U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Parts 91 and 135 Single Pilot, Flight School Procedures During Taxi Operations

Date: 7/30/12 **AC No:** 91-73B

Initiated by: AFS-200 **Change:**

1. PURPOSE. This advisory circular (AC) provides guidelines for the development and implementation of standard operating procedures (SOP) for conducting safe aircraft operations during taxiing to avoid causing a runway incursion. In accordance with the current edition of Federal Aviation Administration (FAA) Order 7050.1, Runway Safety Program, the definition of a runway incursion is, any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft. This AC is intended for use by persons operating aircraft single pilot under Title 14 of the Code of Federal Regulations (14 CFR) parts 91 and 135, and flight schools. The FAA recommends that these guidelines become an integral part of all SOPs, Flight Operations Manuals (FOM), and formal flight training programs.

> **NOTE: Pilots operating aircraft with two or more pilots on the flight deck under 14 CFR parts 91, 121, 125, or 135, refer to the current edition of AC 120-74, Parts 91, 121, 125, and 135 Flightcrew Procedures During Taxi Operations, to avoid causing a runway incursion.**

2. CANCELLATION. AC 91-73A, Part 91 and Part 135 Single-Pilot Procedures During Taxi Operations, dated September 26, 2003, is canceled.

3. FOCUS. This guidance focuses on the development and use of mitigation procedures that will avoid a runway incursion and enhance safe taxi operations.

4. RELATED READING MATERIAL. You can find this and other ACs on the FAA's Web site at http://www.faa.gov/regulations_policies/advisory_circulars.

a. FAA ACs (current editions).

- AC 90-42, Traffic Advisory Practices at Airports Without Operating Control Towers.
- AC 90-66, Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports Without Operating Control Towers.
- AC 120-57, Surface Movement Guidance and Control System.

b. Other Guidance.

- Safety Alerts for Operators (SAFO) 11004 Runway Incursion Prevention Actions.
- Aeronautical Information Manual (AIM).
- Pilot's Handbook of Aeronautical Knowledge.

c. Web Sites.

- Aircraft Owners and Pilots Association (AOPA): http://www.aopa.org/asf/runway_safety/.
- FAA Runway Safety Program: http://www.faa.gov/airports/runway_safety/
- Final Approach Runway Occupancy Signal (FAROS): http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/nextgen/research_tech_dev/td/projects/faros/.
- NASA Aviation Safety Reporting System (ASRS): http://asrs.arc.nasa.gov/
- Runway Status Light (RWSL) Program: http://www.faa.gov/air_traffic/technology/rwsl/.
- Notices to Airmen (NOTAM): https://pilotweb.nas.faa.gov/PilotWeb/.

5. BACKGROUND. Runway incursions have sometimes led to serious accidents with significant loss of life. Although they are not a new problem, with increasing air traffic, runway incursions have been on the rise. One of the biggest safety concerns in aviation is the surface movement accident. As a direct result, the FAA has rapidly expanded the information available to pilots, including the addition of taxiway and runway information in FAA publications. The FAA has also implemented new procedures and created educational awareness programs for pilots, air traffic controllers, and ground operators. By focusing resources to attack this problem head-on, the FAA hopes to reduce and eventually eliminate surface movement accidents. This AC develops practical guidance toward the goal of increasing safety and efficiency of aircraft movement on the airport surface while reducing the risk of runway incursions.

a. Need for SOPs. Increased traffic and expansion at many airports creates complex runway and taxiway layouts. This additional complexity makes airport surface operations more difficult and potential for runway incursions more hazardous than in the past. To increase safety and efficiency, it is necessary to lessen the exposure to hazards and risks by holding the pilot's workload to a minimum during taxi operations. This can be accomplished through SOPs that direct the attention of the pilot to essential tasks while the aircraft is in motion. The development and formalized training of safe operating procedures during taxi operations should be implemented by each operator.

b. Development of SOPs. In developing SOPs, it is important to consider pilot workload prior to takeoff and before landing. Considerations should be given to tasks that make up the normal workload of pilots, such as accomplishing checklists, configuring the aircraft for takeoff and landing, programming flight management systems (FMS), and managing communications with air traffic control (ATC). The more complex the activities within the flightdeck work environment, the greater the need for explicit, yet simple and clear SOPs. The overall goal is for operators to develop standardized pilot procedures that will increase the pilot's awareness but will not increase his/her workload while taxiing the aircraft.

