

Drone Tracking JSON Format

General:

The JSON drone tracking structure contains three sets of information:

- **Timing:** the start and end time of the current interval
- **Antennas:** name, location, orientation and current state of the antennas used
- **Detections:** drone detections including directions relative to the antennas and global position

Positions and Directions:

Positions can be either given as global coordinates in degrees or relative to another object in 3D meter coordinates with X being E/W, Y for N/S and Z for vertical distance.

Directions are given in radians, where azimuth is the angle relative to north and altitude the angle relative to the plane (<https://en.wikipedia.org/wiki/Azimuth>).

Antenna:

Name	Type	Unit	Meaning
antennaID	I64		A unique ID for the antenna, referenced by the detections in the tracking struct
antennaName	String		Name given to the antenna block
latitude	F64	Degree	Latitude of the global antenna position
longitude	F64	Degree	Longitude of the global antenna position
azimuth	F32	Radians	Current direction of a "rotating" antenna
segments	F32[]	Radians	Orientation of the antenna sectors



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Detection:

Name	Type	Unit	Meaning
antennaID	I64		The unique ID of the antenna reporting this detection
detectionID	I64		Unique ID of this detection
detectStartTime	F64	Seconds	Start time of this detections in seconds since the start of the epoch
detectStopTime	F64	Seconds	Last time the detection was made in seconds since the start of the epoch
azimuthValid	Bool		True if the azimuth measurement is valid
altitudeValid	Bool		True if the altitude measurement is valid
azimuth	F32	Radians	Azimuth of the target detected relative to the antenna
altitude	F32	Radians	Altitude of the target detected relative to the plane
rawAzimuth	F32	Radians	Azimuth prior to Kalman filtering
rawAltitude	F32	Radians	Altitude prior to Kalman filtering
devAzimuth	F32	Radians	Standard deviation for the azimuth
devAltitude	F32	Radians	Standard deviation for the altitude



distance	F32		Relative distance factor of the target for this detection
probability	F32	Percent	Probability of the detection
maxProbability	F32	Percent	Maximum probability of the detection since the start of the detection
energy	F32	dBm	Energy of the detected source
maxEnergy	F32	dBm	Maximum energy of the detected source since the start of the detection
directionalEnergy	F32[]		Energy of the detected source split into the individual sectors of the antenna

Tracking:

Name	Type	Unit	Meaning
trackID	I64		Unique ID of the tracked target
detectorIndex	I32		Internal index of the detector that follows the target
detectorName	String		Internal name of the detector that follows the target
detections	Detection[]		List of the detections for this tracking
positionValid	Bool		True if the position for this tracking is valid
xpos	F32	Meter	Relative East/West position of the target to the reference antenna



ypos	F32	Meter	Relative North/South position of the target to the reference antenna
zpos	F32	Meter	Relative vertical position of the target to the reference antenna
raw(XYZ)Pos	F32	Meter	Relative position to the target of the reference antenna without Kalman filtering
dev(XYZ)Pos	F32	Meter	Standard deviation of the filtered position
positionTime	F64	Seconds	Time in seconds since the epoch when the position was last updated
refLatitude	F64	Degree	Latitude of the reference antenna
refLongitude	F64	Degree	Longitude of the reference antenna
refElevation	F64	Meter	Meters above sea level of the reference antenna
latitude	F64	Degree	Latitude of the tracked target
longitude	F64	Degree	Longitude of the tracked target
elevation	F64	Meter	Meters above sea level of the tracked target

Track State:

Name	Type	Unit	Meaning
antennas	Antenna[]		Antennas active in the system
trackings	Tracking[]		Current tracked targets

