Dronetag SCOUT - Datasheet

Version: 2.0

Changelog

- 1.0: Initial version
  - Added JSON+ODID data format
- 1.1 (Scout v3.8.0+)
  - Added heartbeat format
  - Added "sn" field into JSON+ODID
- 2.0 (Scout v3.10.0+)
  - Support for MQTTS and MQTTS+WS (no client certs)
  - BREAKING: Change URL format for MQTT
  - Add "mac", "counter" and "recv_id" to JSON+ODID message

Transport options

Messages might be sent to Dronetag's servers.

Custom forwarders are also available. Forwarders support batching - then the data are appended as-is. Every JSON ends with "\n" (hex: 0x0A) and binary messages encode their length in their respective header.

Every URL has specific functionality described below.

HTTP(S)

URL format

http(s)://[[header-name:header-value][,other-header:other value...]@]host:port/path

It is possible to specify static HTTP headers to be sent to the client by specifying them in the "authorization" part of URL. Separate multiple headers with comma.
E.g.: http://Authorization:Bearer jlsadoHIO@nkad=@myserver.cz:8081/optional/path

Currently, it isn't possible to authenticate dynamically (e.g using OAuth2).

MQTT

URL format

mqtt(s)(+ws)://[username:password@]host:port/path#topic

Currently, we support MQTT and MQTTS protocols where the secure variant is currently without private client certificates. MQTT+WS and MQTTS+WS are also available with the same constraints.

BREAKING CHANGE of 2.0: Now you can specify even /path parameter for WS and the topic name thus moved to #fragment part of URL.

Data Formats

JSON+ODID

Textual JSON format with raw fields parsed from ODID [1][2]. No indentation, nullified invalid fields (instead of passing invalid numeric values - e.g. for Location.Direction you will never see 361 that denotes invalid value in [1]).

Note: Bluetooth legacy (B4) sends each message (eg. System, Location) separately so it is up to the consumer to compose a full (PACKED) message. We intend to offer messages aggregation but currently we recommend simply ignoring B4 messages.

Key	Type	Example	Description
sn	str	1000033	
mac	str		MAC in stringified format XX:YY:ZZ:AA:BB:CC
counter	int	13	
rssi	int	-57	Reported RSSI by the receiving module
tech	str[2]	B5	Receiving technology: B4 (Bluetooth legacy), B5 (Bluetooth LE), WN (Wi-Fi Nan), WB (Wi-Fi Beacon)
recv_id	int		Module type ID (SRM RID:
module_id	int	2	Module number that received the message. Corresponds to the antenna position on the box.
module_type	int	11	Module type that received the message. Mainly for internal use.
msg_type	int	15	ODID message type as defined in the reference: BASIC_ID (0), LOCATION (1), AUTH (2), SELF_ID (3), SYSTEM (4), OPERATOR_ID (5), PACKED (15), INVALID (255); we don't forward AUTH messages
odid	dict	-	see table 1.1

table 1.0 - JSON+ODID top-level fields

ODID/JSON "odid" field

BasicID	list of Basic IDs	see table 1.2
Location	dict | null	see table 1.3
SelfID	dict | null	see table 1.4
System	dict | null	see table 1.5

OperatorID	dict | null	see table 1.6

table 1.1 - JSON+ODID "odid" field

JSON+ODID "odid. BasicID" field

This field is AN ARRAY of the objects described in the table below.

Key	Type	Example	Description
UAType	int	0	UNKNOWN=0, AEROPLANE=1, HELICOPTER_OR_MULTIROTOR=2, GYROPLANE=3, HYBRID_LIFT=4, ORNITHOPTER=5, GLIDER=6, KITE=7, FREE_BALLOON=8, CAPTIVE_BALLOON=9, AIRSHIP=10, FREE_FALL_PARACHUTE=11, ROCKET=12, TETHERED_POWERED_AIRCRAFT=13, GROUND_OBSTACLE=14, OTHER=15
IDType	int	1	NONE=0, SERIAL_NUMBER=1, CAA_REGISTRATION_ID=2, UTM_ASSIGNED_UUID=3, SPECIFIC_SESSION_ID=4
UASID	str		e.g.: 1596F350457791312042

table 1.2 - JSON+ODID "odid.BasicID[]" field

JSON+ODID "odid.Location" field

Position of the aircraft. This will be the most common message over B4. Other techs use mainly PACKED messages with location included. Used units: M - meters, M/S - meters per second, NM nautical miles (1.852 km).

Key	Type	Example	Description
Status	int	1	UNDECLARED = 0, GROUND = 1, AIRBORNE = 2, EMERGENCY = 3, REMOTE_ID_SYSTEM_FAILURE = 4,
Longitude	float | null	14.4666903	-180 - +180; 7 decimal places

