civilian, or contractor, including the Regular Air Force, Air Force Reserve, and Air National Guard, except where noted otherwise. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule located in the Air Force Records Information Management System. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. This publication may be supplemented at any level, but all supplements must be routed to the OPR of this publication for coordination prior to certification and approval. The authorities to waive wing/unit level requirements in this publication are identified with a Tier ("T-0, T-1, T-2, or T-3") number following the compliance statement. See Air Force Instruction (AFI) 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command in accordance with **paragraph 1.2** of this manual. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

*SUMMARY OF CHANGES*

This document has been substantially revised and must be completely reviewed. Major changes include: (1) reducing directive guidance as directed by the Secretary of the Air Force, (2) re-tiering directive guidance, (3) correcting administrative and grammatical errors, (4) and adopting AF Form 679, *Air Force Publication Compliance Item Waiver Request/Approval*.

# Chapter 1

## OVERVIEW

**1.1. General.** This instruction provides broad guidance for aircraft movement on the ground. It cannot address every possible situation; therefore, wing commanders should establish appropriate guidance to ensure safe aircraft movement on the ground as directed in **paragraph 2.2**. This instruction does not apply to specialized maintenance procedures normally conducted away from aircraft aprons, ramp, and movement areas (e.g. engine runs conducted in approved sound suppressors).

**1.2. Waivers.** Refer to AFI 33-360. The Director of Operations, AF/A3O, is the approval authority for any non-tiered directive guidance in this manual. MAJCOMs (or subordinate units for Tier 2 and Tier 3 waivers) initiate and staff all waiver packages. Coordination through the Air Force Flight Standards Agency Flight Directives division (AFFSA/XOF), **hqaffsa.xof@us.af.mil**, is required for Tier 0 and Tier 1 waivers, and recommended for Tier 2 and Tier 3 waivers.

1.2.1. All Tier 0 statements are referenced to Federal Aviation Administration (FAA) Title 14, Code of Federal Regulations, Part 91, *General Operating and Flight Rules,* FAA Order JO 7110.65, *Air Traffic Control*, International Civil Aviation Organization (ICAO), Annex 2, *Rules of the Air*, or ICAO Annex 14 Volume 1, *Aerodrome Design and Operations*.

1.2.2. AFFSA/XOF pursues external agency concurrence for Tier 0 waivers and provides results to the requesting MAJCOM (e.g., an exemption to the Code of Federal Regulations).

1.2.3. Accomplish all waivers using the AF Form 679, *Air Force Publication Compliance Item Waiver Request/Approval*. Once approved, wings will send an informational copy to MAJCOM Standardization/Evaluation and AFFSA/XOF within five duty days. **(T-1).**

## Chapter 2

## ROLES AND RESPONSIBILITIES

**2.1. General.** Wing commanders or equivalent may reference current or future revisions of the following documents when developing training, guidance, and operational execution procedures to comply with the intent of this instruction. **Note:** See **Attachment 1** for versions referenced at the time this manual was written.

2.1.1. Advisory Circular (AC) 00-34, *Aircraft Ground Handling and Servicing*,

2.1.2. AC 120-57, *Surface Movement Guidance and Control System*,

2.1.3. AC 150/5300-13, *Airport Design*,

2.1.4. AC 150/5210-20, *Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports*,

2.1.5. AC 150/5340-1, *Standards for Airport Markings*,

2.1.6. AC 150/5340-18, *Standards for Airport Sign Systems*,

2.1.7. AC 150/5340-30, *Design and Installation Details for Airport Visual Aids*,

2.1.8. AFI 11-202 Volume 3, *General Flight Rules*,

2.1.9. AFI 13-204 Volume 3, *Airfield Operations Procedures and Programs*,

2.1.10. AFI 13-213, *Airfield Driving*,

2.1.11. AFI 21-101, *Aircraft and Equipment Maintenance Management*,

2.1.12. FAA-H-8083-25, *Pilot's Handbook of Aeronautical Knowledge*,

2.1.13. International Civil Aviation Organization (ICAO) Doc 9476-AN/927, *Manual of Surface Movement Guidance Control Systems* (SMGCS),

2.1.14. UFC 3-260-01, *Airfield and Heliport Planning and Design*,

2.1.15. UFC 3-260-04, *Airfield and Helicopter Markings*, and

2.1.16. UFC 3-535-01, *Visual Air Navigation Facilities*.

**2.2. Wing Commander or Equivalent.** Wing Commanders will establish:

2.2.1. Training and evaluation requirements of personnel who are involved with aircraft movement on the ground; authorized to start, run, or test engines; or authorized to taxi. **(T-3).**

2.2.2. Supervision and training requirements when authorizing programs that allow unqualified personnel to occupy a pilot seat during taxi (see **paragraph 3.11**); include briefing requirements, emergency procedures, and egress procedures. **(T-3).**

2.2.3. Personal protective equipment requirements in accordance with AFMAN 91-203, *Air Force Occupational Safety, Fire, and Health Standards*, and AFI 48-127, *Occupational Noise and Hearing Conservation Program*. **(T-1).**

2.2.4. Procedures for operating aircraft when waiving the 25-foot or 10-foot horizontal clearance requirements directed in **paragraph 3.7** **(T-1).** **Note:** These waivers are considered

operational waivers as defined in Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*, and are not waivers to airfield criteria or standards.

2.2.5. Any necessary airfield specific marshalling signals. **(T-3).**

**2.3. Aircraft Marshallers.** Aircraft marshallers shall provide standard marshalling signals to aircraft in a clear and precise manner using the signals described in **Attachment 2**. **(T-3).**

2.3.1. Personnel will not marshall an aircraft unless trained and qualified to carry out the functions of an aircraft marshaller. **(T-3).**

2.3.2. Aircraft marshallers will be clearly identifiable to the aircraft operator. **(T-3). Exception:** Flight crew personnel deplaned by the pilot in command to perform marshalling duties are not required to wear a distinctive fluorescent outer garment unless available on the aircraft.

2.3.3. Daylight-fluorescent wands will be used for signaling by all participating ground personnel during daylight hours. **(T-3).** Illuminated wands will be used at night or in low visibility. **(T-3). Exception:** Flight crew personnel deplaned by the pilot in command to perform marshalling duties are not required to use wands unless available on the aircraft; however, they should keep their hands and arms visible to the pilot in command.

2.3.4. Aircraft marshallers will ensure the area is clear of obstructions prior to marshalling an aircraft. **(T-3). Note:** The design of many aircraft is such that the path of the wing tips, engines, and other extremities cannot always be monitored visually from the flight deck while the aircraft is being maneuvered on the ground.

2.3.5. When not in verbal communication with aircraft operators, aircraft marshallers will repeat the signal given by the operator when it is safe to operate that aircraft system. **(T-3).**

