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**INTERIM GUIDANCE
FOR
UNMANNED AIRCRAFT SYSTEMS (UAS) FACILITIES and
OPERATIONS IN AND AROUND ARMY AIRFIELDS (AAF)
IN THE NATIONAL AIRSPACE SYSTEM (NAS)**

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TABLE OF CONTENTS

1	Introduction
2	Request for FAA Certificate of Authorization (COA)
3	Takeoff and Landing Criteria
4	ATC Procedures
5	Weather Requirements
6	Lighting
7	Letter Of Agreement (LOA)
8	Arm/Disarm Pads
9	Facility Requirements
10	Operational Restrictions
11	Notification Requirements

Appendix A (Example Shadow COA)

Appendix B (Example Facility Requirements) (Shadow Only)

SUBJECT: INTERIM GUIDANCE FOR UNMANNED AIRCRAFT SYSTEMS (UAS) FACILITIES and OPERATIONS IN AND AROUND ARMY AIRFIELDS (AAF) IN THE NATIONAL AIRSPACE SYSTEM (NAS)

1. Introduction

This document contains interim guidance and criteria for UAS operations not covered in current ARs, FMs and Unified Facility Criteria (UFC). This applies to the active Army, Army National Guard and Army Reserve. This document will remain in effect until superseded.

2. Request for FAA Certificate of Authorization (COA)

a. UAS operations (in the NAS) outside of restricted airspace or warning areas require an FAA approved COA. (See Appendix A)

b. Requests for COAs will:

(1) Be submitted to the Department of the Army Regional Representative (DARR) office by the responsible brigade/garrison commander or higher 60 days prior to requested commencement of UAS operations.

(2) Contain the following information (see Appendix A example):

(a) Dates/Times of mission(s).

(b) Detailed description (altitudes, lat/longs, etc) of the intended flight operation including the classification of the airspace (A,B,C,D,E,G) to be utilized. Include an appropriate scaled map with the area of operations depicted.

(c) UAS Physical Characteristics/Capabilities: Explain how the aircraft launches and recovers. Complete the following table (Add additional characteristics/capabilities as appropriate):

CHARACTERISTICS	
Wing Span/Rotor Diam.	
Weight	
Range	
Airspeed	
Altitude	
Endurance	
Climb rate	
CAPABILITIES	
Primary Payload(s)	
Launch/Recovery	
Transponder	
Armed/Unarmed	

SUBJECT: INTERIM GUIDANCE FOR UNMANNED AIRCRAFT SYSTEMS (UAS) FACILITIES and OPERATIONS IN AND AROUND ARMY AIRFIELDS (AAF) IN THE NATIONAL AIRSPACE SYSTEM (NAS)

(d) Airworthiness Certification - Airworthiness Release (AWR)/ Airworthiness Qualification (AWQ) from Aviation Engineering Directorate (AED), AMCOM is required.

(e) Equivalent Level of Safety (ELOS) provisions for “seeing and avoiding” (14 Code of Federal Regulations (CFR) 91.113) other airspace users for flights below 18,000 feet MSL. This includes qualifications and procedures of chase plane, ground and radar observers. The FAA has determined that use of radar alone is not sufficient to achieve an equivalent level of safety to mitigate the “see and avoid” regulations.

(f) Detailed communications procedures - Observer to pilot/operator, ATC to pilot/operator, etc.

(g) Dropping Objects/Hazardous Materials outside of active restricted/warning areas. If Unmanned Aircraft (UA) intended use includes the dropping or spraying of aircraft stores, the application must specifically address this hazard and make a clear case that injury to persons on the ground is very unlikely. A similar case must be made for hazardous materials carried aboard the UA.

(h) Lost Link Procedures: The UAS must provide a means of automatic autonomous recovery in the event of lost link. There are many acceptable approaches to satisfy this requirement. The intent is to ensure airborne operations are predictable in the event of lost link.

(i) Flight over Congested or Populated Areas: If flight over congested areas, heavily trafficked roads, or an open-air assembly of persons is required by the mission, the applicant must provide information that clearly establishes that the risk of injury to persons on the ground is highly unlikely.

3. Takeoff and Landing Criteria

a. Introduction

The following guidance provides arrival and departure criteria for operating UA at Army facilities. Guidance for joint military-civilian use airfields will be issued at a later date.

SUBJECT: INTERIM GUIDANCE FOR UNMANNED AIRCRAFT SYSTEMS (UAS) FACILITIES and OPERATIONS IN AND AROUND ARMY AIRFIELDS (AAF) IN THE NATIONAL AIRSPACE SYSTEM (NAS)

b. Criteria

(1) UAS surface and clearance requirements:

Wing Span	Landing/Takeoff Surface (feet)	Lateral Clearance (feet)	Clearzone (feet)
Wing Span < 20 ft	400x40 *	150 from landing/takeoff centerline **	150**
Wing Span 20 to 30 ft	2000x60 *	150 from landing/takeoff centerline **	200**
Wing Span > 30 ft and < 60 ft	5000x100 *	500 from landing/takeoff centerline **	500**
Wing spans 60 ft and greater	TBDx150 *	500 from landing/takeoff centerline**	1000**

*** Note 1: Garrison commanders may waive landing/takeoffs surface criteria after a risk assessment and when lesser criteria is specified in the manufacturers or appropriate military operations manual.**

****Note 2: Include fixed or mobile objects. Lateral Clearance criteria is not waivable.**

(2) Minimum pavement classification number has to support the heaviest equipment/aircraft that will operate on it.