6. USE OF SOPs. The use of SOPs should be:

- Emphasized during the certification and proficiency training of all pilots;
- Emphasized and used during all phases of flight, including ground operations; and
- Evaluated during the flight review of all certificated pilots (refer to 14 CFR part 61, § 61.56).

7. SINGLE-PILOT PROCEDURES.

a. General. The potential for runway incidents and accidents can be reduced through adequate planning, coordination, and communication. The following guidelines are intended to help pilots cope more effectively with current airport conditions during taxi operations. All pilots will benefit from this guidance, which expands on and is grouped into seven major categories: Planning, Situational Awareness, Written Taxi Instructions, Pilot/Passenger Communications, ATC/ Pilot Communication, Taxiing, and exterior lighting.

b. Planning. Thorough planning for taxi operations is essential for a safe operation. Pilots should plan for the airport surface movement portion of the flight just as they plan for the other phases of flight. Planning for taxi operations should be an integral part of the pilot's flight planning process and should be completed in two phases: review items and briefing items.

(1) Review Items. Because of the constantly changing airport conditions and guidance information, the pilot must be aware of any changes made to regulatory and guidance information sources. The pilot also needs to have a through understanding of the items in this AC and other relevant reading material.

(a) FAA initiatives are updating airport signage, marking, and lighting. Be sure you are thoroughly familiar with the updates. Also, there are initiatives that are taking place in airport lighting, and it is important to know what the lighting is displaying to the flightcrews (e.g., Surface Movement Guidance Control System (SMGCS) and RWSL).

(b) Without explicit ATC clearance, do not cross any runway hold short lines or an instrument landing system (ILS) critical area if in use.

(c) Review the current airport NOTAM and the automated terminal information service (ATIS) for runway and taxiway closures, construction activity, and other airport-specific risks. It is assumed that ATC has firsthand knowledge of runway and taxiway status. If a clearance is received to use a runway/taxiway that a NOTAM/ATIS broadcast indicates is closed, query the controller for verification of clearance.

(d) Review the current airport diagram and hot spots and, if in use, a published textual description of standard taxi routes to provide an overall "big picture" of the airport and its potential areas for a runway incursion.

(2) Briefing Items. It is critical for safety that a through briefing of taxi operations is conducted and understood by the pilot. Briefing of the following items should take place at a time when they are relevant and fresh in the pilot's memory (e.g., before taxi and prior to initial descent for landing). The following guidance should be used to conduct a briefing for all pilots.

(a) Pilots should brief the timing and execution of aircraft checklists and communications at times that will not interfere with the pilot's responsibility to be aware of their taxi progress, location, and overall airport taxiing activity. When briefing these tasks, they should also consider the anticipated duration of the taxi operation, the locations of hot spots/complex intersections and runway crossings, and the visibility along the taxi route. If possible, pilots should conduct pre-departure checklists only when the aircraft is stopped or while taxiing straight ahead on a taxiway without complex intersections.

(b) Remind all cockpit occupants of the importance of maintaining a sterile cockpit, but encourage the ability to speak up if anyone sees a potential conflict.

(c) Brief all pilots to display the current airport diagram to follow the progress of the taxi operation. (Refer to the NOTE below.)

(d) Brief the expected taxi route to include any hold short lines and runways to cross, hot spots, as well as any other potential conflicts. Once taxi instructions are received, the pretaxi route should be reviewed and monitored. It is essential that any changes to the taxi route be fully understood by pilots.

> **NOTE: It is highly recommended that part 91 operators, flight schools, and certificated flight instructors (CFI) instruct pilots and students in the meaning and use of airport diagrams. It is also recommended that flight schools and CFIs require pilots and students to have and use current airport diagrams for departure, arrival, and alternate airports.**

(e) Address previous experience at the airport and unusual procedures or techniques that are not typically used on an everyday basis, such as different pushback procedures or communication requirements.

