AirSafe Streaming API

User Guide

Change Log

Version	Release Date	Note
1.0	2019-10-14	Initial version

Description

Spire's AirSafe Stream delivers the Aircraft Target Updates from both Satellite and Terrestrial sources in a data stream. The stream can be filtered by sending

ADS-B transponders emit several messages with different bits of information each second. Spire's satellites collect these messages into a "Target Update," that is, an update for each ICAO address for each 5 second interval. For the satellite data, if we have not received a squawk, callsign, or other piece of information within that 5 second interval those fields will be null.

GET STARTED

Authentication

Before accessing the APIs, Spire must provide users with an API token for the AirSafe Data Stream API.

Host https://api.airsafe.spire.com/stream

API Token (Example) AbcDEfghIJklmn0pQrstuvWXYZ012345

Header Value Authorization: Bearer your_token

Connecting

The connection to the streaming endpoint is a long lived Http GET request. The server will keep sending messages until the connection terminates. The client can reconnect and resume consuming the messages from the last known position token. The position token is sent in short intervals as part of the Target Update stream.

Curl Example

The following curl commands connects to the streaming endpoint and prints the received data to the console.

curl -H "Authorization: Bearer {your_token}" -H "Accept: application/json" 'https://api.airsafe.spire.com/stream'

Streaming Messages

The messages are separated by new lines and are encoded in the JSON format. The only exception is the Keep Alive, which is an empty new line.

- Target Update
  The Target Update contain all the fields describing a positional update for an aircraft, the target is delivered in the following format: {"target": {...}}. The fields included in the Target Update are described below.

- Stream position token
  In case the connection is interrupted the client needs to reconnect, to avoid losing any messages which have been received in the meantime the client can send the stream position token in order to continue to receive the stream from the last known location. The streaming token is only send occasional and is intended to guarantee an “at least once” reception of each Target Update sent by the stream.

  The steam position token is delivered in this format:
  {"stream_token": “your_stream_token”}

- Keep Alive
  In case no data is received for a longer period of time the server sends an empty line to ensure the connection is still alive.

To distinguish which message is sent the client should look for the “target” or “stream_token” keys in the JSON object.

Stream Parameters

The following parameters can be specified to filter the stream on the server side to reduce the bandwidth requirements. Since these are query parameters the total number of filters that can be specified are limited by the maximum URL length.

Query Parameters	Required?	Type	Description
stream_token	no	string	token to resume the stream from a certain position, the invocation must return a token that was previously sent and is not older than 6 hours
icao_address	no	string	comma separated list (limit results to any of the provided values)
callsign	no	string	comma separated list (limit results to any of the provided values)
latitude_between	no	float,float	• Two numbers, separated by a comma. • First value must be smaller than the second, specifies south-to-north range. • First value is inclusive, last value is exclusive.
longitude_between	no	float,float	• Two numbers, separated by a comma.

			• Specifies west-to-east range. E.g. range [170, -170) is a 20° range crossing anti-meridian, and [-170, 170) is a 340° range covering most of the globe. • First value is inclusive, last value is exclusive.
altitude_baro_between	no	integer, integer	• Barometric altitude in ft, two integers separated by a comma. • First value is inclusive, last value is exclusive.

Target Update Fields

The fields in this table are taken directly from ADS-B messages:

Field	Type	Description	Example
callsign	string	call sign	"RAM200"
icao_address	string	hexadecimal representation of ICAO 24-bit address	"02013F"
latitude	float	latitude in degrees, between -90 and 90 (both inclusive)	-26.80491819
longitude	float	longitude in degrees, between -180 (exclusive) and 180 (inclusive)	28.64151588
altitude_baro	integer	barometric altitude in feet	38000
heading	float	aircraft heading in degrees (0 is North)	273.200012207
speed	float	aircraft speed in knots	477.8†
vertical_rate	integer	vertical rate of ascent/descent, in ft/min	1020
squawk_code	string	Mode-A squawk code	6617

These fields are merged into each record to give additional information:

Field	Type	Description	Example
timestamp	timestamp	timestamp when the message was received by ADS-B receiver	"2019-06-06T07:55:25Z"
source	string	Terrestrial or FM value for satellite	“FM83”
ingestion_time	timestamp	timestamp when record was stored to the database	"2019-06-06T07:55:25Z"
collection_type	string	collection type	"satellite" or "terrestrial"

The following fields are enhanced data and may be present in the record:

Aircraft information

Field	Type	Description	Example
icao_actype	string	aircraft type (ICAO code)	"B738"
tail_number	string	aircraft Registration	"A6-EEQ"

Flight information

Field	Type	Description	Example
flight_number	string	flight number (IATA format)	"WN9002"
origin_airport_icao	string	origin airport ICAO code	"EHAM"
destination_airport_icao	string	destination airport ICAO code	"KDTW"
scheduled_departure_time_utc	timestamp	scheduled departure time, format is in	"2019-06-06T07:55:25Z"

		ISO 8601	
scheduled_departure_time_local	timestamp	scheduled departure time, format is in ISO 8601	"2019-06-06T07:55:25"
scheduled_arrival_time_utc	timestamp	scheduled arrival time, format is in ISO 8601	"2019-06-06T07:55:25Z"
scheduled_arrival_time_local	timestamp	scheduled departure time, format is in ISO 8601	"2019-06-06T07:55:25"
estimated_arrival_time_utc	timestamp	estimated arrival time, format is in ISO 8601	"2019-06-06T07:55:25Z"
estimated_arrival_time_local	timestamp	scheduled departure time, format is in ISO 8601	"2019-06-06T07:55:25"

Contact Us

Please contact Customer Service <cx@spire.com> for any questions.