



FAA ATO

Low Altitude Authorization and Notification Capability (LAANC)

USS Operating Rules

14 December 2018

Version 1.3

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Revision History

Version	Description	Date
1.0	First complete release	6/16/2017
1.1	Major update based on internal and external review	9/18/2017
1.2	Update per prototype evaluation feedback	2/26/2018
1.3	Update following first open onboarding period	12/14/2018

Explanation of Changes

Version 1.3 of the LAANC USS Operating Rules takes effect on January 7, 2019. Version 1.3 replaces Version 1.2, which previously took effect on February 26, 2018. Version 1.3 keeps intact the content and basic framework of the LAANC system and how a USS will interact with the FAA. However, significant changes were made including issuing new rules, deleting existing rules, clarifying common items, and consolidating repeating sections and information. USSs are required to comply with all rule provisions contained in these Operating Rules. Therefore, due to the nature of the changes, all USSs should review this document carefully to ensure awareness and understanding of all provisions set forth.

To assist existing USS and potential applicants, the cross-reference table below shows what rules have been changed, adjusted, issued, or removed from the last version.

Previous Rule Number or Section	New Rule Number or Section	Change Summary
3.1a	3.1a	Editorial changes
3.1b	3.1b	No change
3.1c	3.1c	No change
3.1d	3.1d	Editorial changes
3.1e	3.1e	No change
3.1f	3.1f	Editorial changes
3.2.1a	3.2.1a	No change
	3.2.1b	New rule
3.2.2a	3.2.2a	Clarified
3.2.2b	3.2.2c	Clarified
3.2.2c	3.2.2d	Clarified
3.2.3a	3.4.4b	Clarified
3.2.3b	3.2.2b	Aligned into new section
3.2.3c	3.4.4b	Clarified
	3.2.2e, 3.2.2f, 3.2.2g, 3.2.2h	New rules
3.3.1a	3.3.1a	Clarified
3.3.1b	3.2.2g	Incorporated into new rule
3.3.1c	3.2.2g	Incorporated into new rule
Section 3.3.2	Section 3.3.2	Editorial changes
Section 3.3.3	3.3.3a & 3.3.3b	Section clarification and additional rules
3.3.4a	3.3.4a	No change
	3.3.4b	New rule
3.3.4b	3.3.4c	Rule number change
3.3.4c	3.3.4d	Rule number change
3.3.5a	3.3.5a	Clarification

Section 3.4 – Part 101E Notifications		Removed per Section 349, FAA Reauthorization Act of 2018 (P.L. 115-254)
3.5.1a	3.4a	Clarified
	Section 3.4.3 including – 3.4.3a,	New section and rule
	3.4.4a, 3.4.4b, 3.4.4c, 3.4.4d	New rules
3.5.1b, 3.5.1c, 3.5.1d	3.4.4d, 3.4.4e, 3.4.4f, 3.4.4g, 3.4.4h, 3.4.4i, 3.4.4j	Clarified and expanded
3.5.2a	3.4.5a	Editorial changes
3.5.3a	3.4.1b	No change
3.5.4a	3.4.1a	Clarified and moved
3.5.5a	3.5a	Clarified with rule expansion or adjustment
	3.5b, 3.5c	New rules
	Section 3.6 including – 3.6a, 3.6b, 3.6c	New rules for Recreational Users
3.5.5b	Section 3.4.6 including 3.4.6a, 3.4.6b, 3.4.6c	Expanded requirement with new section and rules
3.5.6a	3.4.10a	No change
3.5.6b	3.4.10b	No change
3.5.6c	3.4.10c	Editorial changes
	3.4.10d, 3.4.10e	New Rules
Section 3.6.1 – Compliance Checks (Further Coordination)	Section 3.4.4	Consolidation
Section 3.6.2 – Class E Surface Area Weather Caveat (Further Coordination)	Section 3.4.5	Consolidation
3.6.3a	3.4.2c	No change
3.6.3b	3.4.2b	Rule consolidation
3.6.3c	3.4.2e, 3.4.2f	Rule adjustment and new rule
3.6.4a	3.4.2a	No change
3.6.5a	3.4.2d	No change
3.6.6a	3.5a	Consolidated with Auto-approval
3.6.6b	Section 3.4.6 including 3.4.6a, 3.4.6b, 3.4.6c	Expanded requirement with new section and rules
3.7.1a	3.4.8a	Editorial changes
3.7.2a	3.4.7a	No change
3.7.2b	3.4.7b	No change

3.7.3a	3.2.1b	Replaced and clarified
3.7.3b	3.4.9a, 3.4.9b, 3.4.9c	Rule change and expansion
3.8a	3.7a	Editorial changes
3.9a	3.8a (including Section 3.8 language)	Editorial changes
	Section 3.9 – Operations and Maintenance	New Section
	3.9.1a, 3.9.1b & 3.9.1c	New rules
	3.9.2a, 3.9.2b & 3.9.2c	New rules
	3.9.3a & 3.9.3b	New rules
Attachment A: USS-FAA High-Level Exchange Model	Attachment A: USS-FAA High-Level Exchange Model	Removed Part 101E; clarified Part 107 items; added System Health and Versions, Operation Lists, Operation Status, Operation Statistics, & Operation History

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1 Introduction

1.1 Background

The FAA's challenge is to foster equitable airspace access while ensuring that critical Air Traffic Control (ATC) technical and safety requirements are met for operations in the National Airspace System (NAS). In addition, the FAA seeks to foster a competitive environment for providers of Unmanned Aircraft Systems (UAS) and related services. With the fast pace of small UAS (sUAS) operators entering the market, automation is critical to support the growing demand and to ensure safe and efficient NAS operations.

The FAA developed LAANC to provide sUAS operators an automated, streamlined, and efficient solution to receive airspace authorizations from ATC. LAANC provides near real-time processing of airspace authorizations including automatic approval of requests that are below approved altitudes in controlled airspace. LAANC uses a data exchange framework with UAS Service Suppliers (USSs) to provide quick access to sUAS operators. This quick access is expected to increase and encourage regulatory compliance. From an ATC perspective, the development of LAANC enables safe and efficient flight services of sUAS in the NAS.

1.2 Purpose

This document identifies operating rules for non-government organizations that participate in LAANC as USSs. USSs enter into an agreement with the FAA to act as an intermediary between UAS operators (e.g. pilots) and the FAA's LAANC system interfaces. The FAA provides the ability to incorporate LAANC access into USS service offerings, and USSs provide operator access and validation of operational submissions concerning authorization. LAANC supports innovative USS business models beyond intermediary services to individual operators, provided that the USS is managing ATC authorizations.

1.3 Scope

The scope of this document encompasses current LAANC capabilities, including:

- support for automatically approved authorizations using altitude maps established by the FAA around airport facilities,
- mechanism for "further coordination" of Part 107 authorizations that cannot be approved automatically,
- management of which facilities are available via LAANC and their associated airspace boundaries,
- providing sUAS operations information to ATC/ATM personnel, and
- operations and maintenance functions (status and metrics, downtime, outages, etc.).