> **CAUTION: A potential pitfall of pretaxi and prelanding planning is setting expectations and then receiving different instructions from ATC. Pilots need to follow the clearance or instructions that are actually received, and not the ones they expected to receive.**

(f) Identify critical locations on the taxi route (e.g., hot spots/complex intersections, crossing intervening runways, entering and lining up on the runway for takeoff, and approaching and lining up on the runway for landing) where enhanced vigilance is important to avoid a runway incursion.

(g) Complete as many checklist items as possible (e.g., setting the flaps, trim, loading final weight and balance data, and FMS/global positioning system (GPS) navigation inputs) before initial taxi, once the aircraft is clear of equipment and personnel. In addition, upon landing, no items should be changed or moved until the entire aircraft has crossed the respective runway's hold short line.

(h) Conduct all after landing checklist items, contact ground control for taxi instructions, read back the instructions, review the airport diagram, and monitor your progress to parking.

> **NOTE: After the entire aircraft crosses over the landing runway's hold short line, conduct after-landing checklist items, based upon company procedures, before contacting ATC for taxi instructions.**

(i) During low visibility operations, brief the requirements and special considerations such as the low visibility taxi chart, if published for the airport, and be alert if ATC states to hold short of the ILS critical area line.

(j) The use of cell phones and other electrical devices is discouraged during taxi and prohibited for air carrier operations. It is important to ensure that everyone present in the aircraft turn off their phones and devices during taxi operations to prevent any distractions.

c. Pilot/Passenger Communications. When operating an aircraft that does not have a door between the flight deck and the passenger compartment, the pilot may need to ask passengers to maintain a sterile cockpit and refrain from unnecessary conversation from the time the preflight preparations begin until the time the aircraft is clear of the terminal area and at cruising altitude. The same procedure should be followed on arrival, from the time landing preparations begin until the aircraft is safely stopped at the terminal.

d. Situational Awareness (SA). When conducting taxi operations, pilots need to be aware of their proximity to other aircraft and vehicles moving on the airport. This SA is comprised of, but not limited to, knowledge of the aircraft's precise position. Pilots should use a "continuous loop" process to actively monitor and update their progress and location during taxi. This includes knowing the aircraft's present location and mentally calculating the next location on the route that will require increased attention (e.g., a turn onto another taxiway, an intersecting runway, or hot spots). SA is enhanced by understanding the ATC clearance issued to the pilots, other aircraft, and vehicles in order to avoid potential conflicts. In addition to the above, the following are specific pilot actions to mitigate the pilot causing a runway incursion.

(1) Have a current airport diagram readily available for reference and check the assigned taxi route against the diagram with the heading indicator or compass, paying special attention to hot spots/complex intersections. While maintaining outside vigilance, the pilot(s) must follow the aircraft's progress on the airport diagram of ensuring that the pilot is following the instructions received from ATC.

(2) Pilot(s) must monitor the taxi clearance and read back all hold short instructions. Verbalizing hold short instructions is a method to ensure that the pilot(s) have a clear understanding of the intended taxi plan and do not cross any runway hold short lines without ATC clearance.

(3) Know and use all of the visual aids available at the airport, such as the signs, markings, and lighting, as well as ground and/or tower ATC, to follow the taxi route.

NOTE: A fundamental concept of improving monitoring is realizing that many pilot errors occur when one or more pilots are off-frequency or doing heads-down work, such as programming an FMS/GPS. Therefore, pilots should perform all high workload duties before beginning to taxi. Otherwise, performing these duties during taxi can have significant safety implications.

(4) Prior to entering or crossing any runway, the pilot must be positive that ATC has cleared them to enter or cross the runway. Pilots should scan the full length of the runway and also scan for aircraft on final approach. If there is any confusion about the scan results, the pilot should stop and ask ATC to clarify the situation.

(5) When approaching an entrance to a runway, pilot(s) will ensure compliance with hold short or crossing clearance. Furthermore, bring the aircraft to a complete stop, or be in a phase of taxiing that has no risk of causing a runway incursion, before continuing with operational duties and checklists.

CAUTION: Exercise increased awareness when taxing in between active parallel runways.

(6) Be especially vigilant if another aircraft that has a similar call sign is on frequency. Care should be taken to avoid inadvertently executing a clearance or instruction for another aircraft.