(3) Standard approach angle: 3° (318' per nautical mile)

(4) Departure: Minimum required climb rate is 200' per nautical mile.

(5) Approach speed: Treat UA as CAT A aircraft.

(6) Traffic pattern: Do not mix UA and manned aircraft. A manned aircraft may follow an unmanned aircraft on final, if authorized in a LOA with the ATC facility exercising jurisdiction.

(7) A comprehensive LOA is required between the unit commander, airfield commander/manager and affected ATC facility chief. Coordinate LOA with the appropriate DARR.

4. ATC Procedures

a. ATC Separation and Phraseology

(1) Treat UA as CAT A aircraft.

SUBJECT: INTERIM GUIDANCE FOR UNMANNED AIRCRAFT SYSTEMS (UAS) FACILITIES and OPERATIONS IN AND AROUND ARMY AIRFIELDS (AAF) IN THE NATIONAL AIRSPACE SYSTEM (NAS)

(2) US Army Radar Approach Control (ARAC) facilities will apply CAT A separation standards (IAW FAA Order 7110.65) to UAS operations outside of FAA established active restricted areas.

(3) The restricted area Using Agency (as identified in FAA Order 7400.8) will establish separation criteria to ensure safe operations within their restricted areas.

(4) US Army ATC facilities will utilize standard phraseology IAW FAA Order 7110.65 (taxi to, cleared for takeoff, cleared to land, etc) for communications between ATC and UAS pilot/operators. Establishment of non-standard phraseology is not authorized.

b. Chase Plane/Ground/Radar Observers (when required by COA)

(1) Unit commanders will establish an SOP detailing observer training and certification requirements. Training must include the rules and responsibilities in 14 CFR 91.111 (Operating Near other Aircraft) and 14 CFR 91.113 (Right-of-Way Rules). Refer to AR 95-23 for additional non-crewmember guidance.

(2) Unit commander certified observers will provide traffic information to the UAS pilot/operator using standard clock directions, distance, and direction of flight (“Traffic one o’clock, two miles, northbound”). The UAS pilot/operator is responsible for adjusting UA route of flight to avoid other air traffic.

(3) Chase aircraft pilots are not authorized to concurrently perform observer or UAS pilot duties. To the extent possible, consistent with safety, the chase aircraft should be operated within one mile laterally and 3000 feet vertically from the UA. Observers onboard a chase aircraft must keep visual contact with the UA at all times. Observers will not perform UAS pilot duties.

(4) Ground observer duties require continuous visual contact with the UA at all times. Use of binoculars, or telephoto television as an observation aid is authorized. Visual observers will conduct their duties within one mile laterally or 3000 feet vertically from the UA.

(5) Radar observers must be qualified ATC personnel dedicated to monitoring a single UA. Radar observers may not perform other ATC services simultaneously. As a minimum, primary radar returns must be enabled. Secondary radar may be used in addition to primary radar, but not as a sole source of radar observing. UAS operations must be in compliance with the approved COA.

Note: Chase plane/ground/radar observer duties within active restricted/warning areas are as specified by the Using Agency.

SUBJECT: INTERIM GUIDANCE FOR UNMANNED AIRCRAFT SYSTEMS (UAS) FACILITIES and OPERATIONS IN AND AROUND ARMY AIRFIELDS (AAF) IN THE NATIONAL AIRSPACE SYSTEM (NAS)

c. Approaches

UAS operations require a pre-coordinated missed approach procedure established in the LOA (See para 3b(7) and IAW an approved COA. LOA will cover lost link and/or loss of visual contact procedures.

5. Weather Requirements

a. VFR

(1) Must be forecast VFR for entire route of flight at takeoff through 1 hour after landing.

(2) Flight visibility of 3 miles, cloud clearance requirements 500' below, 1000' above, 2,000' horizontal.

b. IFR (TBA)

6. Lighting

a. Position lights will be illuminated IAW 14 CFR 91.209(a)(1) and (2) as well as Mil-L-6503 standards.

b. UAS anticollision lights will be on when aircraft engine/engines are operating.

7. Letter Of Agreement (LOA)

Prepare and maintain LOAs IAW AR 95-2, FM 3-04.303 and AR 25-50.

8. Arm/Disarm Pads

Arm/Disarm pads will be constructed and maintained IAW UFC 3-260-01.

9. Facility Requirements

Facility requirements/specifications in appendix B are for Shadow only. For all other UAS facility requirements, contact PM UAS. United States Army Corps of Engineers (USACE) is responsible for establishing facility specifications.