Part 107 waivers are not currently within the scope of LAANC.

This document establishes operating rules for USSs. Other aspects of LAANC, such as the technical details of the interface between USSs and the FAA and the design of FAA LAANC systems, are not discussed herein.

This document will refer to the party conducting the sUAS flight operation as the “operator”. Exceptions to this convention may be made in cases where there is a direct link to regulatory language.

2 Referenced Sources

“Low Altitude Authorization and Notification Capability (LAANC) Concept of Operations”, Version 1.1, 12 May 2017.

“USS-FAA Authorizations and Notifications Interface Control Document”, Version 1.6.

14 CFR Part 107, “Small Unmanned Aircraft Systems”.

14 CFR Part 99.7, “Special Security Instructions”.

FAA Form 7711-1, “UAS COA”.

49 U.S.C. § 44809 (Sec. 349, FAA Reauthorization Act of 2018 (P.L. 115-254)),
“Exception for limited recreational operations of unmanned aircraft.”

3 LAANC USS Operating Rules

This section documents the operating rules that each USS is required to follow. The rules identified here only minimally define USS behavior. Further processes, features, and capabilities are up to each USS to determine as they develop their unique service offerings. Rules are identified in brackets with a letter appended to the document section number, for example [1.2.3a], [1.2.3b], etc. Restatements and clarifications of rules are not given a new identifier.

There are several types of sUAS operations that USSs may handle as a participant in LAANC. It is essential that USSs accurately understand what operations comply (without a waiver) with statutory and regulatory requirements with regard to time of day, location, and maximum altitude. Potential UAS operations fall into three categories: (1) allowed by the applicable UAS regulation or statute without authorization, (2) require authorization, but can be automatically approved (e.g. based on UAS Facility Maps – UASFM), or (3) require authorization through manual processes (“further coordination”). The operating rules defined here are designed around corresponding LAANC operation types.

3.1 Operator Access to LAANC

The USS must [3.1a] manage UAS authorizations as a service to operators. Operators must [3.1b] be managed using individual accounts and reasonably secure identification mechanisms (for example, usernames and passwords). Available LAANC-related records of interactions with operators must [3.1c] be made available to the FAA for review on request.

The USS must [3.1d] make the following statement available to operators in a manner appropriate to their application designs: “[USS name] is a provider of UAS services within the FAA’s Low-Altitude Authorization and Notification Capability (LAANC). LAANC may be used to satisfy compliance with ATC authorization. Information provided here is based on real-time and available projected information on airspace status and airport-specific maps, and that information is subject to change. Planning tools should be checked prior to flight for any changes that could impact the operation.”

The USS must [3.1e] notify operators that the FAA has issued a Privacy Statement regarding information collected within LAANC. The Privacy Statement is located at https://www.faa.gov/uas/programs_partnerships/uas_data_exchange/privacy_statement/.

Each LAANC authorization corresponds to a single operator controlling at most one aircraft at a time. Authorization of multiple aircraft operated by a single operator (e.g. “swarms”) is not supported by LAANC at this time. The USS must not [3.1f] contradict this in its communication to operators.

3.2 USS Access to FAA Systems and Information

3.2.1 API-Based Interface Between USS and FAA

LAANC incorporates an FAA system portion and USS system portions, linked by an application programming interface (API). The USS must [3.2.1a] conform to the “USS-FAA Authorizations and Notifications Interface Control Document” (ICD) version in effect. The ICD includes details on connecting to the FAA’s LAANC system via the internet. The FAA provides the ICD to USSs as part of the LAANC onboarding process after successful completion of a technical interview. “Attachment A: USS-FAA High-Level Exchange Model” provides an overview of the major data items transferred over the API.

The USS-FAA LAANC API is bidirectional. The USS must [3.2.1b] implement and maintain the interface capabilities defined by the ICD, including the ability to receive real-time messages from the FAA (a webhook-style mechanism). Alternative messaging described in the ICD (a periodic polling-style mechanism) is also encouraged as a backup to avoid interruptions in connectivity that might otherwise go undetected.

3.2.2 Required Authoritative Sources of LAANC Geospatial Information

To ensure operators have the most complete and current information, the USS must use the listed source for each geospatial item below. Note that each row is an enumerated rule.

Table 1: Required Sources for Certain LAANC Information Types

Rule	Information Type	Authoritative Source	Category / Dataset
[3.2.2a]	UAS Facility Maps (UASFMs)	http://udds-faa.opendata.arcgis.com	UAS Facility Map Data / FAA UAS Facility Map Data V2
[3.2.2b]	National Security UAS Flight Restrictions (NSUFRs)	http://udds-faa.opendata.arcgis.com	National Security UAS Flight Restrictions / National Security UAS Flight Restrictions
[3.2.2c]	Class Airspace	http://adds-faa.opendata.arcgis.com	Airspace / Class Airspace
[3.2.2d]	Airports	http://adds-faa.opendata.arcgis.com	Airports / Airports
[3.2.2e]	Stadiums	http://adds-faa.opendata.arcgis.com	Miscellaneous / Stadiums
[3.2.2f]	Washington D.C. FRZ	http://adds-faa.opendata.arcgis.com	Airspace / Airspace Boundary

For the geospatial information above, the USS must [3.2.2g] use information that is not more than 24 hours old. The USS must [3.2.2h] acquire the data directly from the authoritative source. USSs may not get this data via an intermediary.

3.3 UAS Facility Maps (UASFMs)

UASFMs play a vital role in the LAANC concept of operations. UASFMs identify threshold altitudes at or below which ATC has decided that the FAA can automatically authorize operations (provided the operations comply with all other legal provisions). This means that the FAA can authorize operations within the UASFMs automatically, requiring far less time and human effort than manually processed authorizations.

Note: UASFMs are not used for LAANC alone. Other FAA processes, such as non-LAANC authorization and waiver requests, also use them. UASFMs are a shared resource within the FAA.

3.3.1 UASFM Changes

The USS must [3.3.1a] apply the appropriate UASFM(s) to each operation proposed or submitted by an operator. Base map UASFM data will change on a predetermined update cycle similar to other FAA chart publications. Base map data includes the definition of UASFM grid cells. UASFM values (such as altitude limits and flags) may change on a daily timeframe, especially to expedite map corrections or time-sensitive adjustments.

3.3.2 UASFM and Airspace Boundaries

UASFM grid cell boundaries are rectangular and airspace boundaries are generally curved. If a UASFM extends beyond a controlled airspace boundary, the airspace boundary has precedence. For example, in the area outside a controlled airspace boundary but covered by a UASFM grid, the UASFM threshold does not apply to airspace authorizations.