**2.4. Aircraft Operators.**

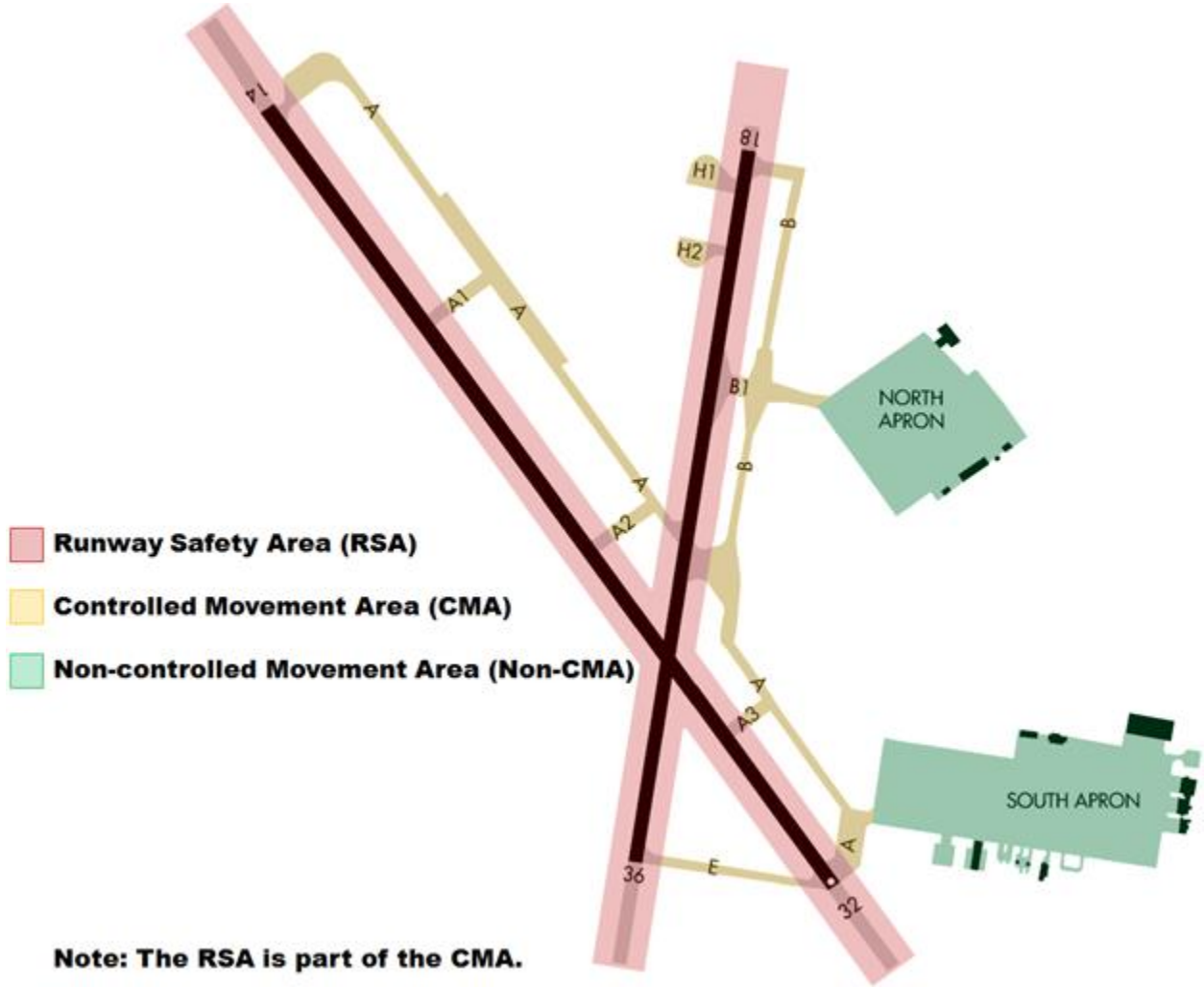
2.4.1. Personnel operating aircraft shall take action as required by the marshalling signals. **(T-3).** When not in verbal communication with aircraft marshallers, personnel operating aircraft will initiate all signals regarding the operation of aircraft systems (speed brakes, flaps, etc.) in a clear and precise manner as shown in **Attachment 2**. **(T-3).**

## Chapter 3

## AIRCRAFT MOVEMENT ON THE GROUND

**3.1. General.** An airfield consists of three areas with respect to aircraft movement on the ground: the runway safety area (RSA), controlled movement area (CMA), and non-CMA (**Figure 3.1**).

**Figure 3.1. General Areas on an Airfield.**




**3.2. Runway Safety Area (RSA).** The RSA is an area surrounding the runway intended for use by aircraft in emergency situations; it is measured from the runway ends and centerline. The RSA may extend up to 500 feet from the runway centerline and 1,000 feet beyond the runway ends. **Note:** The RSA is part of the CMA.

**3.3. Controlled Movement Area (CMA).** The CMA includes the surfaces of an airfield used for take-off, landing, and taxiing of aircraft, excluding aircraft ramps, aprons, and parking areas. Do not operate aircraft on the CMA without air traffic control clearance. **(T-0).**

**3.4. Non-CMA.** Ramps, aprons, and parking areas not under air traffic control. Local guidance may dictate a ramp authority to contact or procedures to follow.

**3.5. Aircraft Surface Operations.** An aircraft operating on the CMA shall stop and wait at all lighted stop bars until the lights are switched off. **(T-1).** Do not operate aircraft beyond runway holding position markings or within the RSA unless cleared by air traffic control. **(T-0). Note:** Refer to **Chapter 4** for airfield markings. In case of potential collision between two aircraft operating on an airfield the following applies:

3.5.1. Approaching head on, or approximately so, each aircraft shall stop or alter its course to the right to keep well clear. **(T-1).**

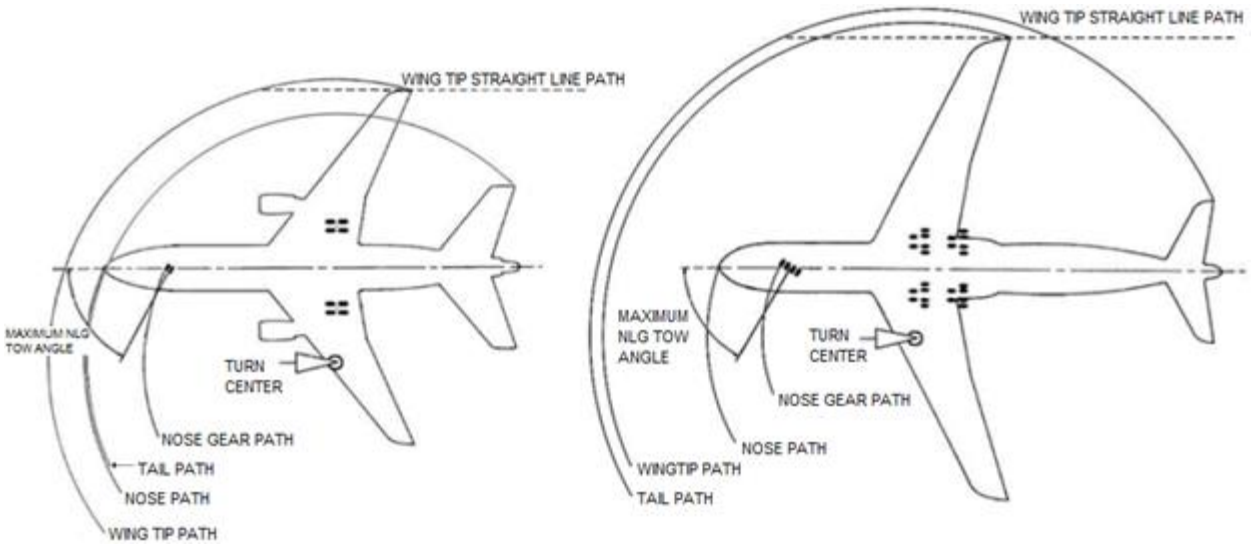
3.5.2. On a converging course, the aircraft with the other on its right shall give way. **(T-1).**

3.5.3. An aircraft that is being overtaken by another aircraft shall have the right-of-way and the overtaking aircraft shall keep well clear of the other aircraft. **(T-1). Note:** An overtaking aircraft is an aircraft that approaches another from the rear and is unable to see the aircraft's port or starboard navigation lights.

**3.6. Transponder.** Aircraft operating on the CMA or RSA must have the transponder on in the altitude reporting mode and Automatic Dependent Surveillance – Broadcast (ADS-B) Out transmissions enabled (if equipped). **(T-2). Exception:** The wing commander or equivalent may specify transponder operations on airfields under their authority.

