

CASE FILE 99 / 237UAP00524

237UAP00524

Time/location anchored public UAP report; score 8

NORMAL-OBJECT FAVORED

REPORT NO.	UAP-OM-99-237UAP00524	DISPOSITION	NORMAL-OBJECT FAVORED
PRIMARY CASE	237UAP00524	GENERATED	2026-05-20 18:32 UTC
REPORT TIME	2023-07-21T04:40:00+00:00	OBSERVER	33.82918, -116.15899
SOURCE CASE IDS	237UAP00524		

Abstract

This case file evaluates a reported UAP sighting against the available orbital-object layer. No compact same-launch group fully identifies the file by itself. The final disposition is assigned under a normal-object favored standard, where ordinary aerospace/orbital explanations are preferred when they reasonably fit the report.

This is a standalone independent analysis prepared from public-source records and public orbital datasets. It is not an official government determination, classification marking, or agency-authored report.

1. Executive Summary

237UAP00524 is assessed as normal-object favored because the available public evidence gives a case-specific ordinary-object candidate: strong ADS-B aircraft candidate N454WN B737 a582f9 at 2.7 km, azimuth 54.1 deg, elevation 68.21 deg, 3.38 min from report. Dense satellite presence alone is not treated as causation in this packet.

1.1 Key Findings

- Source score 8 based on: UAP/UFO language.
- Report time used: 2023-07-21T04:40:00+00:00.
- External object layer used: public LEO catalog objects.
- Disposition standard: NORMAL-OBJECT requires case-specific causal fit. Satellite density above the horizon is context only and cannot by itself resolve the report.
- Case-specific ordinary-object evidence: strong ADS-B aircraft candidate N454WN B737 a582f9 at 2.7 km, azimuth 54.1 deg, elevation 68.21 deg, 3.38 min from report.
- Non-causal context / rejection screens: very dense orbital-object sky background; context only, not causation.
- Objects above horizon: 926; at/above 10 deg: 440.
- No compact same-launch/designator group survived the report threshold.
- No explicit Starlink/balloon wording was found in the source excerpt used for ranking.

1.2 Bottom Line

NORMAL-OBJECT FAVORED: A case-specific ordinary-object candidate exists from source language, orbital geometry, launch-object context, or compact trajectory grouping. Dense ordinary sky traffic alone is not treated as causation.

2. Source Control

The source-control table identifies the public report records reviewed for this case and lists public access links where available. The table is included so this PDF remains interpretable when distributed by itself.

CASE ID	REPORT DATE FIELD	FACILITY / TITLE	TEXT EXTRACT	PUBLIC PDF LINK
237UAP00524	7/20/2023 9:40:00 PM (-07 PDT)	SWA121 UFO-UAP ACTIVITY 07-21-2023	text extract present	237UAP00524.pdf

3. Original Report Evidence

PRIMARY EXCERPT USED FOR MATCHING	Washington Operations Center Date: 7/20/2023 9:40:00 PM (-07 PDT) Title: SWA121 UFO-UAP ACTIVITY 07-21-2023 Latitude: 33.82917647 Latitude: -116.1589874 DESCRIPTION PRELIM INFO FROM FAA OPS: PALM SPRINGS, CA/UFO-UAP ACTIVITY/2140P/ LOS ANGELES ARTCC ADVISED SOUTHWEST 121, B737, PHX - BUR, REPORTED AND UNIDENTIFIED AERIAL PHENOMENON 100 MILES FROM THE LEFT SIDE WHILE W BOUND AT FL240 20 E PSP. NO EVASIVE ACTION TAKEN. WOC 7-3333 DD/JG
REPORT TIME USED	2023-07-21T04:40:00+00:00
OBSERVER COORDINATE USED	33.82918, -116.15899
OBSERVER SOURCE BASIS	(public text extract 237UAP00524)