In graphically presenting limits to operators, USSs may round off or clip UASFMs to match airspace boundaries where this accurately represents the precedence described above. USSs may also aggregate adjacent grids having the same altitude threshold and/or annotate grids (for example, with authorizing facility association) as deemed effective in their graphical interface designs.

3.3.3 Subdividing Operations

In some cases, USSs and/or operators may wish to or need to geographically subdivide a single operational volume in controlled airspace into two or more adjacent operational volumes for submission as authorizations. Valid reasons to subdivide a single operational volume in controlled airspace are as follows:

1. Crossing authorization boundaries.
 - See Section 3.3.4 and Figure 4: *Example Operation Crossing Authorization Boundaries* for more information.

- Part of the operation can be auto-approved, part must be a further coordination request.

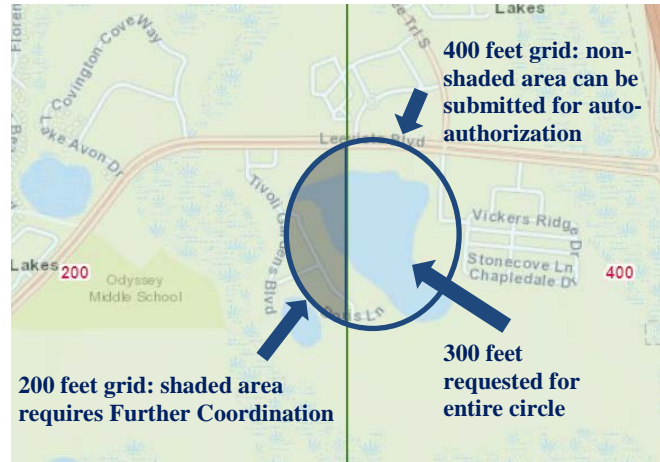


Figure 1: Further Coordination Subdivision

- Portions of the operation at are different maximum altitudes.

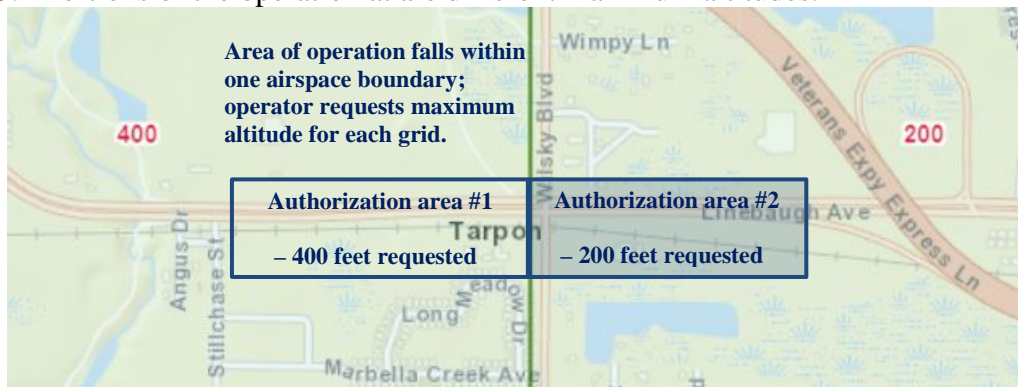


Figure 2: Different Maximum Altitude Subdivision

Note: Adjacent UASFM grid cells may have different thresholds and operators may wish to take advantage of this by planning to fly to a higher threshold in one grid than the other. Currently in LAANC, each authorization can only have a single boundary with a single maximum altitude. Planned operations of this type with multiple maximum altitudes must be submitted as two (or more, as necessary) adjacent authorizations.

The USS must not [3.3.3a] subdivide a single operational volume in controlled airspace into multiple authorization submissions for any reason other than those enumerated above. For example, the USS may not submit separate adjacent authorizations at the same maximum altitude just because they fall within different UASFM grids. (see Figure 3)



Figure 3: Non-divided Operations

Note: This section is not referring to multiple non-contiguous operational volumes in controlled airspace. This situation may arise when an operation passes into and out of controlled airspace at more than one location. “Subdivision” refers only to how a single volume may be split into two or more contiguous volumes. For more on associating multiple volumes (multiple authorizations) with a single operation, see Section 3.4.6.

Where operational subdivisions coincide with UASFM grid or airspace boundaries, geometric uncertainties can arise. USSs must [3.3.3b] use a tolerance to fall cleanly on one side or the other of the relevant boundary and this tolerance may not exceed 10 feet.

Note: Future LAANC development may include specific rules for coordinated operations of multiple aircraft in the same area. However, currently in LAANC, each UAS vehicle operation should be submitted separately for authorization— with overlapping operational volumes if appropriate for multiple vehicles to be flown at once.

3.3.4 Operations that Cross FAA Authorization Boundaries

FAA authorization boundaries for the purposes of LAANC are expressed by the airspace boundaries. UASFM grids also identify the authorizing facility associated with each maximum auto-approval altitude. All airports that are participating in LAANC have UASFM grids for which they are listed as the LAANC ATC authority. As the grids are geodetically rectangular, some grids cross boundaries and list two (or more) authorities.

USSs must [3.3.4a] subdivide operations as necessary so that each authorization has a single authority. Additionally, if any subdivision of the operation falls outside of controlled airspace, the USS must not [3.3.4b] submit that portion of the operation. For example, if a proposed operation crosses the airspace boundary between Airport A and Airport B, the USS must subdivide the operation along the airspace boundary and make separate LAANC submissions, to each authority, without transmitting any uncontrolled airspace. An example is shown in Figure 1.

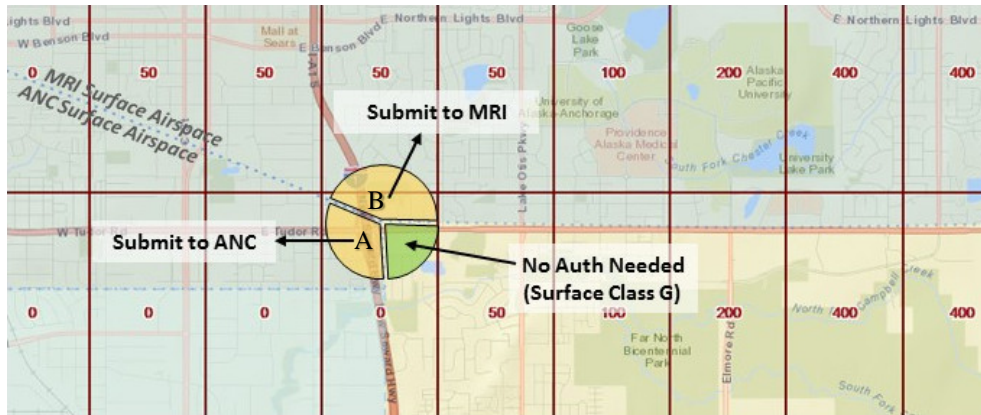


Figure 4: Example Operation Crossing Authorization Boundaries

In this example, the desired operation (whole circle) needs to be subdivided into three regions corresponding to the different airspace authorities defined by the surface airspace boundaries. The auto-approval maximum altitudes (red numbers) indicate that most of the operation must be submitted under Further Coordination (0' equates to no auto-approval). The Class G region needs no authorization and therefore no LAANC submission. The MRI region of the operation could be further subdivided along the grid boundary to auto-approve the uppermost portion (up to 50').