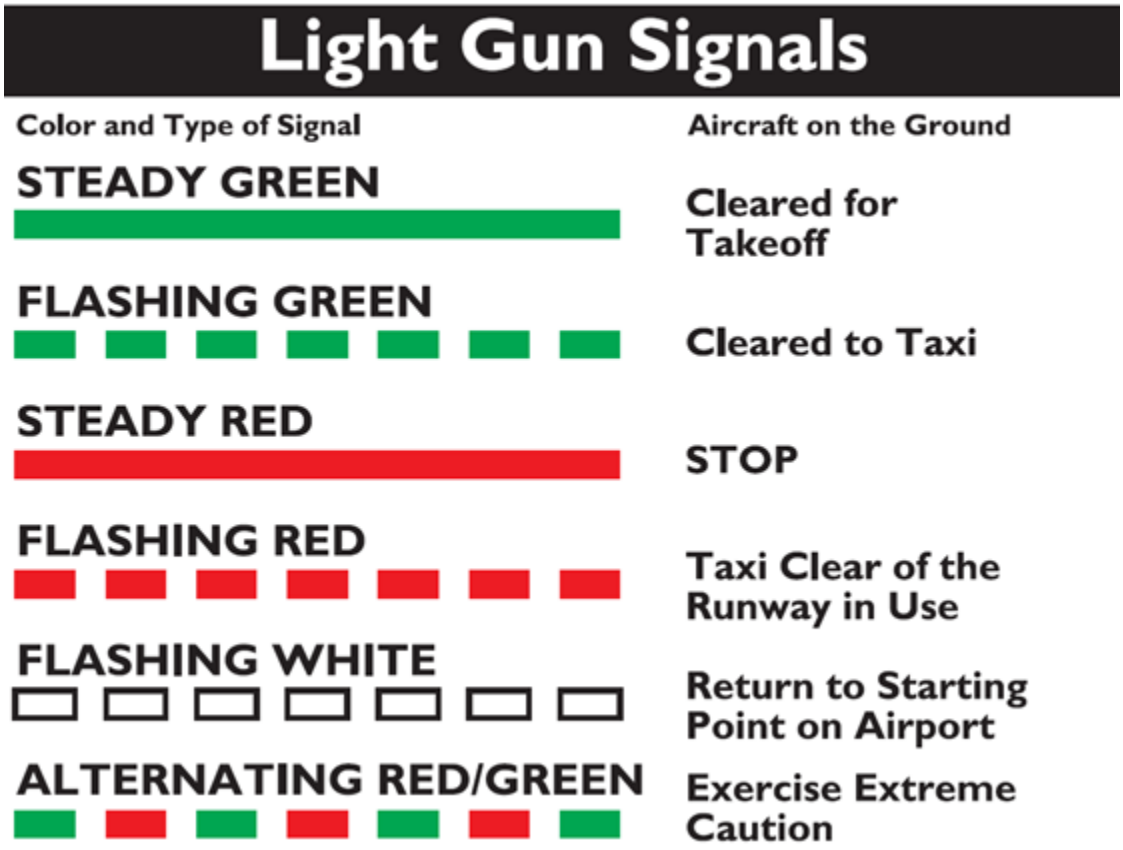
**3.7. Taxi and Towing Clearance.** Personnel should plan taxi and towing operations so that no part of an aircraft is within 25 horizontal feet of an obstruction; account for wing tip and tail growth during turns (**Figure 3.2**). Do not operate aircraft within 25 horizontal feet of any obstruction without wing walkers. **(T-3).** Do not operate aircraft within 10 horizontal feet of any obstruction. **(T-3). Exception:** USAF Air Demonstration Squadron aircraft marshalled by qualified team members may taxi within 10 feet of obstructions.

**Figure 3.2. Wing Tip and Tail Growth.**




**3.8. Air Traffic Control Light Signals.** Air traffic control towers may use the following procedures to control aircraft, ground vehicles, equipment, and personnel not equipped with a radio or if radio contact cannot be established. Air traffic control personnel use a directive traffic control signal that emits an intense narrow light beam of a selected color (i.e., red, white, or green) when controlling traffic by light signals (**Figure 3.3**).

**Figure 3.3. Air Traffic Control Light Signals.**




3.8.1. Between sunset and sunrise, a person operating an aircraft on the ground wishing to attract the attention of the control tower should turn on a landing light and taxi the aircraft into a position, clear of the active runway, so that light is visible to the tower. The landing light should remain on until appropriate signals are received from the tower.

3.8.2. Acknowledge tower instructions during daylight hours by moving the ailerons or rudder; acknowledge instructions at night by blinking the landing or navigation lights. Watch the tower for light signals if a radio malfunction occurs after departing the parking area.

**3.9. Position Lights.** Turn on position lights between sunset and sunrise when starting or running an engine, while being towed, or when parked in an area likely to create a hazard unless clearly illuminated by an outside source. **(T-0). Exception:** Aircraft that do not have power available before start shall turn them on as soon as power is available. **(T-0).** Wing commanders will establish required procedures and lighting for towing unpowered aircraft between sunset and sunrise. **(T-2).**

**3.10. Anti-collision or Strobe Lights.** Turn on anti-collision or strobe lights prior to engine start; do not turn them off until after engine shutdown. **(T-0). Exception:** Aircraft that do not have power available before engine start shall turn anti-collision or strobe lights on as soon as power is available. **(T-0). Note:** Flashing lights may be turned off or reduced in intensity if they adversely affect the performance of duties or subject an outside observer to harmful dazzle.

**3.11. Crew Requirements.** Authorized personnel must occupy both seats during taxi operations if an aircraft requires two pilots for flight. **(T-2). Exception:** Wing commanders may establish incentive, indoctrination, and orientation programs that allow unqualified personnel to occupy a pilot seat during taxi in accordance with AFI 11-401, *Aviation Management*.

## Chapter 4

## AERONAUTICAL LIGHTING AND OTHER AIRFIELD VISUAL AIDS

**4.1. General.** Personnel involved with aircraft movement on the ground should be familiar with aeronautical lighting and other airfield visual aids (**Figure 4.1**, **Figure 4.2**, and **Figure 4.3**). Additional information is available in **Chapter 2** of the *Aeronautical Information Manual*, available from the Federal Aviation Administration (FAA) website at **http://www.faa.gov/**.

**4.2. Low Visibility Operations.** A surface movement guidance and control system (SMGCS) plan provides guidance to and control of aircraft and ground vehicles on the airfield. Do not operate aircraft on the ground at locations where a SMGCS plan or low visibility operations are in effect without MAJCOM-developed training. **(T-2).** Non-trained personnel must request a "follow me" vehicle or delay taxi operations until visibility conditions improve. **(T-2).** Personnel must use the low visibility taxi route chart published for the airfield when low visibility operations are in effect. **(T-1). Note:** Low visibility taxi route charts are not published in Department of Defense flight information publications but may be available from the State's *Aeronautical Information Publication* or commercial vendors (Jeppesen®, etc.).