SUBJECT: INTERIM GUIDANCE FOR UNMANNED AIRCRAFT SYSTEMS (UAS) FACILITIES and OPERATIONS IN AND AROUND ARMY AIRFIELDS (AAF) IN THE NATIONAL AIRSPACE SYSTEM (NAS)

10. Operational Restrictions

- a. VFR-on Top, VFR-over-the-Top and Special VFR operations are not authorized in the NAS.
- b. Simulated engine failures are only authorized in active restricted/warning areas.
- c. Military Authority Assumes Responsibility for Separation of Aircraft (MARSA) operations are not authorized in the NAS.

11. Notification Requirements

- a. All UAS accidents or incidents that occur in the NAS will be reported as soon as possible to the DARR of the region in which the accident or incident took place and to the Commander, US Army Aeronautical Services Agency, Ft Belvoir, VA, via fax (703) 806-4409, DSN 656-4409.
- b. If there is personnel injury or damage to other than Army property, also notify HQDA, ATTN: DAMO-ODO through channels.

SUBJECT: INTERIM GUIDANCE FOR UNMANNED AIRCRAFT SYSTEMS (UAS) FACILITIES and OPERATIONS IN AND AROUND ARMY AIRFIELDS (AAF) IN THE NATIONAL AIRSPACE SYSTEM (NAS)

Appendix A (Example Shadow COA)

MEMORANDUM FOR Department of the Army Regional Representative, XXXX, Address.

SUBJECT: Application for Army Unmanned Aircraft Systems (UAS) Certificate of Authorization

1. Purpose. This application for UAS Certificate of Authorization (COA) is for Unit which will employ the type UAS on the Installation or Location. The aircraft will launch and recover from Location Army Airfield.

2. Effective Date. Enter date.

3. Deactivation Date. Enter date.

4. Detailed description of the intended flight operation including the classification of the airspace to be utilized.

Description of Flight Operations Area: (Attach appropriate map)

Launch and recovery operations for the UAS will be conducted from Location Army Airfield Class D airspace (Attach appropriate map). Flights departing the Location Class D airspace will transition via the depicted corridor (Attach appropriate map) directly to R-XXXX at or below Enter MSL altitude, and at no time will the UAS be outside of the Class D or R-XXXX airspace. Recovery operations terminating at Location will transition from R-XXXX into the Location Class D airspace at or below Enter MSL altitude.

Classification of Airspace:

The classification of the areas to be utilized for UAS operations are as follows; Location Class D airspace surface to Enter MSL altitude.

5. UAS physical characteristics.

RQ-7B SHADOW 200

Launch/Recovery, Navigation Lights and Transponder: Controlled by an automatic takeoff and landing system, it is rail catapult launched and uses a tailhook for rolling arrested recoveries, both within an area of 960' length by 50'. Emergency landings are by use of a parachute. The UA has standard aircraft red and green position lights, a

white anti-collision strobe light arrangement, a remotely programmable Mode 3A/C and Mode 4 (IFF) transponder, and GPS navigation. Standard mission beacon codes for UA operations will be coordinated through _____ Approach Control. Navigation can be preprogrammed autonomous or through direct control by the UAS pilot/operator. Autonomous navigation is for executing preprogrammed missions via GPS waypoints and certain emergency procedures. Recovery and landing is performed autonomously by the Tactical Automated Landing System (TALS), a process similar to an Instrument Landing System (ILS) approach for manned aircraft. A UAS pilot/operator located in the Ground Control Station (GCS) controls the UA, continually monitoring system status, and maneuvers the UA as desired. The downlink data includes a display of health and status parameters such as attitude, magnetic heading, indicated airspeed, GPS position, barometric altitude, rate of climb, engine instrumentation, and warnings and cautions. UA position is displayed onto a high-resolution digital map within the GCS. The primary and backup links have a line of sight operational range. Both links incorporate error detection to ensure that erroneous interference is not processed by the avionics. Two separate up-link frequency bands and a directional antenna are incorporated to minimize communication link issues due to interference.

An assigned Mission Commander maintains oversight for the operation. This system incorporates two GCS with an ability of transferring control from one to the other. For launch/recoveries, an additional UA pilot/operator is located in the Portable GCS for redundancy. Radio contact is continuously maintained with ground observers and with air traffic control (ATC) during missions.

Wing Span	14 feet
Weight	375 lbs
Range	~ 125 km
Airspeed	70 kt loiter, 110 kt dash
Altitude	>15,000 Ft
Endurance	4 Hours @ 50 km
Primary Payload (s)	EO / IR (up to 60 lb)
Launch / Recovery	100m x 50m Area
Climb Rate: 1,500	Feet per Minute (FPM)
Transponder	mode 3 A/C

Lost link/mission abort procedures: In the event of lost link, the UAS is programmed to fly via a predetermined route to a waypoint located at (N 00° 00' 00.0" W 000° 00' 00.0") (**Attach appropriate map**). The waypoint is approximately 3 nautical miles from the GCS, in a remote geographic location where the potential for reacquiring direct control of the UA is enhanced. If re-establishment of link is not accomplished, the UA will remain in loiter until a flight termination command is autonomously executed by the UAS pilot/operator and the parachute is deployed.