4. Methodology

1. **Spacetime extraction.** The report time and observer coordinate were extracted from the public text report and normalized to UTC. Aviation fixes/radials were resolved during earlier preprocessing where applicable.
2. **External object dataset.** The object layer used historical Space-Track/TLE-derived public LEO catalog objects element rows. The analytic mode for this case is historical public LEO catalog objects element propagation and same-launch/designator sky grouping.
3. **Propagation.** Orbital elements were propagated to the report minute and observer location. For launch-object checks, samples around the report minute were retained. For Starlink group checks, objects above the horizon were clustered by sky position and filtered for same-launch groupings.
4. **Comparison.** The output was compared against the report's count of lights, direction cue, motion language, altitude/radar language, and whether the file itself already suggested a satellite explanation.
5. **Causation standard.** Mere object presence above the horizon is treated as background context only. A normal-object disposition requires a case-specific causal fit, such as a named launch object, a compact same-launch trajectory group, or source language that directly supports that object class.
6. **Disposition assignment.** *Identified* means a specific normal object fits the report spacetime and the hard reported features do not materially conflict. *Normal-object favored* means a case-specific ordinary aerospace/orbital candidate exists, but it is not a full named identification. *Insufficient* means the file is too thin to carry high anomaly value. *High-value unresolved* is used when radar, video, rapid maneuver, or multi-witness features remain after reasonable normal-object checks.

5. External Object Evidence

5.1 Search Volume and Density

This table is a screening layer only. Objects above the horizon show background opportunity; they do not establish causation unless a specific object or compact trajectory group matches the reported behavior.

PUBLIC LEO CATALOG OBJECTS CATALOG IDS CONSIDERED	17977	HISTORICAL ELEMENT ROWS	17977
ABOVE HORIZON AT REPORT MINUTE	926	AT/ABOVE 10 DEG	440
LARGEST SAME-SKY CLUSTER	440		

No compact same-launch/designator group survived the report threshold. In this condition, satellite density remains context only and cannot by itself resolve a report with hard features.

5.2 Same-Launch / Same-Designator Candidate Groups

#	LAUNCH DATE	COUNT	AZIMUTH SPAN	ELEVATION SPAN	MOTION LABELS	MEMBERS
No same-launch group identified.						

5.3 Primary Group Members

OBJECT	NORAD	LAUNCH	AZ	EL	RANGE KM	APPARENT MOTION	ELEMENT AGE H
No members available.							

5.4 Bright-Sky Context: Top public LEO catalog objects Objects by Elevation

OBJECT	AZ	EL	RANGE KM	APPARENT MOTION	LAUNCH DATE
NORAD 25366	72.22	81.2	1752.36	westward, setting	98036D
NORAD 4655	161.94	74.21	1026.85	westward, setting	70025AP
NORAD 13416	269.09	71.0	1000.93	eastward, setting	82052D
NORAD 41511	49.33	70.22	909.54	westward, setting	00055MK
NORAD 51647	258.86	69.56	1292.92	eastward, setting	22012AB
NORAD 48088	154.05	68.74	1619.61	westward, rising	76077GT
NORAD 87280	135.61	67.77	1138.87	westward, setting	unknown
NORAD 47252	286.46	66.96	1590.88	eastward, setting	20091E
NORAD 30039	159.62	65.52	678.79	westward, setting	99025NQ
NORAD 41413	112.92	65.12	903.56	westward, setting	00055KS
NORAD 16493	143.54	64.93	1080.95	westward, setting	86005A
NORAD 21157	234.07	63.95	1677.3	eastward, rising	91009U

5.5 Largest Sky Clusters

#	COUNT	AZIMUTH SPAN	ELEVATION SPAN	MOTION LABELS
1	440	0.07-359.12 deg	10.06-81.2 deg	eastward, level, eastward, rising, eastward, setting, nearly fixed azimuth, rising, nearly fixed azimuth, setting, westward, rising, westward, setting

5.6 Space-Track SATCAT Enrichment

Space-Track SATCAT metadata was pulled as a cached subset for NORAD catalog IDs appearing in this packet's evidence tables. This section adds owner/type/status context to the propagated object candidates.