**Figure 4.1. Airfield Markings.**

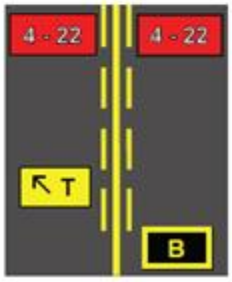
| EXAMPLE | TYPE OF MARKING | LOCATION/CONVENTION |
|---|---|---|
|  | Holding Position. | Located across centerline within 10 feet of hold sign on taxiways and on certain runways. |
|  | Instrument Landing System (ILS) Critical Area | Located on taxiways where the taxiways enter the ILS critical area or where aircraft on taxiway would violate ILS approach airspace. |
|  | Taxiway/Taxiway Holding Position. | Used at airports where needed to hold traffic at a taxiway/intersection. Located to ensure wing clearance for taxiing aircraft. |
|  | Non-CMA Boundary. | Located on boundary between CMA and non-CMA. Located to ensure wing clearance for taxiing aircraft. |
|  Taxiway Edge. | | Located along taxiway edge where contiguous shoulder or other paved surface NOT intended for use by aircraft. |
|  Dashed Taxiway Edge. | | Located along taxiway edge where contiguous shoulder or other paved surface is intended for use by aircraft. |
|   | Surface Painted Holding Position. | Supplements elevated holding position signs. Required where hold line exceeds 200'. Also useful at complex intersections. |
| | **Enhanced Taxiway Centerline** | Taxiway centerlines are enhanced 150' prior to a runway holding position marking. |
| | Surface Painted Taxiway Direction. | Located left side for turns to left. Right side for turns to right. Installed prior to intersection. |
| | Surface Painted Taxiway Location. | Located right side. Can be installed on left side if combined with surface painted hold sign. |

**Figure 4.2. Airfield Signs.**

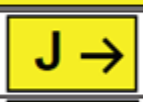
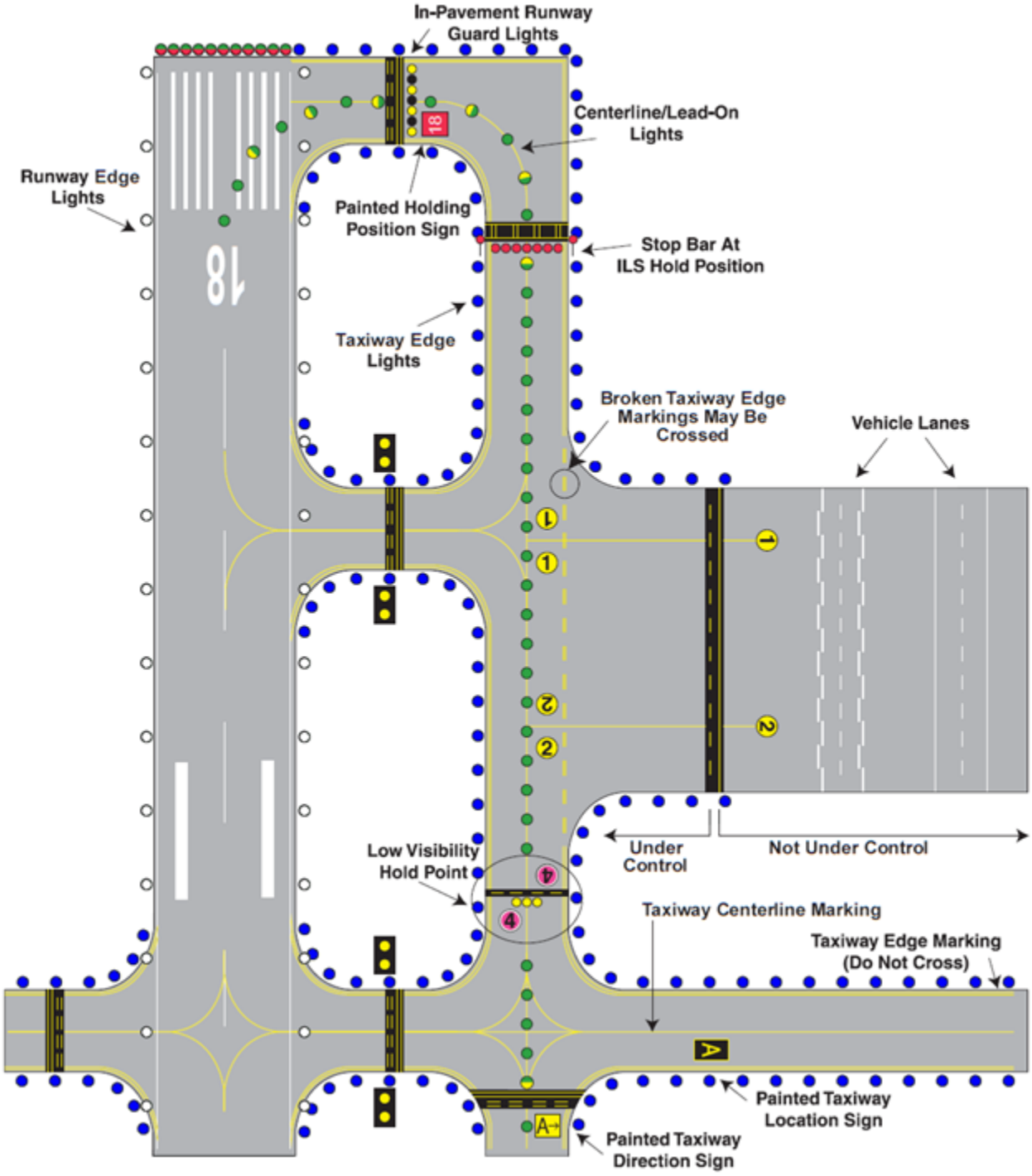
| EXAMPLE | TYPE OF SIGN | LOCATION/CONVENTION |
|---|---|---|
|  | Mandatory: Hold position for taxiway/ runway intersection. | Located left side of taxiway within 10 feet of hold position markings. |
|  | Mandatory: Holding position for runway/runway intersection. | Located left side of runway prior to intersection, and right side if runway more than 150' wide, used as taxiway, or has "land & hold short" ops. |
|  | Mandatory: Holding position for runway approach area. | Located on taxiways crossing thru runway approach areas where an aircraft would enter an RSA or approach/departure airspace. |
|  | Mandatory: Holding position for ILS critical area/precision obstacle free zone. | Located on taxiways where the taxiways enter the ILS critical area or where aircraft on taxiway would violate ILS approach airspace. |
|  | Mandatory: No entry. | Located on paved areas that aircraft should not enter. |
|  | Taxiway Location. | Located along taxiway by itself, as part of an array of taxiway direction signs, or combined with a runway/ taxiway hold sign. |
|  | Runway Location. | Normally located where the proximity of two runways to one another could cause confusion. |
|  | Runway Safety Area and Runway Approach Area Boundary. | Located on taxiways on back side of certain runway/ taxiway holding position signs or runway approach area signs. |
|  | ILS Critical Area. | Located on taxiways on back side of ILS critical area signs. |
|  | Direction: Taxiway. | Located on left side, prior to intersection, with an array left to right in clockwise manner. |
|  | Runway Exit. | Located on same side of runway as exit, prior to exit. |
|  | Outbound Destination. | Located on taxi routes to runway(s). Never collocated or combined with other signs. |
|  | Inbound Destination. | Located on taxi routes to airport destinations. Never collocated or combined with other types of signs. |
|  | Information. | Located along taxi routes or aircraft parking/staging areas. May not be lighted. |
|  | Taxiway Ending Marker. | Installed at taxiway end or far side of intersection, if visual cues are inadequate. |
|  | Distance Remaining. | Located along the sides of runways at 1000' increments. |

**Figure 4.3. Example Airfield Lighting, Marking, and Signage.**

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Deputy Chief of Staff, Operations

## Attachment 1

## GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

***References***

Advisory Circular (AC) 00-34A, *Aircraft Ground Handling and Servicing*, 29 July 1974

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UFC 3-260-04, *Airfield and Helicopter Markings*, 16 May 2018

UFC 3-535-01, *Visual Air Navigation Facilities*, 11 April 2017

***Adopted Forms***

AF Form 679, *Air Force Publication Compliance Item Waiver Request/Approval*

AF Form 847, *Recommendation for Change of Publication*

***Abbreviations and Acronyms***

**AC**—Advisory Circular

**ADS-B**—Automatic Dependent Surveillance – Broadcast

**AFFSA/XOF**—Air Force Flight Standards Agency Flight Directives

**AFRIMS**—Air Force Records Information Management System

**AFI**—Air Force Instruction

**AFMAN**—Air Force Manual

**CMA**—Controlled Movement Area

**FAA**—Federal Aviation Administration

**ICAO**—International Civil Aviation Organization

**ILS**—Instrument Landing System

**MAJCOM**—Major Command

**OPR**—Office of Primary Responsibility

**RDS**—Records Disposition Schedule

**RSA**—Runway Safety Area

**SMGCS**—Surface Movement Guidance and Control System

**UFC**—Unified Facilities Criteria

***Terms***

**Airfield**—An area on land or water that is used or intended to be used for the landing and takeoff of aircraft; includes its buildings and facilities, if any. The FAA term "airport" and the ICAO term "aerodrome" may be used interchangeably with airfield for the purposes of this instruction.