Lost link procedures involve a preprogrammed lost link plan for the UA to navigate to and loiter. The UA will return to a predetermined lost link waypoint at or above **Enter MSL altitude**. The predetermined lost link waypoint shall be located in restricted area **R-XXXX**, mitigating collateral damage to property and personnel.

6. Method of pilotage and proposed method to avoid other traffic.

Method of Pilotage: Flights are managed within the GCS via uplink commands. Although most flights are performed by programmed GPS waypoint navigation, the aircraft may be flown manually with heading, altitude, and airspeed commands. This allows for responsive maneuvering if desired by ATC. During pre-flight mission planning, the specific route is programmed within the GCS. Once airborne, the Shadow UA initiates flight along this stored flight plan route unless maneuvering for traffic or mission requirements necessitates a deviation.

Traffic Avoidance:

Traffic Avoidance will be accomplished using restricted airspace, **# of** assigned visual observers (**Attach appropriate map**), as well as U.S Army air traffic controllers equipped with radar being used as a supplement. At no time will the UA be more than one mile laterally or 3,000 feet vertically from an assigned ground observer.

7. Coordination procedures. For all flights the Mission Commander shall notify **Location** Army Airfield Base Operations a minimum of twenty four hours in advance to coordinate and issue a Notice to Airmen (NOTAM). All UAS flights shall file a flight plan with **Location** Base Operations and shall receive a weather briefing. The UA pilot/operator shall file all flight plans using the “_____” call sign.

8. Communications procedures. Mission Commanders shall ensure reliable UHF or VHF communication is established between the UAS pilot/operator, the ground observers and **Location** Tower prior to launch. Additionally, telephonic communications will be established as a backup in case of radio failure. The UAS pilot/operator shall remain in contact with the ground observers and **Location** Tower for the duration of the mission. The UAS pilot/operator shall obtain permission from ATC prior to departing the airfield or re-entering the Class D airspace. UAS flights are not authorized when **Location** Tower is closed.

9. Route and altitude procedures.

UA will fly directly from the **Location** Class D airspace via the depicted route (**Attach appropriate map**) to **R-XXXX** at or below **Enter MSL altitude**. UAS's will operate in **R-XXXX** and **R-XXXX** between **Enter MSL altitude** and **Enter MSL altitude**.

10. Airworthiness Certificate.

See attached Airworthiness Release (AWR).

11. Point of Contact.

The point of contact is **Name** at **000 000-0000** and **email address**.

12. Attachments: **List all.**

Note 1: Modify this example to support your UAS COA request.

Note 2: The FAA has developed an Excel COA spreadsheet with essential information. Attach completed FAA Excel spreadsheet. A copy of the current spreadsheet can be obtained at: http://www.faa.gov/ats/ata/uas_index.htm.

SUBJECT: INTERIM GUIDANCE FOR UNMANNED AIRCRAFT SYSTEMS (UAS) FACILITIES and OPERATIONS IN AND AROUND ARMY AIRFIELDS (AAF) IN THE NATIONAL AIRSPACE SYSTEM (NAS)

Appendix B (Example Facility Requirements) (Shadow Only)