If an airspace identifies an authority that does not correlate to UASFM grids covering the operation, the USS must not [3.3.4c] submit that portion of the operation to LAANC. The USS must not [3.3.4d] make LAANC submissions to authorities that do not have a UASFM covering the operation in question.

For example, if a proposed operation is partly in Airport A's airspace and partly in DOD Facility B's airspace, it must be subdivided accordingly. If Airport A has a corresponding UASFM and DOD Facility B does not, only the portion in Airport A's airspace may be submitted to LAANC. The portion in DOD Facility B's airspace cannot be authorized via LAANC, and the operator could be referred to the FAA's website for manual processing (and/or possibly redirection to DOD authorities).

3.3.5 "LAANC Ready" Flag

Data associated with each UASFM grid includes a "LAANC Ready" flag corresponding to each facility touched by that grid. LAANC Ready flags are either "true" or "false". A "true" flag means that LAANC is active (accepting authorization submissions) for the associated UASFM grid and facility. A "false" flag means that LAANC is not active and cannot accept authorization submissions for the associated UASFM grid and facility. The USS must not [3.3.5a] submit any operations to a given facility that touch a grid with a LAANC Ready flag of "false" for that facility.

3.4 ATC Authorizations: General Provisions

Controlled airspace boundaries (Classes B, C, D, and Surface E^{*}) are a determining factor in authorization requirements. To be eligible for automatic approval, the planned operation must fall entirely at or below UASFM maximum altitudes. Planned operations between set UASFM maximum altitudes and 400' are eligible for Further Coordination. The USS must [3.4a] identify planned operations that require authorization and are eligible for automatic approval or further coordination.

3.4.1 Automatic Approved Authorizations

LAANC processes automatically approved authorizations at some facilities and for certain classes of sUAS operations. The auto-approved authorization process must not [3.4.1a] be considered complete until a confirming digital response is received from the FAA as described in the ICD.

USSs may submit auto-approved authorizations up to the start time of the operation. The USS must not [3.4.1b] make submissions more than 90 days in advance. Note that the FAA prefers that submissions be made with as much lead time as practical.

3.4.2 Further Coordination Authorizations

LAANC processes Further Coordination authorizations at some facilities and for certain classes of sUAS operations. A Further Coordination request must not [3.4.2a] be considered authorized or denied until a definitive response has been received from the FAA as described in the ICD.

Further Coordination requests must [3.4.2b] be submitted no later than 24 hours prior to the start time of the requested authorization. Furthermore, the USS must [3.4.2c] automatically cancel any pending requests for Further Coordination 24 hours before the proposed start time if the FAA has not approved or denied the request. Cancellation must be indicated by the corresponding message to the FAA (see Section 3.4.8). *Note: unlike other cancellations, this automatic request cancellation is initiated by the USS rather than the operator.*

The USS must not [3.4.2d] make submissions more than 90 days in advance. Note that the FAA prefers that submissions be made with as much lead time as practical.

The USS must [3.4.2e] inform operators that Further Coordination is a manual process with commensurate timelines. The FAA's goal is to respond to Further Coordination requests in less than 30 days, but it may take up to 90 days to either approve or deny and, in some cases, requests may expire without resolution. After submission, the USS must [3.4.2f] inform the operator that the request is "pending" and discourage following up with ATC by phone as this may result in the request being rejected by FAA.

^{*} Separately from LAANC, the FAA has determined that the only subtype of Class E that applies to UAS authorizations is Class E2.

3.4.3 LAANC Facility Determination

The USS must [3.4.3a] determine the correct facility to which to submit authorization-related messages. The correct algorithm for doing this is described by the enumerated steps below. USSs may implement these steps or an equivalent, alternative process that produces the same result.

1. At any given point of operation, find the encompassing surface-level controlled airspace volume (using the airspace source dataset identified in Section 3.2.2). If more than one airspace volume is found, use the highest class (for example, Class B supersedes Class C).
2. Read the “ADHP_ID” property of the identified airspace volume and use it as an index into the airport dataset (see Section 3.2.2), matching the “GLOBAL_ID” property.
3. The corresponding airport entry has “IDENT” and “ICAO_ID” fields that identify the facility to which LAANC authorizations may potentially be sent.
4. The point of operation must also be within a UASFM grid that identifies the same facility (possibly among several) with the LAANC Ready Flag set to true. If a matching LAANC-ready facility is not found in the UASFM data, the authorization cannot be provided via LAANC.