(7) If the pilot becomes disoriented, never stop on a runway and initiate communications with ATC to regain orientation.

(8) Pilots should be especially vigilant when instructed to taxi and "Line Up and Wait" (LUAW). Traffic Collision Avoidance Systems (TCAS)/traffic advisory systems (TAS) should be turned on in order to obtain an awareness of any aircraft that may be landing on their runway. When taxiing onto a runway either at the end of the runway or at an intersection, scan the full length of the runway and scan for aircraft on final approach or landing rollout.

NOTE: ATC should be contacted any time there is a concern about a potential conflict.

(9) If a pilot has been instructed to LUAW without being advised of the reason/condition (wake turbulence, traffic on intersecting runway, etc.) or the reason/condition is not clearly visible (e.g., another aircraft has landed or is taking off on the same runway), the pilot should expect a communication from ATC within 90 seconds. If the pilot does not receive a communication from ATC within 90 seconds of the LUAW clearance, the pilot should initiate communication with ATC. Pilots should be especially vigilant when instructed to LUAW, particularly at night or during periods of reduced visibility.

NOTE: If radio communications are unusually quiet, suspect radio problems/stuck microphone, contact ATC and look for light gun signals.

(10) Pilots should use caution after landing on a runway that intersects another runway, or on a runway where the exit taxiway is in close proximity to another runway's hold short line.

(11) After landing, ensure that the entire aircraft, including the tail section, has crossed over the respective landing runway's hold short line. This will ensure that the entire aircraft is clear of the respective runway safety area. If you are constrained from clearing the landing runway by an adjacent parallel runway hold short line, stop and immediately advise ATC.

(12) After landing at a non-towered airport, or at an airport where the control tower is closed, remember that not all aircraft are radio-equipped; therefore, before entering or crossing a runway, listen on the appropriate frequency (common traffic advisory frequency (CTAF)) for inbound aircraft information. Scan the full length of the runway, including the final approach and departure paths of the runway(s) you intend to enter or cross.

(13) After landing, nonessential communications and nonessential pilot actions should not be initiated until clear of all runways (e.g., changing radio frequencies and repositioning flaps, and trim).

(14) During landing, do not accept last-minute ATC turnoff instructions unless you clearly understand the instructions and are certain that you can safely comply.

e. Use of Written Taxi Instructions. At many airports, taxi clearance can be very complex. The instruction can involve numerous turns, as well as intermediate hold short lines of other runways. Written taxi instructions can be used as a reference for reading back the instructions to ATC and as a means of confirming the taxi route and any restrictions during the airport surface taxi operation. This will mitigate any misunderstanding or forgetting of any part of the taxi clearance, which can lead to a runway incursion.

(1) While written taxi instructions are a good operating technique, common sense and flexibility should be used in determining the need for them at a specific airport. For example, if the departure runway is very near the aircraft parking location, or if the taxi route has been used numerous times, it may only be necessary to record the basic elements of the taxi clearance. However, when the taxi instructions are complex or the pilot is unfamiliar with the airport layout, a detailed transcription of all instructions is desirable. Additionally, individual pilots may choose to develop a set of symbols and shorthand notations which allow them to clearly record and later recall key items in the taxi instructions. As a technique, some pilots enter taxi instructions into the flight management computer (FMC) scratchpad.

(2) Examples include:

- The ATC clearance is: N123 taxi 9R via Bravo, Echo, Juliet, Hold Short 4L at Echo;
- The ATC clearance written: 9R B E J (4L) E. Where the clearance limit of 4L at Echo is circled;
- The ATC clearance entered into a FMC or other database scratchpad: 9R BEJ/4L E;
- Where the forward slash /, which represents the Hold Short line, proceed to the clearance limit of 4L at Echo;
- Symbols: Hold Short: (/), Cross (X);

- Then from the airport diagram, on a taxiway to make a left turn ( ), right turn ( ).

f. ATC/Pilot Communication. Radio communication is the primary method for pilots and ATC to communicate. The safety and efficiency of taxi operations at airports with operating control towers depends on this "communication loop." Controllers use standard phraseology and require readbacks and other responses from the pilot in order to verify that the clearance is understood. It is the pilot's responsibility to advise ATC when they do not understand an ATC clearance. Pilots should respond by using standard phraseology and include the aircraft's complete call sign or registration number. Regulatory requirements, the AIM, approved flight training programs, and operational manuals provide information for pilots on standard ATC phraseology and communications requirements. The following are elements for clear communications. Pilots should:

(1) Use standard ATC phraseology at all times in order to facilitate clear and concise ATC/flightcrew communications. Be aware of the need for complete understanding of accents, terminology, and ICAO procedures while operating at foreign airports.