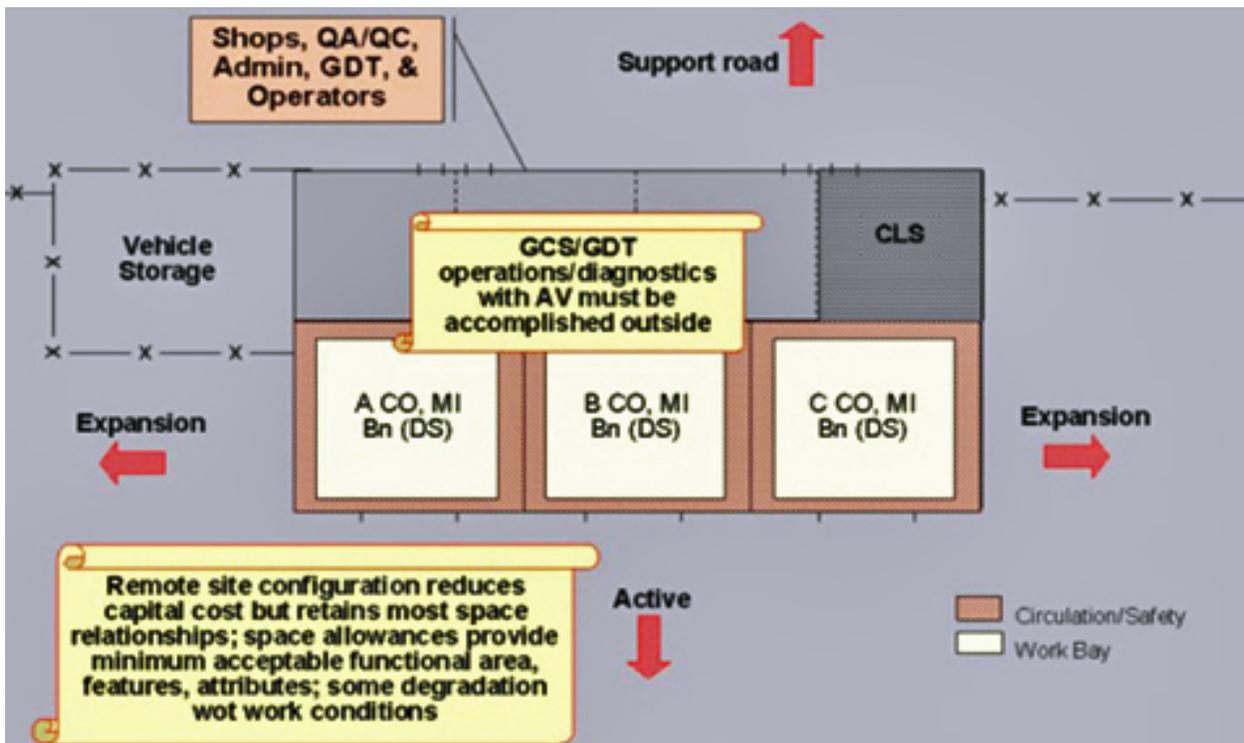


Figure 1: Airfield Shadow Facility

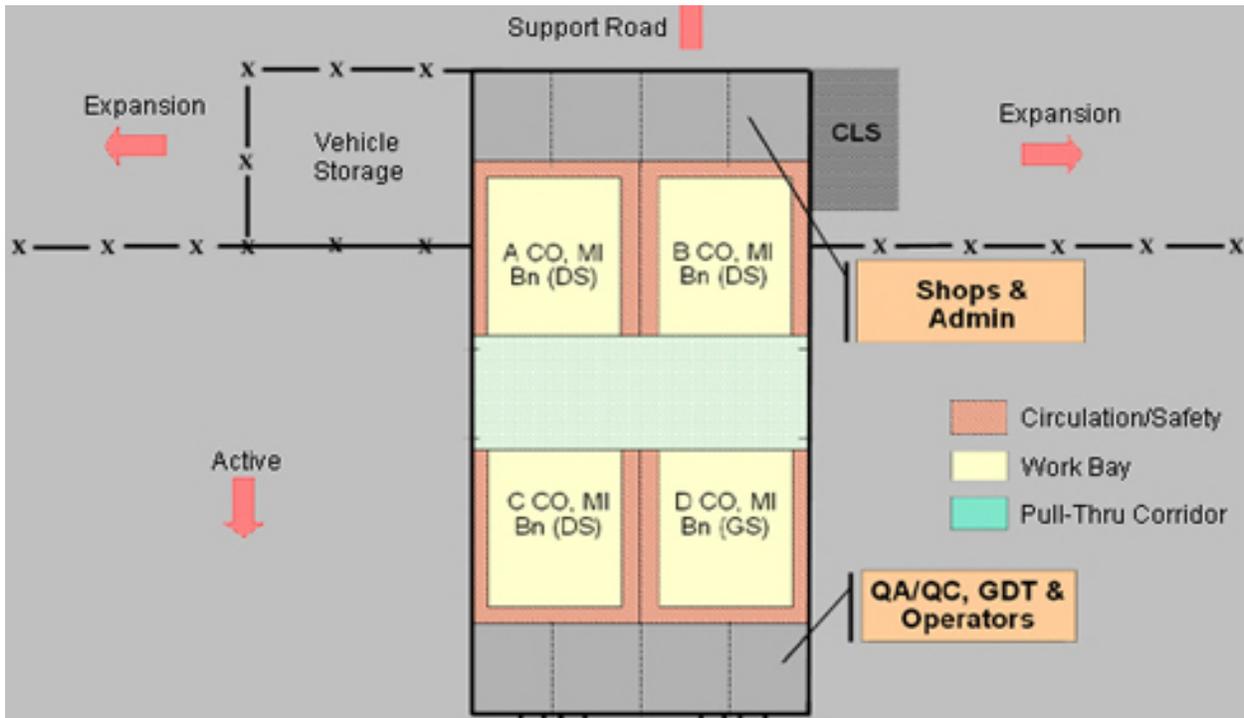