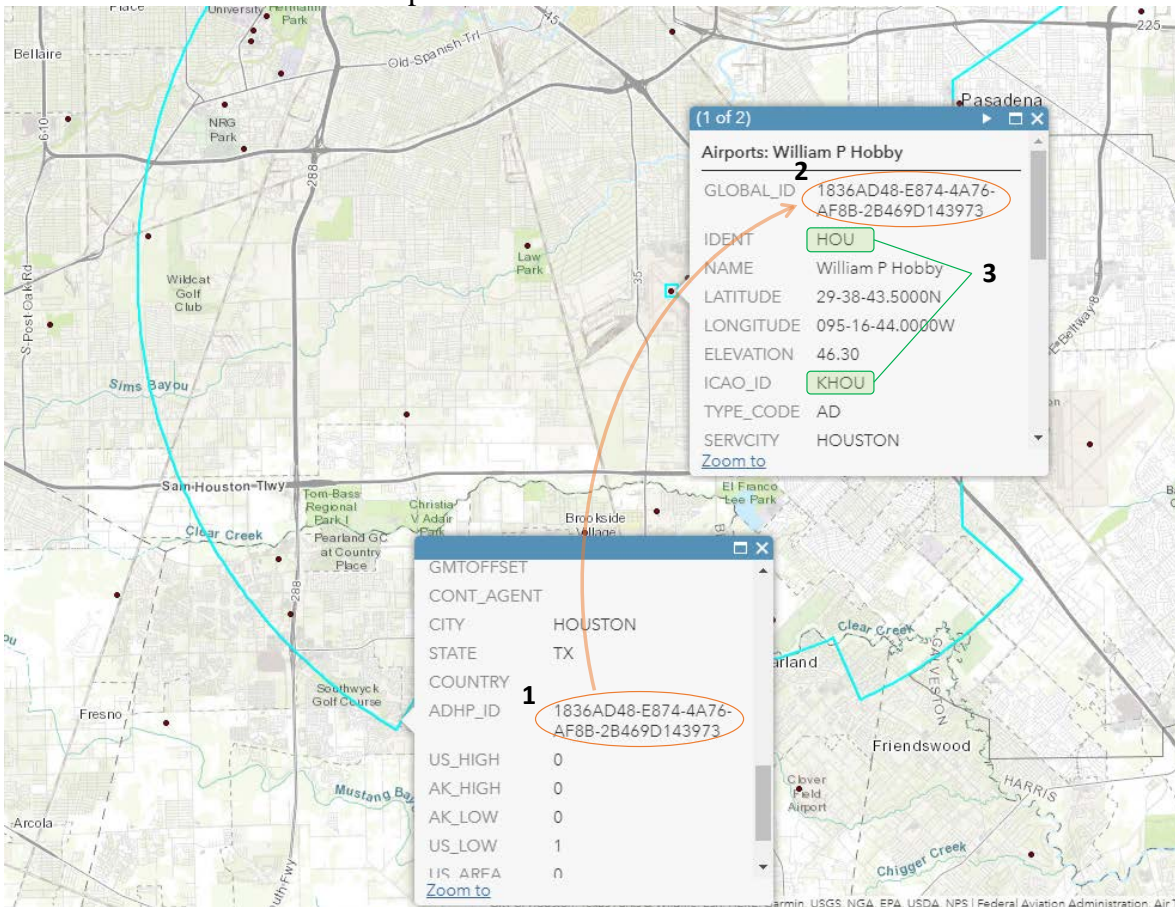


Figure 5: Example Determination of Submission Facility

Note: The airspace volume also has facility identifier fields, but these do not always match the correct submission facility – for example, in Figure 5, the airspace identifies IAH (which is incorrect). Use the algorithm provided above.

Note: There are two known facilities where the above algorithm does not currently work – DAL and JFK. These facilities have no distinct surface airspace due to the proximity of other airports and historical factors. The FAA may introduce data model updates in the future to handle these facilities.

Note: Some airspaces transition to a different airspace class and/or controlling facility based on time of day (usually corresponding to tower staffing). The above algorithm is sufficient for LAANC purposes until USSs are notified otherwise by the FAA. Night waivers are not currently supported by LAANC (nor any other waivers). Future data model updates may introduce more flexible submission algorithms with respect to class airspace transition times.

3.4.4 Compliance Checks

Operators are required to comply with applicable aeronautical information, including restrictions, published by the FAA and other airspace authorities. At a minimum, USSs are *required* to check for certain applicable restrictions and *may* check for others (see Table 3) as part of their service offering to inform operators and prevent unsafe, unauthorized flights.

Potential aeronautical data items include Notices to Airmen (NOTAMs), including Temporary Flight Restrictions (TFRs). Special Use Airspace (SUA) data may also be used. FAA sources for these data items are listed below.

Table 2: Specific FAA Sources of Certain LAANC Information Types

Information Type	FAA Source(s)	Category / Dataset
NOTAMs (incl. TFRs)	https://notams.aim.faa.gov/notamSearch/ Flight Service	n/a
TFRs	http://tfr.faa.gov/ Flight Service	n/a
SUAs	https://sua.faa.gov/ http://adds-faa.opendata.arcgis.com Sectional Charts Flight Service	(ADDS site) Airspace / U.S. Special Use Airspace

If used, the USS must [3.4.4a] use aeronautical data that is not more than 24 hours old. If used, the USS must either [3.4.4b] acquire the aeronautical data items listed above directly from an FAA source; or, the USS may utilize a third-party intermediary *provided* documentation from the third party is provided demonstrating the aeronautical data is

obtained from an official FAA source. Additionally, if a third-party intermediary is used, the USS must [3.4.4c] prominently display the following text to the operator, “*This graphical representation [if displayed] / aeronautical data [if text] is for informational purposes only. The operator is responsible for referring to an FAA official source for NOTAM information relevant to this operation.*”

Notices to Airmen (NOTAMs), including Temporary Flight Restrictions (TFRs), convey many relevant sUAS restrictions. Special Use Airspaces (SUAs) may also apply to sUAS. “Prohibited” and “Restricted” are important SUA types that generally *do* apply to sUAS. (Note that Restricted SUAs also have associated schedules documenting when they are active or “hot” – these schedules are published on sua.faa.gov.) The FAA wants to ensure that operators using LAANC are aware of these potential restrictions. These operating rules offer several ways for USSs to address these concerns.

Unless all applicable NOTAMs (including TFRs and manually readable NOTAMs) and Prohibited/Restricted SUAs are completely processed by the USS from an FAA source as a service to operators and presented to them, USSs must [3.4.4d] provide a link to FAA sources of information for these restrictions. The notams.aim.faa.gov, tfr.faa.gov, and sua.faa.gov sources listed above are recommended.

Note: Certain restrictions sources are known to be difficult to process, such as manually readable NOTAMs (some with complex references to other sources of regulatory text). USSs are advised that the links associated with [3.4.4d] above are a good way to ensure compliance with these rules, even if only as a safety net after processing that is done automatically for operators.

USSs may process NOTAMs (including TFRs) and SUAs, either in part or in whole, as part of their service offering to operators. Some processing of SUAs is necessary to comply with rules documented below. In addition to required geospatial data (see Section 3.2.2), the USS will also need to employ daylight calculations and other algorithms.

The USS must block certain types of operations within LAANC and advise the operator concerning other types of operations. The table below identifies each type at the associated USS responsibilities. Note that each row is an enumerated rule.

Table 3: USS Responsibilities for Certain Flight Restrictions

Rule	Operation Type	USS Responsibility	Notes
[3.4.4d]	Operations exceeding 400 feet (§107.51b)	Block	This request type is not supported by LAANC.
[3.4.4e]	Operations at night (§107.29)	Block	USS must employ a reasonable algorithm for civil twilight and block accordingly.
[3.4.4f]	Operations in an NSUFR or the DC FRZ (§107.47)	Block	This request type is not supported by LAANC.
[3.4.4g]	Operations in a Prohibited or active Restricted SUA (§107.45)	Block	This request type is not supported by LAANC. USS is only responsible for start/end times published on sua.faa.gov.
[3.4.4h]	Operations in a TFR (§107.47)	Advise	Providing FAA link(s) per [3.4.4c] minimally satisfies this rule. USS may read digital TFR's and display them. Blocking is permissible but not required.
[3.4.4i]	Operations in another type of SUA (MOA, CFA, Warning, Alert, etc.) (§107.49)	Advise	Providing FAA link(s) per [3.4.4c] minimally satisfies this rule. USS may read digital SUAs for these other types and display them. Blocking is permissible but not required.
[3.4.4j]	Operations within 3NM of a stadium (§107.47)	Advise	Identifying stadium area minimally satisfies this rule. USSs may offer additional guidance (e.g. event times) on a best-effort basis. Blocking is permissible but not required.