(2) When making initial contact with any tower or ground controller, regardless of whether you previously stated your position to the previous controller, state who you are (make and registration number), where you are on the airport, what you want, and what you know. An example is: Cessna N1234, at SeaBreeze FBO, VFR to taxi, with information Alpha.

(3) Focus on the ATC clearance. Pilots should not perform any nonessential tasks while communicating with ATC. Given that many runway incursions occur even after the pilot reads back the "hold short" instruction, pilots should develop a technique to remind themselves to "hold short" of a hold line. For example, place something on an instrument knob or on top of the instrument panel, or hang it on the magnetic compass or the control yoke.

(4) Pilots are required to read back all clearances. Ensure that you include the complete call sign and runway designator when reading back a clearance to enter a specific runway, hold short of a runway, or taxi to LUAW. Avoid using "Roger" or "Wilco" in these instances.

(5) Pilots must actively monitor the assigned tower frequency or CTAF for potential conflicts involving their runway, or a crossing runway, when holding in position for takeoff and when on final approach. If not in use for a higher priority communication, the additional radio, if equipped, should be set to monitor guard frequency as a backup to stuck microphone or lost communications.

(6) Read back all takeoff and landing clearances, including the aircraft call sign and the runway designator, and, as applicable, state the intersection of the takeoff.

g. Taxiing. This paragraph suggests good operating practices regarding cockpit activities during taxi.

(1) Prior to taxiing, a current copy of the airport diagram should be available for use by the pilot. Review the taxi route and identify all airport-designated hot spots that are in or near the taxi route. The aircraft's compass or heading display is an excellent tool, as a supplement to

visual orientation, or for confirming correct taxiway or runway alignment. It should be referred to as frequently as necessary, but especially at complex intersections and where the departure ends of two runways are close to one another.

(2) Pilots should complete all aircraft pretaxi checklist items and navigation data entry prior to taxi. So as not to distract from maintaining outside taxi vigilance, limit or eliminate all non-ATC communications. When approaching an entrance to a runway, pilots must be clear as to their clearance to either hold short of, cross, or enter the runway. If there is any doubt, the pilot should verify their clearance with ATC.

(3) When taxiing on an airport with a control tower, pilots must remember that the tower may lose communication capability at any time. To ensure you will not miss any tower communications, pilots should monitor guard frequency (if able) and scan the tower when taxiing or on a runway with a LUAW clearance.

(4) Low visibility conditions increase the risk of a runway incursion. During low visibility conditions, all resources available should be used during taxi. Resources include the airport diagram, the heading indicators, and airport signs, markings, and lighting. These resources help keep the aircraft on its assigned taxi route, and not crossing any runway hold lines without clearance. Therefore, it is extremely important that pilots perform all heads-down tasks (e.g., programming the FMS and calculating takeoff data) while the aircraft is stopped so they can maintain outside vigilance and SA.

(5) Any time the pilot is uncertain of their location on the airport or during taxi, do not stop on a runway. Stop the aircraft and immediately advise ATC, and, if necessary, request progressive taxi instructions. Remember that runways have white, segmented center lines, whereas taxiways have continuous, yellow center lines.

(6) When cleared to take off or cross a runway, or when exiting a runway, do so in a timely manner. Never exit the landing runway onto another runway without ATC clearance. ATC should also be informed of any anticipated delay for takeoff or of exiting a runway.

(7) Some cockpit displays of traffic information, (TCAS, Traffic Information System (TIS)) have the capability to display traffic behind the aircraft. When pilots are in LUAW, and waiting for takeoff clearance, these systems should be turned on to increase the pilot's awareness of landing traffic.

h. Use of Exterior Aircraft Lights to Make Aircraft More Conspicuous.