Figure 2: Pull-thru Hanger Layout

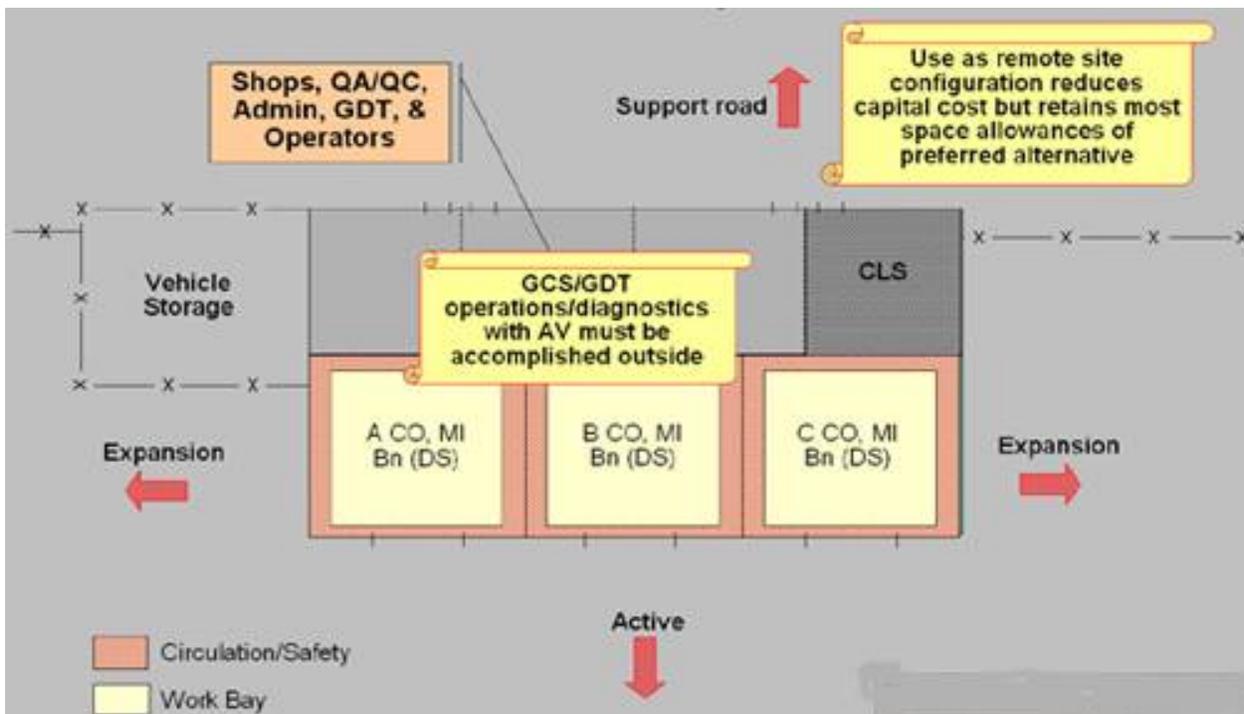


Figure 3: Direct in-out Hanger Layout

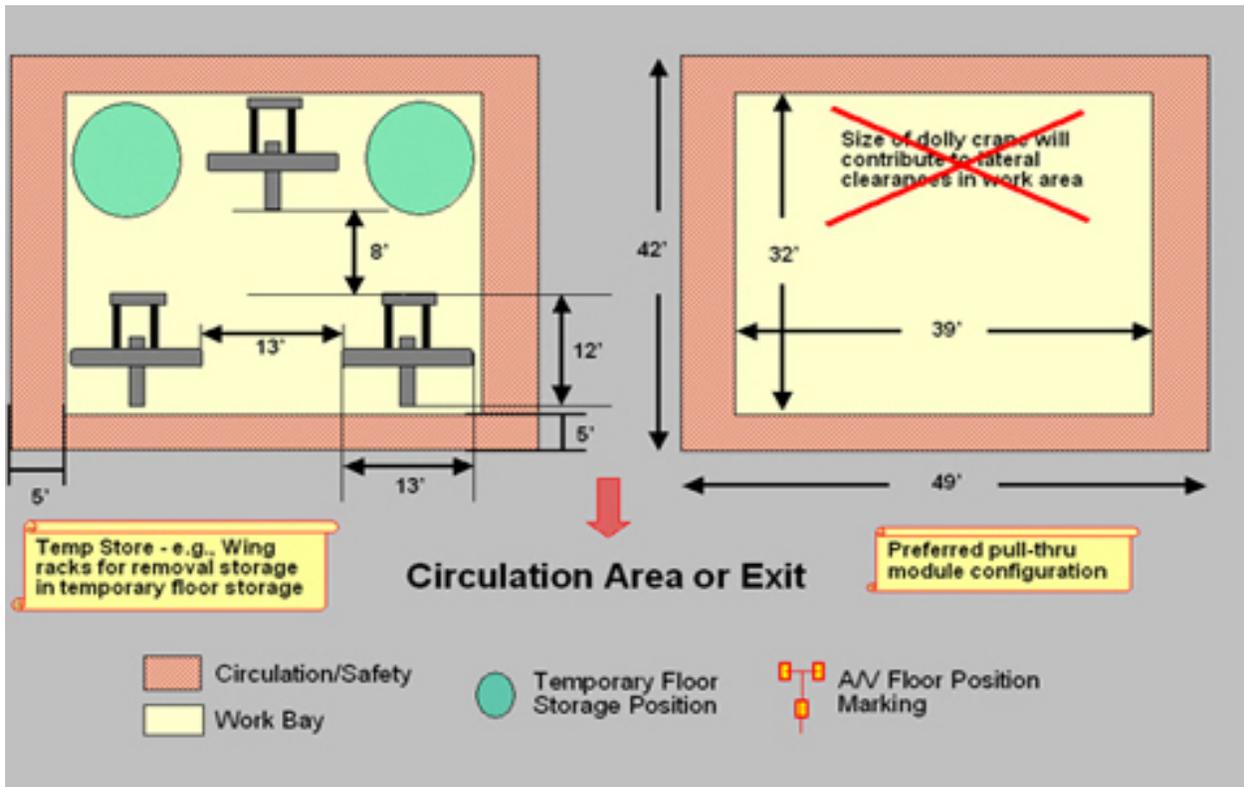