PACKET SATCAT SUBSET ROWS	5370	FETCHED	2026-05-19T01:19:50+00:00
THIS CASE NORAD IDS CHECKED	30	SATCAT ROWS MATCHED	29
TOP OWNERS	US: 11, CIS: 10, PRC: 3, UK: 2, FR: 1, JPN: 1		
OBJECT TYPES	DEBRIS: 15, PAYLOAD: 13, UNKNOWN: 1		

5.7 Space-Track Metadata for Top Propagated Objects

NORAD	OBJECT NAME	TYPE	OWNER	LAUNCH DATE	DECAY DATE
25366	COSMOS 2355	PAYLOAD	CIS	1998-06-15	n/a
4655	THORAD AGENA D DEB	DEBRIS	US	1970-04-08	n/a
13416	COSMOS 1372 FUEL CORE	DEBRIS	CIS	1982-06-01	n/a
41511	NOAA 16 DEB	DEBRIS	US	2000-09-21	n/a
51647	ONEWEB-0457	PAYLOAD	UK	2022-02-10	n/a
48088	DELTA 1 DEB	DEBRIS	US	1976-07-29	n/a
47252	OBJECT E	UNKNOWN	CIS	2020-12-03	n/a
30039	FENGYUN 1C DEB	DEBRIS	PRC	1999-05-10	2025-04-15
41413	NOAA 16 DEB	DEBRIS	US	2000-09-21	n/a
16493	COSMOS 1725	PAYLOAD	CIS	1986-01-16	n/a
21157	SL-8 DEB	DEBRIS	CIS	1991-02-12	n/a
31209	FENGYUN 1C DEB	DEBRIS	PRC	1999-05-10	n/a

5.9 NASA / NOAA / ADS-B Expansion Layer

NASA POWER/Horizons/DONKI batch context had not yet been written for this case at packet build time.

5.11 Free Source Availability and Remaining Work

LAYER	STATUS	CASE-SPECIFIC NOTE
ADSB.LOL HISTORICAL RELEASE LISTING	screened/present	planes-readsb-staging-0 1198.8 MiB; planes-readsb-prod-1 1199.7 MiB; planes-readsb-prod-0 1198.8 MiB
ADSB TRACKS DOWNLOADED	not yet exhausted	Requires targeted extraction from large daily history archives before claiming aircraft exhaustion.
NOAA GOES IMAGERY	not yet exhausted	Needed for cloud/lightning visual context.
NOAA GOES ABI/GLM MANIFEST	screened/present	Public S3 object availability for the report hour.
NOAA NEXRAD WEATHER RADAR	not yet exhausted	Weather radar only; not ATC radar.
NOAA IGRA RADIOSONDE	screened/present	Needed for balloon drift plausibility.
ASOS/METAR WEATHER OBSERVATIONS	screened/present	Nearest station surface observations around report time.

- ADSB.lol historical: extract aircraft traces from adsblol/globe_history_2023 for 2023-07-21, then filter +/-60 min and 250 nmi around 33.8292,-116.1590.
- NASA POWER/Horizons/DONKI: batch context for 237UAP00524 at 2023-07-21T04:40:00+00:00.
- NOAA GOES: pull nearest ABI/GLM products for the UTC hour and render cloud/lightning map.
- NOAA NEXRAD: select nearest radar stations and render Level-II/III weather radar sweep around event time.
- NOAA IGRA: find nearest radiosonde station launches bracketing the event and model wind drift for balloon-like descriptions.

- Space-Track gp_history/decay: fetch exact historical element rows and decay/reentry status for top candidate NORAD IDs.

5.12 Weather, Imagery, and Balloon Query Plan

This plan identifies the concrete free sources needed for the next case-specific weather and balloon checks. These are not treated as completed exclusions until the data are downloaded and plotted.