**Civil Twilight**—The moments at which the geometric center of the Sun's disk is at most six degrees below the horizon, published in the *Air Almanac*, converted to local time. Morning civil twilight ends at sunrise. Evening civil twilight begins at sunset.

**Day**—The time between sunrise and sunset, published in the *Air Almanac*, converted to local time.

**Horizontal Clearance**—The distance between an obstruction and the closest extremity of an aircraft as measured across the ground.

**Controlled Movement Area (CMA)**—The runways, taxiways, and other areas of an airfield which are utilized for taxiing, hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of aprons, ramps, and aircraft parking areas. Specific approval for entry onto the CMA is required at airfields with an operating control tower. The FAA term "movement area" and the ICAO term "maneuvering area" may be used interchangeably with CMA for the purposes of this instruction.

**Night**—The time between the end of evening civil twilight and the beginning of morning civil twilight, published in the *Air Almanac*, converted to local time.

**Non-controlled Movement Area (Non-CMA)**—Ramps, aprons, and parking areas not under air traffic control. Local guidance may dictate a non-air traffic control ramp authority or procedures. The FAA term "non-movement area" and the ICAO term "movement area" may be used interchangeably with non-CMA for the purposes of this instruction.

**Obstruction**—An existing object that violates airfield clearances. Fixed obstructions include natural and man-made features such as buildings, trees, rocks, and terrain irregularities. Mobile obstructions include parked aircraft, parked and moving vehicles, and similar equipment.

**Operate**—General term to describe taxi or towing operations for the purposes of this instruction.

**Operational Waiver**—A waiver to address airfield safety/risk considerations and operational mitigations for the design of existing airfield facilities. The Service authority who owns the airfield determines the requirements needed to safely operate on the existing facilities.

**Overtake**—An overtaking aircraft is an aircraft that approaches another from the rear and is unable to see the aircraft's port or starboard navigation lights.

**Right-of-way**—The legal right of an aircraft to proceed with precedence over others.

**Runway Safety Area (RSA)**—An area surrounding the runway intended for use by aircraft in emergency situations; it is measured from the runway ends and centerline. The runway safety area may extend up to 500 feet from the runway centerline and 1,000 feet beyond the runway ends.

**Sunrise and Sunset**—The moments when the Sun's upper edge touches the horizon, published in the *Air Almanac,* converted to local time. Within Alaska, the end of evening civil twilight and the beginning of morning civil twilight, as defined for each locality.

**Taxi**—Movement of an aircraft under its own power on the surface of an airfield.

**Tow**—Movement of an aircraft under the power of a ground vehicle on the surface of an airfield.

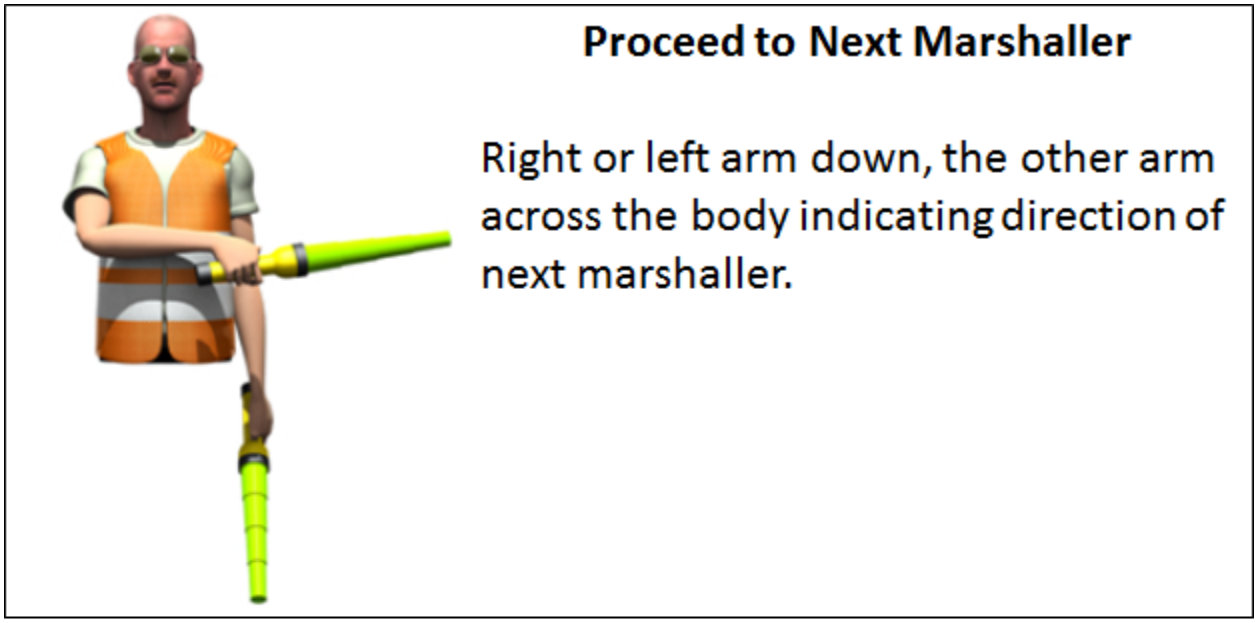
**Wingtip and Tail Growth**—Occurs during turns when an aircraft's wingtip or tail describes an arc greater than its wingspan due to its geometry and the arrangement of its landing gear.

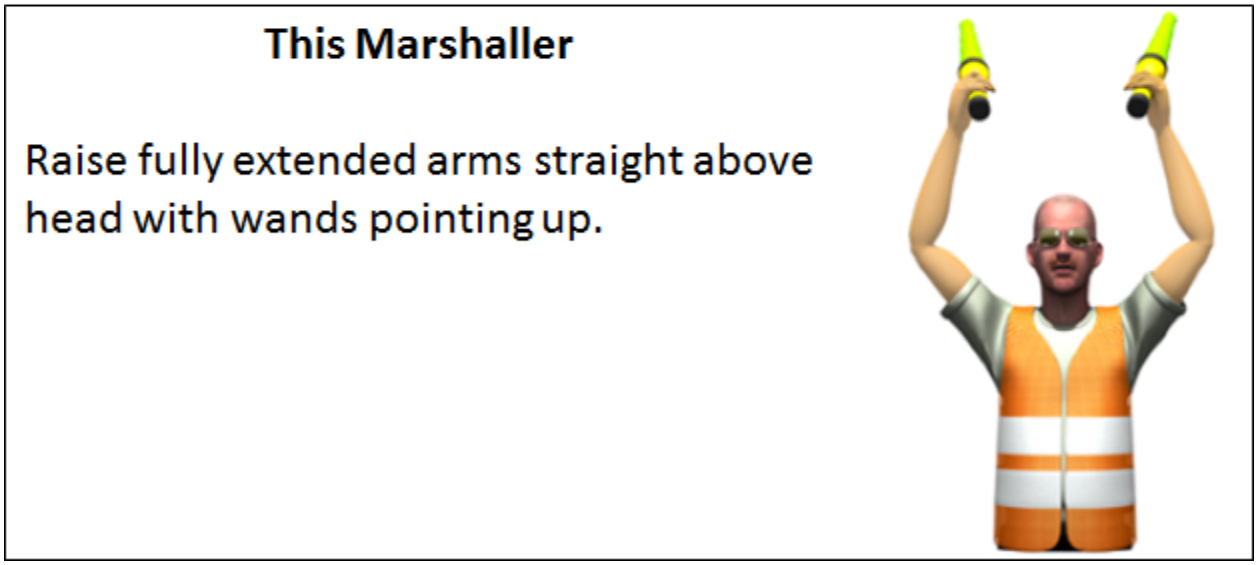
## Attachment 2

## AIRCRAFT MARSHALLING SIGNALS

**A2.1. General.** These signals are designed for use by the aircraft marshaller facing the aircraft in a position where the aircraft marshaller can best be seen by the pilot. The aircraft marshaller will have wands illuminated at night or low visibility to facilitate observation by the pilot.