Figure 4: Hanger Bay Layout-OPT 1

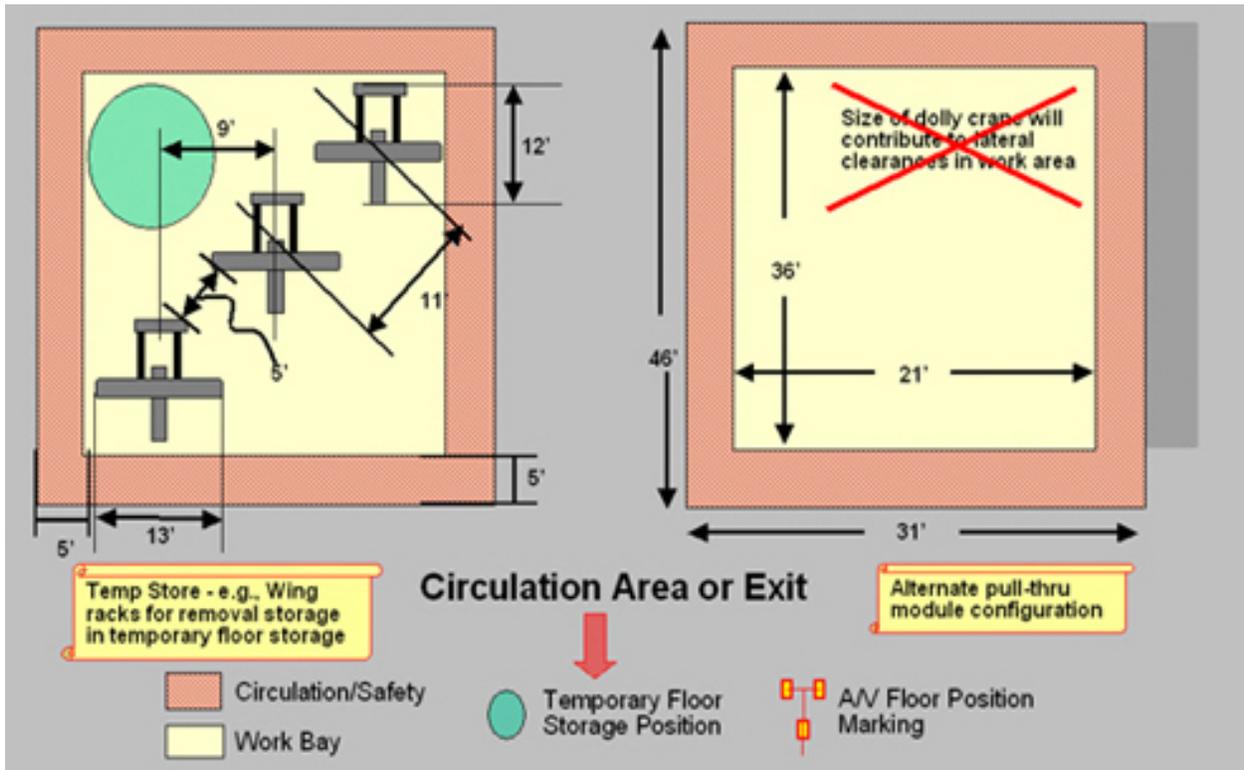


Figure 5: Hanger Bay Layout- OPT 2