(1) General. Exterior aircraft lights may be used to make an aircraft operating on the airport surface more conspicuous. Pilots may use various combinations of exterior lights to convey their location and intent to other pilots. Certain exterior lights may also be used in various combinations to signal whether the aircraft is on a taxiway or on a runway, in position on the runway but holding for takeoff clearance, crossing an active runway, or moving down the runway for takeoff.

NOTE: Because adherence to the guidelines in this AC are voluntary and aircraft equipment varies, pilots are cautioned not to rely solely on the status

of an aircraft's lights to determine the intentions of the pilot(s) of the other aircraft. Additionally, pilots must remember to comply with operating limitations on the aircraft's lighting systems.

(2) Exterior Lights. To the extent possible and consistent with aircraft equipage, operating limitations, and pilot procedures, pilots should illuminate exterior lights as follows:

(a) Engines Running. Turn on the rotating beacon whenever an engine is running.

(b) Taxiing. Prior to commencing taxi, turn on navigation, position, anti-collision, and logo lights, if available. To signal intent to other pilots, consider turning on the taxi light when the aircraft is moving or intending to move on the ground, and turning it off when stopped or yielding or as a consideration to other pilots or ground personnel. Strobe lights should not be illuminated during taxi if they will adversely affect the vision of other pilots or ground personnel.

(c) Crossing a Runway. All exterior lights should be illuminated when crossing a runway.

CAUTION: Pilots should consider any adverse effects to safety that illuminating the forward-facing lights will have on the vision of other pilots or ground personnel during runway crossings.

(d) Entering the Departure Runway for Takeoff or LUAW. When entering a runway, either for takeoff or when taxiing into LUAW pilots should make their aircraft more conspicuous to aircraft on final behind them and to ATC by turning on all lights *except for landing lights* that highlight the aircraft's silhouette. Strobe lights should not be illuminated if they will adversely affect the vision of other pilots.

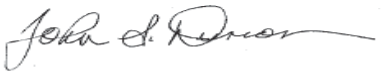
(e) At Night, and When Cleared to LUAW. Consider lining up slightly (approximately 3 feet) to the left or right of the centerline (CL) to enable a landing aircraft to visually differentiate your aircraft from the runway lights.

(f)Takeoff. Landing lights should be turned on when takeoff clearance is received, or when commencing takeoff roll at an airport without an operating control tower.

8. SUMMARY. Taxi operations require planning, SA, written taxi instructions, Crew Resource Management (CRM), ATC communications, taxiing, and use of exterior lighting. Safe aircraft operations can be accomplished and incidents eliminated if flightcrews are properly trained and correctly accomplish standard taxi operating procedures and practices as stated in this AC.

9. APPENDICES TO THIS AC. Appendix 1 of this AC contains SOP items and Best Practices that are very similar to SOPs/Best Practices currently in use in the air carrier segment of the industry, and has been modified for single-pilot operations. Appendix 2 contains briefing information that should be adopted into the operator's checklists or existing briefing material. Appendix 3 contains a sample outline for flight schools briefings, Best Practices, and SOP procedures to avoid students causing runway incursions. These appendices are not mandatory. SOPs may vary among aircraft and operators and may change over time. Operators and individuals may use the information contained in the appendices to integrate the basic tenets into

their aircraft-specific, route-specific, and equipment-specific operations and checklists. They are shown to denote how the SOPs and Best Practices can be integrated into the context of specific flight operations.



for
John M. Allen
Director, Flight Standards Service

APPENDIX 1. AIRPORT SURFACE OPERATIONS AT NON-TOWERED AIRPORTS AND AIRPORTS WHEN THE TOWER IS CLOSED

Runway Incursion Avoidance Standard Operating Procedures (SOP) Items

NOTE: For more information about operations at non-towered airports, refer to the current versions of Advisory Circular (AC) 90-42, Traffic Advisory Practices at Airports without Operating Control Towers and AC 90-66, Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports without Operating Control Towers.