**Figure A2.1. Signals for All Aircraft.**



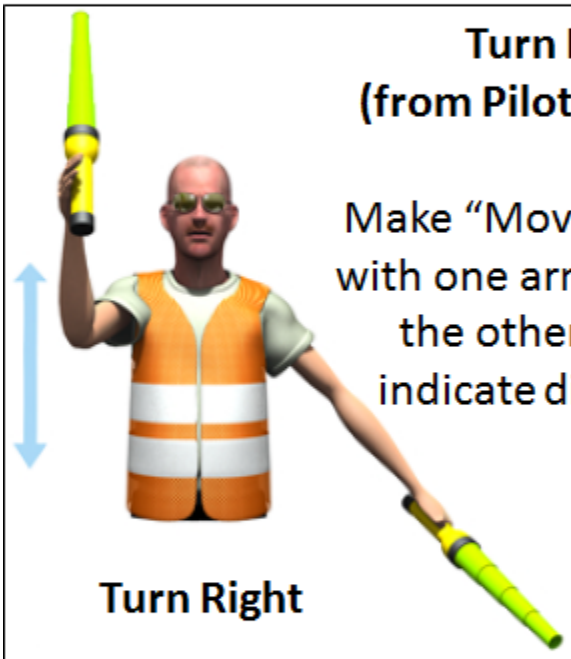



**Move Forward**

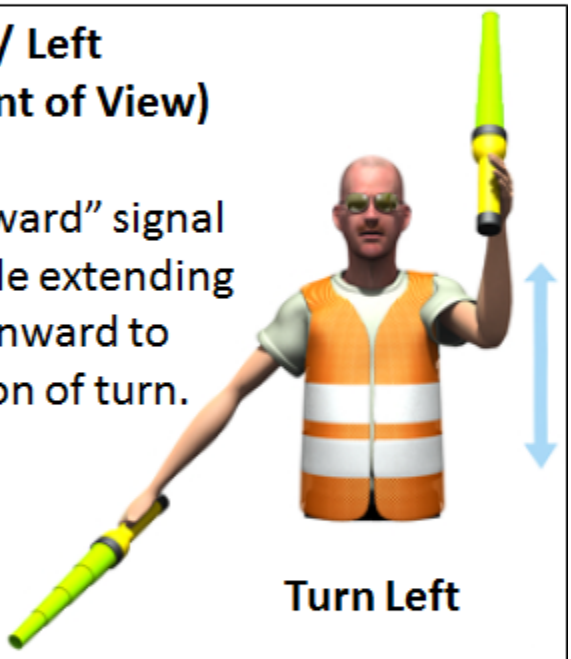
Bend extended arms at elbows, move hands up and down from shoulder height to head.

**Turn Right / Left**
**(from Pilot's Point of View)**

Make "Move Forward" signal with one arm while extending the other downward to indicate direction of turn.



**Turn Right**



**Turn Left**

**Stop**

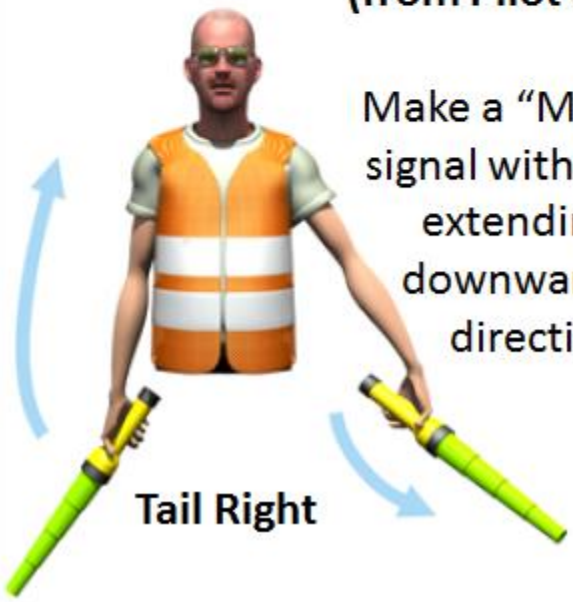
Fully extend arms and wands at a 90-degree angle to sides, slowly move hands up until wands cross.

**Move Backward**

With arms down and wands toward ground, sweep arms forward and upward repeatedly to shoulder height. Do not bend arms at elbow.

**Turn While Backing**
**(from Pilot's Point of View)**

Make a "Move Backward" signal with one arm while extending the other downward to indicate direction of turn.

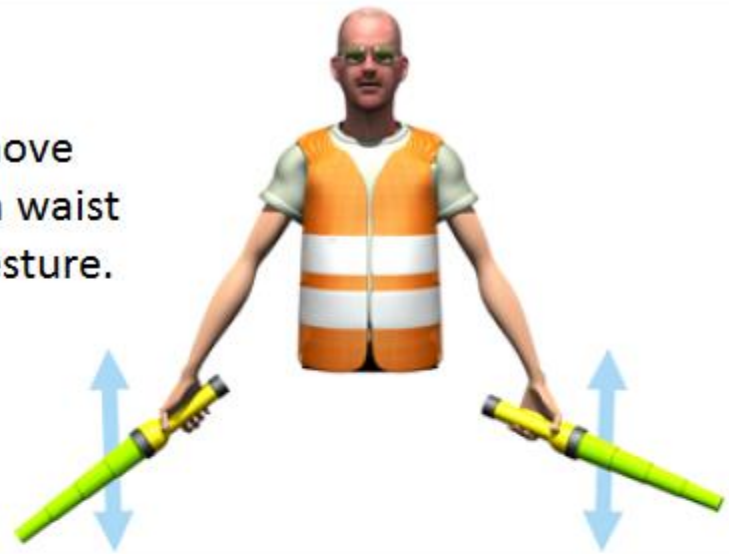


**Tail Right**

**Tail Left**

**Slow Down**

Extend arms down and move wands up and down from waist to knees in a "patting" gesture.



**Slow Down Engine(s) on Indicated Side**

With arms down and wands toward ground, wave either right or left wand up and down indicating engine(s) on left or right side respectively should be slowed down.

**Start Engine(s)**

Circular motion of right hand at head level with left arm pointing to engine.

**Feather / Fuel Shut Off (Propeller Aircraft Only)**

Make a chopping motion with one hand slicing into the other.

**Cut Engine(s) / Rotor**

Extend arm forward of the body at shoulder level; move hand to the top left shoulder and draw hand to top of right shoulder in a slicing motion across throat.

**Engine or APU Fire**

Make rapid horizontal figure-eight motion with one wand, point other to source of fire.

**Hot Brakes**

Arms extended with forearms perpendicular to ground.

**Hot Brakes – Only One Side (from Pilot's Point of View)**

One arm extended with forearm perpendicular to ground, other hand points to wrist indicating aircraft side with hot brakes.