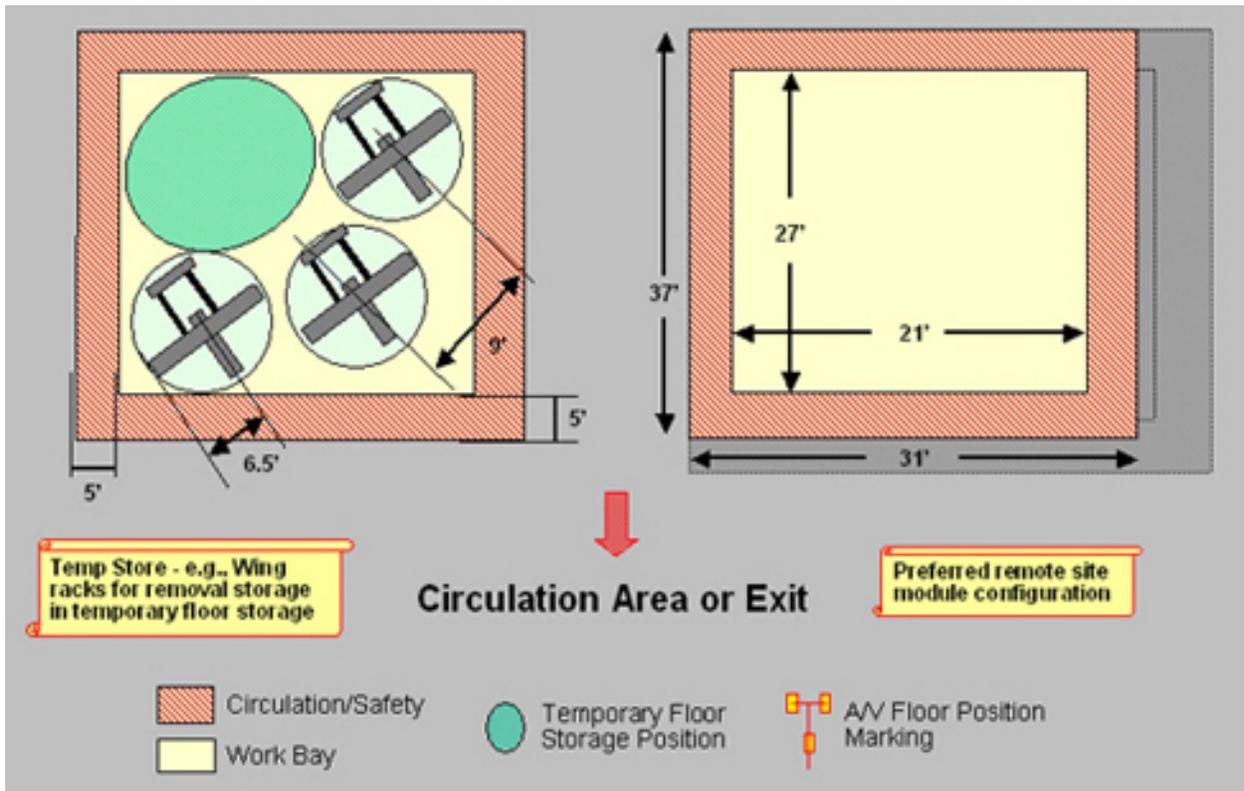


Figure 6: Hanger Bay Layout- OPT 3

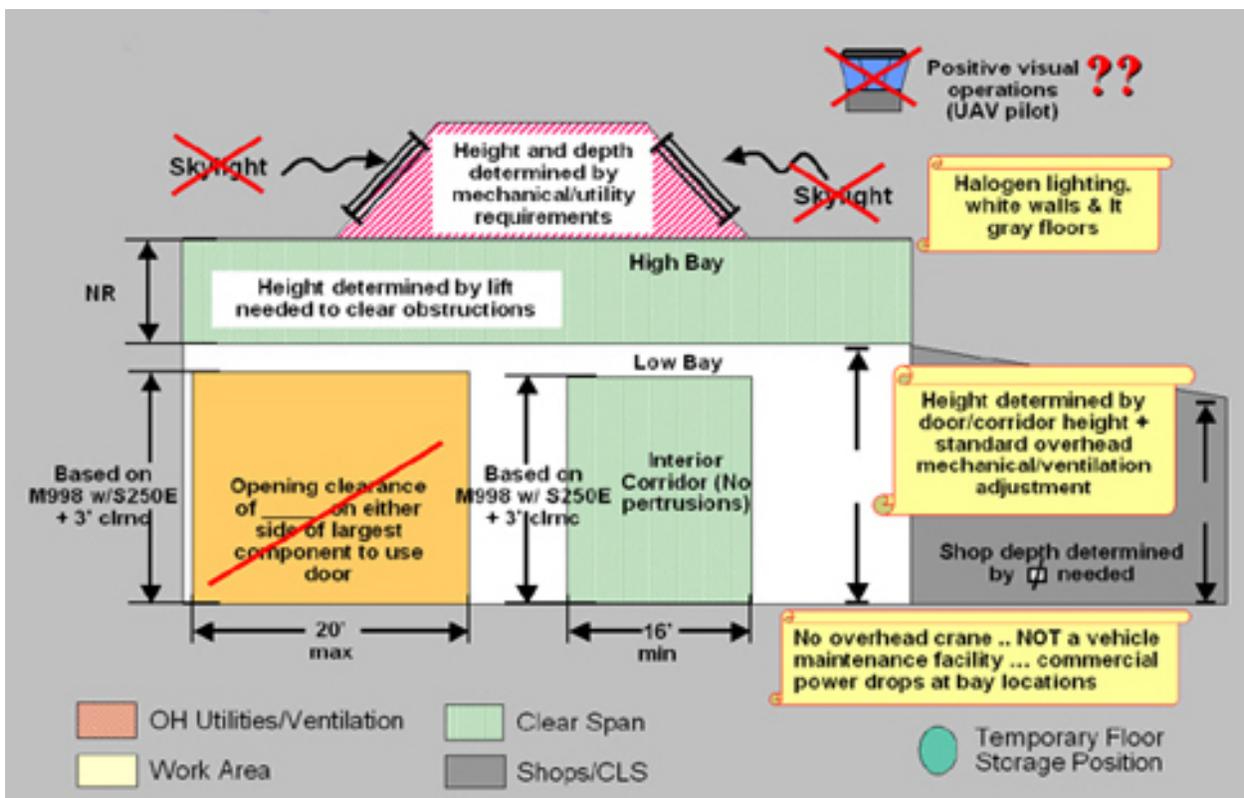


Figure 7: Shadow Hanger Elevations