1. General. The following procedures are in addition to those that are applicable at towered airports. The absence of an operating airport traffic control tower (ATCT) creates a need for increased vigilance on the part of the pilot. There are also specific communications procedures that differ from those used at airports with control towers. Planning, clear communications, and enhanced SA during airport surface operations will reduce the potential for surface incidents at airports without an operating control tower. This appendix focuses on those aspects of taxi operations that are unique to airports without an operating control tower and will not be repeated in such detail as the information covered in other sections of this AC.

2. Planning.

a. Planning taxi operations at an airport without an operating control tower is similar to planning taxi operations at an airport with an operating tower. However, flightcrews must remember that some airports have part-time operational control towers. When planning to fly into or out of such an airport, flightcrews must be absolutely certain of the tower's operational status before conducting any operations. If the status is in doubt, they should attempt contact on the tower's frequency.

b. In addition to the information provided for operations at airports with an operating control tower, pilots should consider doing the following when operating at an airport without an operating control tower:

(1) Familiarize themselves with the local traffic pattern direction and check their specific pattern altitude. During calm wind conditions, be aware that flight operations may occur at more than one runway at the airport.

(2) Aircraft may be using an instrument approach procedure (IAP) to runways other than the runway in use for visual flight rules (VFR) operations. The instrument approach runway may intersect the VFR runway. It is also possible that an instrument arrival may be made to the opposite end of the runway from which a takeoff is being made.

(3) Be sure that the taxi plan is understood.

(4) Be alert, communicate your intentions on the common traffic advisory frequency (CTAF), and listen for other aircraft operating on, to, and from the airport.

3. Situational Awareness (SA). While maintaining SA is important in all circumstances, it is particularly important when operating at an airport without an operating control tower. To achieve SA, the pilot(s) should be fully aware of their intended taxi route and be able to follow the planned route correctly. Without air traffic control (ATC) to verbally assist or tell the pilot(s) where and when to stop, the pilot(s) must rely on visual cues to maintain SA and maintain the planned taxi route. These visual cues include airport signs, hold short lines, other airport markings, and lighting, together with the airport diagram. These particular cues are especially useful during periods of poor visibility and at night.

4. Communication and Aeronautical Data.

a. Communication rules and guidelines and aeronautical data for operations at airports without an operating control tower differ from those applicable at towered airports. Various regulations, the Aeronautical Information Manual (AIM), approved pilot training programs, and operational procedure manuals provide information to the pilot on standard phraseology, communication, and data requirements.

b. Pilots verify that:

(1) Current aeronautical data for the airport is obtained, including the operating hours and status of the control tower.

(2) They have the appropriate airport communication frequency, referred to as the CTAF. Pilots should be especially vigilant when flying into an airport with a closed tower as these airports typically have differing CTAFs and Aeronautical Advisory Station (UNICOM) frequencies.

> **NOTE: Pilots of departing aircraft should monitor/communicate on the appropriate frequency from engine start, during taxi, and until 10 miles from the airport unless appropriate regulations, local procedures, or operations specifications (OpSpecs) require otherwise, or until they contact ATC and begin VFR advisories for their enroute flight to their destination.**

5. Taking the Runway. Pilots should:

- Not line up on the departure runway and hold any longer than absolutely necessary.
- Always state the name of the airport at the beginning and end of the radio transmission.

> **CAUTION: Some aircraft operating at airports without operating control towers may not be equipped with a radio. Be alert for them.**

APPENDIX 2. PILOT BRIEFING CARD

In accordance with sections within this advisory circular (AC), the following is a sample pilot briefing card to be incorporated as a standard operating procedure (SOP), and to be used with the Aircraft Flight Manual (AFM)/pilot's operating handbook (POH) checklist.

Preflight Briefing

Airport Notices to Airmen (NOTAMs): Airport Instrument approaches - Closed taxiways and/or runways.
• Noise abatement procedures.
• Engine failure during takeoff procedures.
• Significant terrain/obstacles in terminal area relative to departure routing.
• Significant weather conditions
— Any other known risks and intentions.
— Takeoff performance for runways, obstacle clearances, minimum climb gradients, etc.

Pretaxi Briefing

—Taking off at a Non-Tower or Towered Airport. Non-tower: increase awareness for other traffic landing or taking off
— Air traffic control (ATC) taxi clearance (if applicable).
— Taxi route/hot spots.
— Standard Instrument Departure (SID) or instrument flight rules (IFR) departure.
— Initial
• Heading.
• Altitude.
• Fix or route segment.
— Any applicable special considerations such as minimum equipment list (MEL) item(s).