3.4.5 Class E Surface Area Weather Ceiling Caveat

Due to the relatively lower minimums for VFR traffic in Class E airspace, additional situational risks limit the validity of automatically approved authorizations provided via LAANC. Specifically, automatic approvals obtained via LAANC are not valid in Class E Surface Area airspace when the weather ceiling is less than 1,000 feet. (This is a situational limitation of the authorization which cannot be known in advance of the actual operation.) The USS must [3.4.5a] inform operators of this limitation when it applies to their planned operation. The USS should also assist the operator to access relevant, reliable weather information.

3.4.6 LAANC Reference Codes

Every operation and authorization referenced by the LAANC API has a reference code. The full authorization code is 12 characters long (note that this is an update from prior 9-

character codes). The first 11 characters make up the base operation reference code and the final character identifies one or more authorizations associated with the operation (for a total of 12 characters). LAANC codes consist of digits (0-9) or letters (A-Z, not case-sensitive, represented as capitals). The first three characters of a LAANC code identify the USS (these codes are assigned by the FAA during onboarding). The next eight characters identify the operation. The last character identifies an authorization or requested authorization within the operation, of which there could be more than one. The code format is illustrated below.

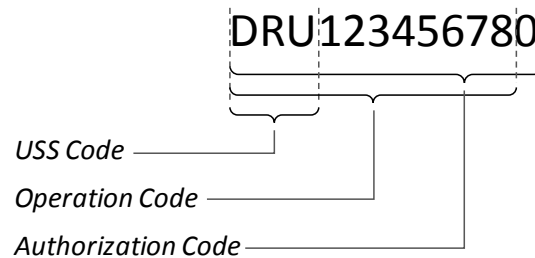


Figure 6: LAANC Code Format

Authorization codes correspond to portions of an operation that are part of the same planned flight but must be subdivided for various reasons (see Section 3.3.3). For example, part of the operation might correspond to one facility and part to another. These require separate authorizations and, therefore, at least two authorization codes. With a way to track authorizations as a subset of operations, LAANC is able to comprehend when different authorizations are part of the same operation, which is beneficial for tracking and managing operations as a whole.

The USS must [3.4.6a] assign unique authorization reference codes for every applicable submission (see ICD for details). The USS must [3.4.6b] make the authorization reference code available to the operator. Reference codes will be used in the event that ATC needs to communicate directly with the operator or if the USS needs to interact with the FAA in any capacity.

A submitted operation with multiple associated authorizations (or authorization requests) must [3.4.6c] correspond to submissions that end in “0”, “1”, ..., “A”, “B”, and so on through “Z”. In the exceedingly rare case that an operation has more than 36 authorization regions, a new operation code could should be started (which is not required to be sequential).

Note: As each submission must use a unique authorization reference code, codes can never be reused. A code associated with an authorization does not necessarily mean that the authorization is approved or valid. A LAANC reference code may refer to an authorization that is requested, canceled, invalid, submitted but not confirmed, etc.

3.4.7 Operator Changes

The USS must [3.4.7a] offer the capability to modify the details of a planned operation if such change does not invalidate the authorization or require ATC Further Coordination. For example, extending the duration of an automatically approved authorization is an acceptable modification. The USS must [3.4.7b] submit such changes to the FAA using the appropriate interface mechanism (see ICD).

Note: It is minimally acceptable for a USS to offer change capabilities by the operator cancelling a previously approved authorization and constructing a new one to replace it. Note that the LAANC ICD describes a more advanced method which preserves the operation Reference Code.

3.4.8 Operator Canceled or Closed Authorizations

The USS must [3.4.8a] incorporate the capability for any previously submitted requests or authorizations to be “canceled” by the operator, indicating the operation is no longer planned. Since cancellation indicates that an operation will not be flown (in the future), it can only occur prior to the operation start time.

Note: The FAA has identified the concept of “closing” an operation, indicating that the operation is complete prior to the submitted end time of the authorization. Closing can only occur after the operation start time. Closing is not implemented in LAANC at this time.

3.4.9 ATC Rescinded Authorizations

FAA personnel (ATC) may rescind any previously approved authorization. “Rescind” means that an authorization is nullified before it begins. Since an authorization can only be rescinded before it begins, rescind can only occur prior to the operation start time.

Note: A similar function to “rescind,” but after the start time of the operation, is the “terminate” function. Termination is not implemented in LAANC at this time. However, ATC may terminate an authorization verbally (ATC contacts operator at phone number included in authorization).

Messages indicating rescinded authorizations will be initiated by the FAA and communicated to the USS via mechanisms described in the ICD. Once the message is received, the USS must [3.4.9a] initiate resolution with the operator upon receipt by informing the operator. As part of this process of informing, the USS must [3.4.9b] provide the operator with an immediate means to send an “acknowledge” message to ATC. This acknowledgement is operationally vital to let ATC know that the operator is aware of the change in authorization status and does not intend to fly.

ATC cannot be sure that the operator is aware of and responding to a rescinded authorization unless there is acknowledgement from the operator. Therefore, in addition to the immediate means in rule 3.4.9b above, USSs must [3.4.9c] design their LAANC

applications to prompt operators to respond to any outstanding rescinded authorizations with an acknowledgement.

Note that ATC may opt to call the operator directly, whether or not they rescind an authorization through LAANC. Should a difference arise, any authorization information provided verbally by ATC supersedes prior authorization information conveyed via LAANC.

3.4.10 Previously Authorized Becomes Invalid

When changes occur that could impact the approved status of previously provided authorizations (e.g. change to UASFM, new NSUFR, etc.), the USS must [3.4.10a] review all prior submissions that have not occurred yet and could be affected. If the information associated with a previously submitted operation changes, the USS must [3.4.10b] update the submission using the appropriate interface mechanism (see ICD).

For previously approved authorizations that are no longer valid, the USS must [3.4.10c] initiate resolution with the operator upon detection by informing the operator. Furthermore, the USS must [3.4.10d] provide the operator with a means to send a “cancel” message to ATC for each invalid authorization. USSs must [3.4.10e] design their LAANC applications to prompt operators to cancel invalid authorizations.

Note: The FAA may or may not detect the invalid status of an authorization before the USS and may or may not send a “rescind” message. The USS should handle invalid authorizations proactively and direct operators to cancel them so that they are not flown regardless of actions that may be taken by ATC or FAA systems.

3.5 Commercial Authorizations: Specific Provisions

Commercial authorizations are provided via LAANC in accordance with 14 CFR Part 107.41. LAANC supports both auto-approved and further coordination types for commercial authorizations. USSs may opt to include one and/or the other type in their service offerings.