**Abandon Aircraft**

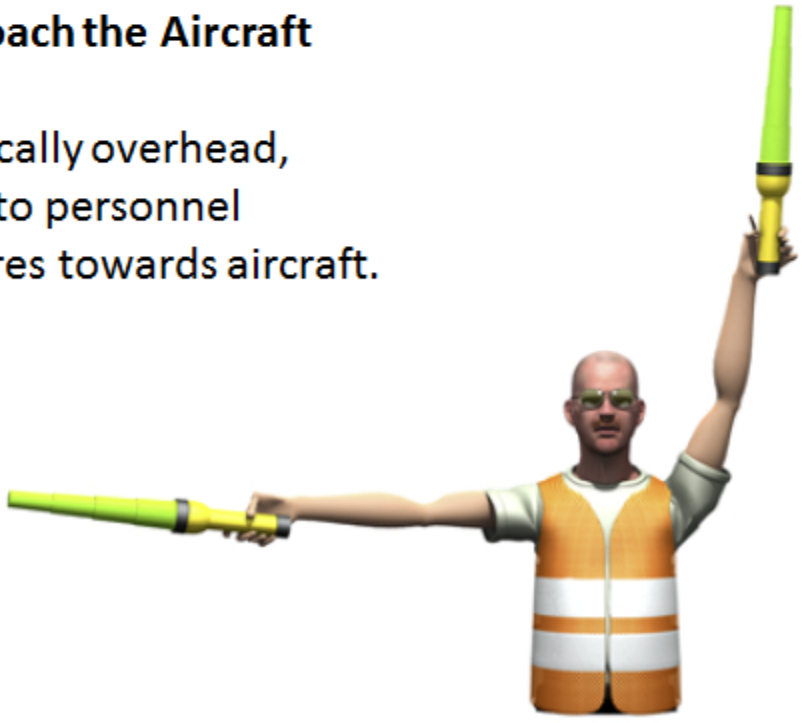
Marshaller first gives “cut engines” signal followed by pantomiming unfastening and throwing seat belt and shoulder straps up and off.

**Request / Clearance for Personnel to Approach Aircraft**

Make a beckoning motion with right hand at eye level.

**Personnel Approach the Aircraft**

Left hand raised vertically overhead, other hand indicates to personnel concerned and gestures towards aircraft.

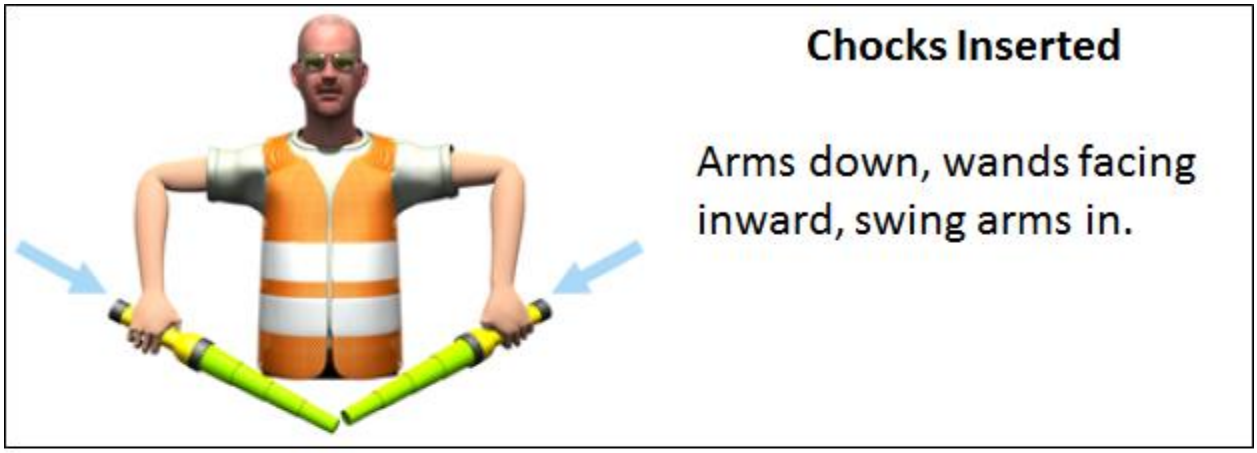


**Brakes On**

Arms above head with wands uncrossed then crossed.

**Brakes Off**

Arms above head with wands crossed then uncrossed.


Chocks Inserted
Arms down, wands facing inward, swing arms in.


Chocks Removed
Arms down, wands facing outward, swing arms out.

**Down Locks / Landing Gear Pins Installed**

Arms above head, right wand held horizontally across left wrist.

**Down Locks / Landing Gear Pins Removed**

Arms and wands start in “installed” position, then swing right wand up.

**Lower Wing Flaps or Flaps Are Extended**

Hands in front, wands together, then opened vertically from the wrist.

**Raise Wing Flaps or Flaps Are Retracted**

Hands in front, wands open vertically from the wrists, then suddenly closed.

**Lock Tail / Nose Wheel**

Hands together overhead, wands in a vertical “V”, then suddenly closed.

**Unlock Tail / Nose Wheel**

Hands overhead, wands together then opened to form a vertical “V”.

**Open Weapon Bay**

Body bent forward at the waist, hands held with wands touching in front of body then swing arms out.

**Close Weapon Bay**

Body bent forward at the waist and arms extended horizontally, then swing arms downward and in until wands touch in front.

**Engage Nose Gear Steering**

Point to wand to nose, indicate turn direction with other wand.

**Disengage Nose Gear Steering**

Point wand to nose, move other wand inward at shoulder height.

**Fold Wings / Helicopter Blades / Sweep Wings Aft**

Arms straight out at sides, then swept forward and hugged around shoulders.

**Spread Wings / Helicopter Blades / Sweep Wings Forward**

Arms hugged around shoulders, then swept straight out to the sides.

**Lock Wings / Helicopter Blades**

Right wand raised, point left wand to right elbow.

**Open Air / Speed Brakes or Air / Speed Brakes Are Open**

Hands in front, wands held together, then opened horizontally from the wrists.

**Close Air / Speed Brakes or Air / Speed Brakes Are Closed**

Hands in front, wands open horizontally from the wrists, then suddenly closed.

**Up Tail Hook**

Right hand, wand extended upward, raised suddenly to meet horizontal wand held in left hand.

**Down Tail Hook**

Right fist, wand extended downward, lowered suddenly to meet horizontal wand held in left hand.

**Affirmative (All Clear) or Negative (Not Clear)**

Right hand raised, wand pointed up or down to indicate response.

**Affirmative**

**Negative**

**Auxiliary Power Unit Connected**

Hands above head, left fist partially clenched, right hand moved toward left hand with first two fingers extended and inserted into circle made by fingers of the left hand.

**Auxiliary Power Unit Disconnected**

Hands above head, left fist partially clenched, right hand moved away from left hand, withdrawing first two fingers from circle made by fingers of the left hand.