Approach Briefing

— Airport NOTAMS:
— Closed runways and/or taxiways.
— Noise abatement procedures.
— Engine failure during missed approach.
— Significant terrain or obstacles in the terminal area relative to approach routing.
— Highest minimum safe/sector altitude (MSA).
— Significant weather conditions.
— Land-and-hold-short operations (LAHSO).
— Aircraft systems status that may affect approach and landing capabilities.
— Maintain awareness for other traffic landing or taking off.
Heightened awareness for operations at non-towered airports.
— Obtain airport weather and landing information.
— Identify the landing runway.
— Electronic/visual means to identify runway.
— Planned runway turnoff and taxi route/hot spots.
— Landing performance.
— Autobrakes setting.
— Landing flaps setting.
— Instrument Approach name and runway.
— Required visibility.
— Approach chart date.
— Primary Navigational Aid (NAVAID) frequency.
— Final approach course.
— Final approach verification altitude.
— Design approval holder DA(H), alert height (AH) or design documentation aid (DDA)/missed approach point (MAP).
— Touchdown zone elevation (TDZE).
— Missed approach procedure.

— **Any other known risks and intentions.**

APPENDIX 3. AIRPORT SURFACE OPERATIONS FOR FLIGHT SCHOOLS AND INSTRUCTORS

In addition to the other sections of this advisory circular (AC), a result of the Federal Aviation Administration (FAA)'s interaction with flight schools, the following Best Practices were developed.

1. During briefings, a specific safety topic and talking points should be delivered to all staff and students. These topics are specific enough to ensure a meaningful discussion that covers a wide range of safety issues, including, but not limited to, proper/safe operation of aircraft systems, runway safety and vigilance, and individual/personal safety measures.

2. Instructors should be advised to limit cockpit instruction during critical phases of flight, particularly during taxiing, to mitigate the risks of a runway incursion or other surface incident. Placards should be developed and mounted on the panel of each aircraft to remind instructors of this action.

3. The flight school's safety officer, chief pilot, and chief executive officer (CEO) should attend monthly safety meetings facilitated by their respective airport personnel. These meetings are usually conducted monthly and attended by the airport organizations. The items discussed at these meetings should be disseminated to all company personnel.

4. Flight school certificated flight instructors (CFI) are required to participate in monthly recurrent training to include the completion of an online runway safety course. The runway safety course should be integrated into the school's CFI standardization syllabus. Students are also required to participate in this training, as part of initial Ground School training, and must complete it before their first solo.

5. Tower visits should be incorporated into the standardization syllabus for all new CFIs, and discuss runway incursion avoidance procedures with ATC personnel.

6. Flight schools should develop a letter of authorization (LOA) with their respective airport control tower, and establish a flight school call sign format by requiring the enunciating all numbers in the call sign (e.g., "Flight School Name three-one-six" and not "Flight School Name three sixteen").

7. Flight schools should look into marking/painting their aircraft in a high visibility accent paint scheme and assign those aircraft to solo operations, and they should look into student pilots announcing to the tower "Student Pilot," then the remainder of their flight school's call sign.

8. Flight school launch and recovery times should be managed to occur during reduced airport operation times. The scheduling of flights during low airport activity times can significantly reduce runway and pattern congestion, reduce the load on the tower controllers, and potentially provide more service to the student pilots and CFIs.

9. Instruct students that, at airports with control towers, there may be a loss of communication, or an aircraft may experience a "stuck microphone," which can block all aircraft/tower

communications. Therefore, pilots should scan the tower as they taxi, after being given a LUAW clearance, and on the runway while waiting for takeoff clearance, the pilot should expect a communication from ATC within 90 seconds. If the pilot does not receive a communication from ATC within 90 seconds of the LUAW clearance, the pilot should query ATC, and scan for "Light Gun Signals" to ensure that they do not miss any tower alerts.

10. Instruct students that on final approach, if they have not received landing clearance, to ask the tower, "Flight School call sign, am I cleared to land?" and, if there is no response, to execute a go-around.