Latitude	float | null	50.0739989	-90 - +90; 7 decimal places
Direction	int | null	180	0-360 degrees
SpeedHorizontal	float | null	254.25	0.0-255.0 m/s. Positive only. Invalid, if speed is >= 254.25 m/s: 254.25m/s
SpeedVertical	float | null		m/s. Invalid, No Value, or Unknown: 63m/s. If speed is >= 62m/s: 62m/s
AltitudeBaro	float | null	154.0	meter (Ref 29.92 inHg, 1013.24 mb)
AltitudeGeo	float | null	272.0	meter (WGS84-HAE)
HeightType	int	0	OVER_TAKEOFF = 0, OVER_GROUND = 1
Height	float | null		meters; can be negative
HorizAccuracy	int	12	UNKNOWN=0, 10NM=1, 4NM=2, 2NM=3, 1NM=4, 0_5NM=5, 0_3NM=6, 0_1NM=7, 0_05NM=8, 30M=9, 10M=10, 3M=11, 1M=12
VertAccuracy	int	3	UNKNOWN=0, 150M=1, 45M=2, 25M=3, 10M=4, 3M=5, 1M=6
BaroAccuracy	int	3	the same as VertAccuracy
SpeedAccuracy	int	3	UNKNOWN=0, 10M/S=1, 3M/S =2, 1M/S=3, 0.3M/S =4
TSAccuracy	int	1	UNKNOWN=0, 0.1s=1, 0.2s=2, 0.3s=3, 0.4s=4, 0.5s=5, 0.6s=6, 0.7s=7, 0.8s=8, 0.9s=9, 1.0s=10, 1.1s=11, 1.2s=12, 1.3s=13, 1.4s=14, 1.5s=15
Timestamp	str|null		date-time in ISO 8601 format; UTC, accuracy is given by the field above.

table 1.3 - JSON+ODID "odid.Location" field

JSON+ODID "odid.SelfID " field

The Self-ID Message is optionally sent in case the Remote Pilot wishes to declare its identity, flight purpose or both. This may serve as mitigation of a perceived threat by a neighbouring person or the public in case a UA is operating in the same close area.

Key	Type	Example	Description

DescType	int	0	TEXT=0, EMERGENCY=1, EXTENDED_STATUS=2
Desc	str		

table 1.4 - JSON+ODID "odid.SelfID" field

JSON+ODID "odid.System " field

Contains information about the Remote Pilot location and a swarm (if applicable).

Key	Type	Example	Description
OperatorLocationType	int	0	TAKEOFF=0, LIVE_GNSS=1, FIXED=2
ClassificationType	int	1	UNDECLARED=0, EU=1
OperatorLatitude	float | null	null	-90 - +90; 7 decimal places
OperatorLongitude	float | null	null	-180 - +180; 7 decimal places
AreaCount	int	1	quantity in a swarm; default 1
AreaRadius	int	250	meters, farthest horizontal distance from any UA's position in a group
AreaCeiling	float | null	100	meters, can be negative, maximal altitude of a swarm
AreaFloor	float | null	-1000	meters, can be negative, minimal altitude of a swarm
CategoryEU	int	1	UNDECLARED=0, OPEN=1, SPECIFIC=2, CERTIFIED=3
ClassEU	int	0	UNDECLARED=0, CLASS_0=1 … CLASS_6=7
OperatorAltitudeGeo	float | null	399.0	meters (WGS84-HAE)
Timestamp	str | null		date-time in ISO 8601 format; UTC, resolution 1 second

table 1.5 - JSON+ODID "odid.System" field

JSON+ODID "odid.OperatorID " field

UAS Operator Registration Number.

Key	Type	Example	Description
OperatorIdType	int	0	OPERATOR_ID=0
OperatorId	str		

table 1.6 - JSON+ODID "odid.OperatorID " field

JSON+ODID data sample

{"rssi": -92, "tech": "B5", "recv_id": 2, "module_id": 0, "module_type": 11, "msg_type": 15, "odid": {"BasicID": [{"UAType": 0, "IDType": 1, "UASID": "1596F359746167260079"}], "Location": {"Status": 1, "Direction": null, "SpeedHorizontal": null, "SpeedVertical": null, "Latitude": null, "Longitude": null, "AltitudeBaro": -23.5, "AltitudeGeo": null, "HeightType": 0, "Height": 0.0, "HorizAccuracy": 0, "VertAccuracy": 0, "BaroAccuracy": 0, "SpeedAccuracy": 0, "TSAccuracy": 0, "Timestamp": "2025-04-06T06:22:58"}, "SelfID": null, "System": {"OperatorLocationType": 0, "ClassificationType": 1, "OperatorLatitude": null, "OperatorLongitude": null, "AreaCount": 1, "AreaRadius": 0, "AreaCeiling": null, "AreaFloor": null, "CategoryEU": 1, "ClassEU": 0, "OperatorAltitudeGeo": null, "Timestamp": "2025-04-06T07:22:58"}, "OperatorID": {"OperatorIdType": 0, "OperatorId": ""}}}
{"rssi": -75, "tech": "B4", "recv_id": 2, "module_id": 0, "module_type": 11, "msg_type": 1, "odid": {"BasicID": [], "Location": {"Status": 1, "Direction": null, "SpeedHorizontal": null, "SpeedVertical": null, "Latitude": null, "Longitude": null, "AltitudeBaro": -22.5, "AltitudeGeo": null, "HeightType": 0, "Height": 0.0, "HorizAccuracy": 0, "VertAccuracy": 0, "BaroAccuracy": 0, "SpeedAccuracy": 0, "TSAccuracy": 0, "Timestamp": "2025-04-06T06:22:59"}, "SelfID": null, "System": null, "OperatorID": null}}twe

Heartbeat

Heartbeat messages are sent periodically in JSON format.

Key	Type	Example	Description
sn	str	1000003473	Serial Number
timestamp	int	0	UNIX timestamp (seconds since 1970-01-01 00:00:00)
receivers	int	2	Number of currently active receiving modules
last_observation	int | null		UNIX timestamp of the last observed message
gnss_position	[float,float] | null		[lat, lon] if GNSS service is available and turned on
gnss_satellites	int	12	Number of visible satelites

References

[1] ODID reference implementation https://github.com/opendroneid/opendroneid-core-c/blob/dfaf3b991a660ce28748bce0e9538564f2c4ee47/libopendroneid/opendroneid.h
[2] ASD-STAN D5 WG8 technical reference