When Part 107 authorizations are provided, the USS must [3.5a] generate, display, and store the following text (including the context-dependent information shown in brackets):

“[LAANC Reference Code / FAA Facility Code, Start Date & Time – End Date & Time, Max Alt numft]: In accordance with Title 14 CFR Part 107.41, your operation is authorized within the designated airspace and timeframe constraints. Altitude limits are absolute values above ground level which shall not be added to the height of any structures. This Authorization is subject to cancellation at any time upon notice by the FAA Administrator or his/her authorized representative. This Authorization does not constitute a waiver of any State law or local ordinance. [Name of operator] is the person designated as responsible for the overall safety of UAS operations under this Authorization. During UAS operations for on-site communication/recall, [name of operator] shall be continuously available for direct contact at [contact phone number] by

ATC or designated representative. Remote pilots are responsible to check the airspace they are operating in and comply with all restrictions that may be present in accordance with 14 CFR 107.45 and 107.49 (a)(2), such as restricted and Prohibited Airspace, Temporary Flight Restrictions, etc. Operations are not authorized in Class E airspace when there is a weather ceiling less than 1,000 feet AGL. If the UAS loses communications or loses its GPS signal, it must return to a predetermined location within the operating area and land. The pilot in command must abort the flight in the event of unpredicted obstacles or emergencies.”

“Start Date & Time” and “End Date & Time” must [3.5b] unambiguously include the year, month, day, hour, minute, and time zone (or UTC).

The USS must [3.5c] provide a method for quick access to the operation-specific authorization information (including text above) in a form that could be produced by the operator to authorities if necessary.

Note: For example, an email generated and sent to the operator each time an authorization is provided would meet this requirement. USSs are encouraged to incorporate additional information, such as a map of the authorization boundaries

3.6 Recreational Authorizations: Specific Provisions

Recreational authorizations are provided via LAANC in accordance with 49 U.S.C. § 44809. LAANC supports only the auto-approved type for recreational authorizations. USSs may opt to include this type in their service offerings.

When recreational authorizations in accordance with 49 U.S.C. § 44809 are provided, the USS must [3.6a] generate, display, and store the following text (including the context-dependent information shown in brackets):

“[LAANC Reference Code / FAA Facility Code, Start Date & Time – End Date & Time, Max Alt *numft*]: In accordance with 49 USC 44809(a)(5), your operation is authorized within the designated airspace and timeframe constraints. Altitude limits are absolute values above ground level which shall not be added to the height of any structures. This Authorization is subject to cancellation at any time upon notice by the FAA Administrator or his/her authorized representative. This Authorization does not constitute a waiver of any State law or local ordinance. [*Name of operator*] is the person designated as responsible for the overall safety of UAS operations under this Authorization. During UAS operations for on-site communication/recall, [*name of operator*] shall be continuously available for direct contact at [*contact phone number*] by ATC or designated representative. [*Name of operator*] is responsible to check the airspace in which the UAS will be operated and comply with all restrictions that may be present in accordance with 44809(a)(5), such as restricted and prohibited airspace, temporary flight restrictions, etc. This authorization is subject to the following conditions: (1) operations are not authorized in Class E surface area airspace when there is a weather ceiling less than 1,000 feet AGL; (2) if the UAS loses communications or loses its GPS signal, it

must return to a predetermined location within the operating area and land; and (3) the person manipulating the controls of the UAS must abort the flight in the event of unpredicted obstacles or emergencies.”

“Start Date & Time” and “End Date & Time” must [3.6b] unambiguously include the year, month, day, hour, minute, and time zone (or UTC). The USS must [3.6c] provide a method for quick access to the operation-specific authorization information (including text above) in a form that could be produced by the operator to authorities if necessary.

Note: For example, an email generated and sent to the operator each time an authorization is provided would meet this requirement. USSs are encouraged to incorporate additional information, such as a map of the authorization boundaries

3.7 Reasonable Filtering

The USS must [3.7a] make reasonable checks to block spurious submissions that do not comply with regulations. Attempts should also be made to block illegitimate submissions (e.g. excessive or malicious).

For example, a reasonable limitation on swarms (and excessive submissions) would be to block more than three temporally overlapping submissions from the same operator unless there is a valid reason (such as a subdivided operation, see Section 3.3.4). A reasonable limitation on operations beyond visual line of sight (see Part 107.31) is to block areas of operation larger in maximum linear extent than 10 miles unless justified. In addition to more specific checks on local sunrise and sunset, a reasonable absolute limit on operation duration is 16 hours (per daylight restriction in Part 107.29) unless justified (as in certain times of the year in Alaska).

Note: Future LAANC development may include more specific rules concerning reasonable filtering, taking into consideration what is found to be necessary and effective in field operations.

3.8 Contingency Operations

If the FAA’s LAANC system is down or inaccessible for any reason, authorization submissions must [3.8a] be considered temporarily incomplete. Authorizations cannot be considered successfully submitted until their receipt is indicated by a positive acknowledgement from FAA systems. This approach ensures that the FAA has the opportunity to check that submissions are valid and correct before they are used operationally, as well as ensuring ATC situational awareness.

However, during such outages, the USS can continue planning functions with operators pending final completion once the FAA’s LAANC system is available. Many authorization situations provide ample time for later resubmission prior to the start time of the operation. For example, given a desired automatically approved authorization that starts in 24 hours, there are many opportunities for digital resubmission before the flight

commences. The USS could inform the operator that the FAA's LAANC system interface is temporarily unavailable and they will be notified when the process is complete (or should check back before flying).

In the event of protracted unavailability of the FAA's LAANC system, USSs may inform operators of other compliant mechanisms (such as requesting Part 107 authorizations via non-LAANC processes accessible from the FAA's website).

3.9 Operations and Maintenance

3.9.1 Manual Reporting and Auditing

The FAA reports LAANC outages, both scheduled and unscheduled, to the USSs and ATM users through the LAANC Enterprise Control Center (ECC). Outage information is a critical resource for the FAA to manage incidents and inquiries concerning LAANC capability functionality. The USS must [3.9.1a] manually notify the ECC of scheduled outages at least 24 hours in advance. The USS must [3.9.1b] manually notify the ECC of unscheduled outages within one hour of detection. Outage status communicated to the ECC will not be shared outside the FAA.

The USS must [3.9.1c] provide an audit user account to the FAA for audit of service functionality on a periodic basis. The audit account should be the same in nature as a normal operator account at no cost to the FAA. The FAA understands that USS models vary widely – “accounts” may be secured (not accessible to the public), USS systems may be installed on site or on equipment, and different user groups may be differentiated by location or customer base. The FAA and USS will define appropriate audit accounts as part of onboarding. Manual auditing will be used to confirm compliance with the USS rules and/or identify a need for re-onboarding in some cases (for example, if service has changed significantly).

3.9.2 System Health and Version(s) Check

To facilitate awareness, the FAA makes one or more health and version(s) API endpoints available to USSs, which report the FAA's operational status and system version(s) in effect. A USS must not [3.9.2a] automatically call this endpoint with a period less than one minute. (Endpoint calls that are individually, manually triggered are acceptable without a rate limit, with the expectation that these constitute a much smaller load than once per minute on average.)