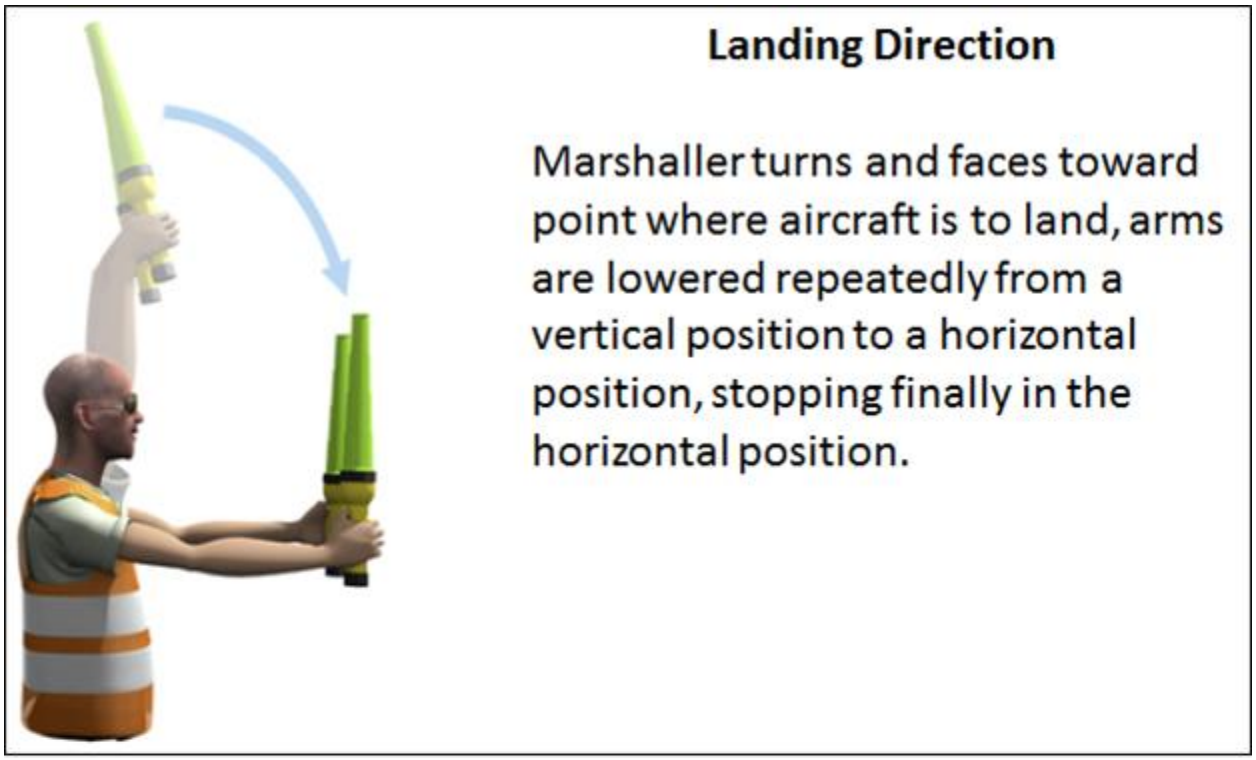
**External Starting Air Connected**

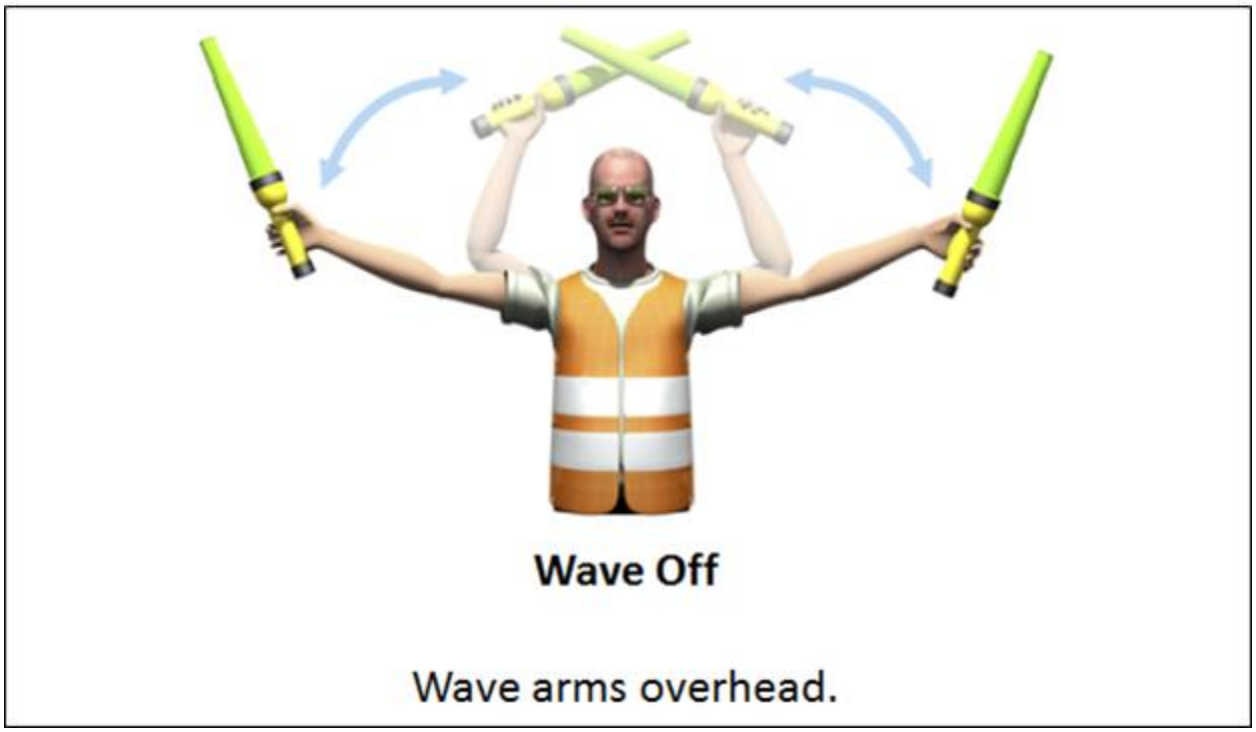
Hands above head, left hand cupped, right fist fully clenched, right fist moved in direction of left hand and inserted into cup made by left hand.

**External Starting Air Disconnected**

Hands above head, left hand cupped, right fist moved away from left hand withdrawing fist from cup made by left hand.

**Figure A2.2. Additional Signals for Rotary Wing and Tilt Rotor Aircraft.**



**Vertical Movement – Move Upward**

Arms extended horizontally sideways beckoning upwards with wands. Speed of movement indicates rate of ascent.

**Vertical Movement – Move Downward**

Arms extended horizontally sideways beckoning downwards with wands. Speed of movement indicates rate of ascent.

**Horizontal Movement – Move Right**

Left arm extended horizontally sideways in direction of movement, other arm swung over head repeatedly.

**Horizontal Movement – Move Left**

Right arm extended horizontally sideways in direction of movement, other arm swung over head repeatedly.

**Release Load / Cut Cable**

Left arm extended forward, move right hand in a slow slicing movement below the left hand. **Note:** Indicate "cut cable" with rapid slicing movement.

**Load Not Released**

Hold left wand across chest and right wand pointing up to the center of the left wand.

**Down Cargo Hook**

Hold left wand across waist and right wand pointing down to the center of the left wand, repeatedly raise and lower right wand.

**Up Cargo Hook**

Hold left wand across chest and right wand pointing up to the center of the left wand, repeatedly raise and lower right wand.

**Winch Up**

Wands horizontal in front of body at waist, raise right wand.

**Winch Down**

Wands horizontal in front of body at waist, lower right wand.

**Wheels or Sling Load This High**

Wands held parallel in front of chest. Distance between the wands indicates the height of the wheels or bottom of sling load above the ground.

**Cargo Load Secure**

Wands crossed at shoulder height.

**Hook Up Load**

Hands make a rope climbing motion.

**Lower Wheels**

Turn sideways and make circular motions with both wands when an aircraft approaches with landing gear retracted.

**Hover**

Arms extended horizontally.

**Spot Turn**

Left or right hand moving up and back to indicate direction of tail movement. Other hand pointing to center of turn.

**Tail Right**

**Tail Left**

**Land**

Arms crossed at wrists in front of waist.

**Droop Stops Out**

Hands above head level, wands pointing out.

**Droop Stops In**

Hands above head level, wands pointing in.

**Remove Blade Tie-Downs**

Left hand above head, right hand pointing to individual tie-downs for removal.

**Takeoff This Way**
**(at Pilot's Discretion)**

Left wand behind back, right wand makes circular motion above head and points toward takeoff direction.

**Engage Rotors**

Left wand down, right wand makes circular motion above head.

**Spread Pylon**

Bend right elbow across chest, extend arm outward.

**Fold Pylon**

Extend right arm, bend arm across chest.