The USS must [3.9.2b] make specified health and version(s) API endpoints available to the FAA. The FAA will not automatically call this with a period less than one minute. (Endpoint calls that are individually, manually triggered may occur without a rate limit, with the expectation that these constitute a much smaller load than once per minute on average.) Fields include:

- System status (up or down)
- Software / API version(s)
- Data model version(s)

- Critical dataset version(s)

See Attachment A for more detail.

Health and version information communicated to the ECC will not be shared outside the FAA. A lack of response may be interpreted as a USS system outage.

Note: If USS endpoints do not respond in less than 30 seconds with one or more retries, the FAA may not consider the endpoint available and interpret it as a system outage.

3.9.3 Operational Statistics

The FAA makes an operational statistics API endpoint available to USSs supporting queries about the numbers of previously submitted operations. A USS must not [3.9.3a] query the operational statistics endpoint with less than one minute between queries with the exception that anytime the FAA returns an error code, a USS may submit a follow-up query without concern for rate.

The USS must [3.9.3b] make a specified operational statistics API endpoint available to the FAA. The FAA will not submit associated queries with less than one minute between queries with the exception that anytime the USS returns an error code, the FAA may submit a follow-up query without concern for rate. Operational statistics include:

- Counts of Part 107 submissions in different LAANC states (*see Attachment B*)
- Counts of Section 44809 submissions in different LAANC states
- Counts of total calls and messages

See Attachment A for more detail.

Note: Accurate responses to operational statistics queries are important, as they will be used to verify a common operational picture between USSs and the FAA. However, perfect alignment in certain cases is not expected, for example due to message transit times or typical processing delays.

3.9.4 Open Authorizations Queries

This section is deferred to a time to be determined after summer 2019 onboarding.

The FAA makes an open authorizations API endpoint available to USSs supporting queries about what currently active and/or open authorizations fall into specified categories. A USS must not [3.9.4a] query the open authorizations endpoint with less than one minute between queries with the exception that anytime the FAA returns an error code, a USS may submit a follow-up query without concern for rate.

The USS must [3.9.4b] make a specified open authorizations API endpoint available to the FAA. The FAA will not submit associated queries with less than one minute between queries with the exception that anytime the USS returns an error code, the FAA may submit a follow-up query without concern for rate. Open authorization lists include:

- Reference codes of Part 107 auto-approved authorizations that are active (issued and stop time has not been reached)
- Reference codes of Section 44809 auto-approved authorizations that are active
- Reference codes of Part 107 further coordination requests that are:
 - Active
 - Pending
 - Rescinded awaiting acknowledgement

See Attachment A for more detail.

Note: Accurate responses to open authorizations queries are important. However, perfect alignment in certain cases is not expected, for example due to message transit times or typical processing delays.

3.9.5 Operation History Queries

This section is deferred to a time to be determined after summer 2019 onboarding.

The FAA makes an operation history API endpoint available to USSs supporting queries about the past transitions of a specific operation. A USS must not [3.9.5a] query the operation history endpoint with less than one minute between queries with the exception that anytime the FAA returns an error code, a USS may submit a follow-up query without concern for rate.

The USS must [3.9.5b] make a specified operation history API endpoint available to the FAA. The FAA will not submit associated queries with less than one minute between queries with the exception that anytime the USS returns an error code, the FAA may submit a follow-up query without concern for rate. Operation history includes:

- Submission type
- Time of approval or denial (as applicable)
- Time of change, rescind, and/or cancel (as applicable)

See Attachment A for more detail.

Note: Accurate responses to operation history queries are important. However, perfect alignment in certain cases is not expected, for example due to message transit times or typical processing delays.

Attachment A: USS-FAA High-Level Exchange Model

The reference material below is intended to assist stakeholders in understanding, planning, and scoping LAANC-related systems and services. Information items listed are high-level and not technically exhaustive (additional data may be required). This material is intended to be synchronized with the relevant ICD, but in any cases of perceived or actual conflict, the ICD has precedence.

Auto-Approved Authorization (USS → FAA)
<ul style="list-style-type: none">▪ Operator Name (first and last)▪ Operator Phone Number (during operation)▪ Start Date/Time (UTC)▪ Duration▪ Maximum Altitude (AGL)▪ Boundary Geometry (polygon or point/radius)▪ Authorizing Airport▪ UASFM Grids Touched (IDs and last edit dates)▪ Airspace Classes Touched

Further Coordination Request (USS → FAA)
<ul style="list-style-type: none">▪ Operator Name (first and last)▪ Operator Phone Number (during operation)▪ Start Date/Time (UTC)▪ Duration▪ Maximum Altitude (AGL)▪ Boundary Geometry (polygon or point/radius)▪ Authorizing Airport▪ Airspace Classes Touched▪ Safety Justification (text)

Further Coordination Response (FAA → USS)
<ul style="list-style-type: none">▪ Operation Reference Code▪ Approved or Denied

Operation Cancelled (USS → FAA)
<ul style="list-style-type: none">▪ Operation Reference Code

Authorization Rescinded (FAA → USS)
<ul style="list-style-type: none">▪ Operation Reference Code

System Health and Versions
(USS → FAA or FAA → USS)

- System Status (Up or Down)
- System Version
- API Version
- UASFM Data Model Version
- UASFM Publication Date
- Airspace Publication Date
- Airports Publication Date

Operation Statistics
(USS → FAA or FAA → USS)

- Count of 107 Operations Submitted
- Count of 107 Auto-Approved Submitted
- Count of 107 Further Coordination Submitted
- Count of 107 Further Coordination Approved
- Count of 107 Further Coordination Denied
- Count of 107 Further Coordination Automatically Cancelled
- Count of 107 Further Coordination Expired
- Count of 107 Rescinded
- Count of 107 Cancelled
- Count of 44809 Operations Submitted
- Count of 44809 Auto-Approved Submitted
- Count of 44809 Rescinded
- Count of 44809 Cancelled
- Count of Successful API Calls
- Count of Failed API Calls
- Count of Polling Calls

[Deferred]
Open Authorizations
(USS → FAA or FAA → USS)

- *List of 107 Auto-Approved Active Authorizations*
- *List of 44809 Auto-Approved Active Authorizations*
- *List of 107 Further Coordination Active*
- *List of 107 Further Coordination Pending*
- *List of 107 Further Coordination Rescinded Awaiting Acknowledgement*

[Deferred]
Operation History
(USS → FAA or FAA → USS)

- *Submission Type (107 AA, 44809 AA, 107 FC)*
- *Submission Time*
- *Approval Time (if applicable)*
- *Denial Time (if applicable)*
- *Change Time (if applicable)*
- *Rescind Time (if applicable)*
- *Cancel Time (if applicable)*

Attachment B: LAANC States and Transitions

The reference material below is intended to assist stakeholders in understanding LAANC-related terminology concerning authorization processes. The information provided here is high-level and may not be technically exhaustive. For example, unsuccessful transitions are not shown and do not count (such as API rejections).