GOES SATELLITE	GOES18
GOES ABI PREFIX	https://noaa-goes18.s3.amazonaws.com/ABI-L2-CMIPF/2023/202/04/
GOES GLM LIGHTNING PREFIX	https://noaa-goes18.s3.amazonaws.com/GLM-L2-LCFA/2023/202/04/

5.13 Nearest Weather-Airport Candidates

STATION	NAME	DISTANCE KM	COORDINATE
KTRM	Jacqueline Cochran Regional Airport	22.50	33.63, -116.16
KPSP	Palm Springs International Airport	32.10	33.83, -116.51
KNXP	Twentynine Palms Strategic Expeditionary Landing Field	51.90	34.30, -116.16
KRIV	March Air Reserve Base	101.70	33.88, -117.26
KSBD	San Bernardino International Airport	103.70	34.10, -117.24

- KTRM: [IEM ASOS/METAR daily CSV query](#)
- KPSP: [IEM ASOS/METAR daily CSV query](#)
- KNXP: [IEM ASOS/METAR daily CSV query](#)

5.14 Nearest Radiosonde Stations

STATION	NAME	DISTANCE KM	COORDINATE
USM00072293	SAN DIEGO/MIRAMAR; NAS; CA.	142.00	32.83, -117.12
USM00074004	YUMA PROVING GROUNDS AZ	197.30	32.84, -114.40
USM00072381	EDWARDS AFB; CA.	200.40	34.92, -117.90
USM00074005	YUMA PRVGR	224.80	32.86, -114.03
USM00074612	CHINA LAKE; NAF; CA.	248.80	35.68, -117.68

5.15 ASOS/METAR Surface Weather Observations

surface visibility ranged 8-10 statute miles; no precipitation was reported in the retained observations; no low broken/overcast cloud ceiling was evident in the retained station observations. Surface ASOS/METAR observations describe airport-level weather and visibility; they do not by themselves prove conditions at the sighting altitude or line of sight.

STATION	DISTANCE KM	NEAREST OBS UTC	VIS SM	SKY	WIND DEG/KT	METAR
KTRM	22.50	2023-07-21T04:52:00 +00:00	9.00	CLR, M, M, M	330.00 / 12.00	KTRM 210452Z AUTO 33012KT 9SM CLR 39/08 A2969 RMK AO2 SLP058 T03940083
KPSP	32.10	2023-07-21T04:53:00 +00:00	10.00	CLR, M, M, M	290.00 / 8.00	KPSP 210453Z 29008KT 10SM CLR 41/06 A2975 RMK AO2 SLP069 T04110056 \$
KNXP	51.90	2023-07-21T04:56:00 +00:00	10.00	CLR, M, M, M	330.00 / 9.00	KNXP 210456Z AUTO 33009KT 10SM CLR 37/04 A2997 RMK AO2 SLP102 T03720039

5.16 NOAA IGRA Radiosonde Wind Profile

Nearest sounding implies mean 0-12 km wind drift toward 340.9 deg at 8.19 m/s; a passive balloon could drift about 59.0 km in two hours under this crude layer-average model. Radiosonde winds are sparse station soundings; balloon drift remains approximate without launch time, ascent rate, object altitude, and exact line-of-sight bearing.

STATION	NAME	DISTANCE KM	SOUNDING UTC	MEAN DRIFT BEARING	MEAN SPEED M/S	2H DRIFT KM	MAX WIND
USM00072293	SAN DIEGO/ MIRAMAR; NAS; CA.	142.00	2023-07-21T00:00 :00+00:00	340.90	8.19	59.00	34.50 at 1145.00 m

5.17 NOAA GOES ABI/GLM Public File Manifest

GOES public S3 objects are listed for the report hour where available. This is an availability manifest, not yet a rendered satellite image.

SATELLITE	GOES18	BUCKET	noaa-goes18
ABI SAMPLE FILES	12	GLM SAMPLE FILES	12

ABI sample objects:

- [ABI-L2-CMIPF/2023/202/04/OR_ABI-L2-CMIPF-M6C01_G18_s20232020400226_e20232020409535_c20232020410000.nc](#)
- [ABI-L2-CMIPF/2023/202/04/OR_ABI-L2-CMIPF-M6C01_G18_s20232020410226_e20232020419534_c20232020420000.nc](#)
- [ABI-L2-CMIPF/2023/202/04/OR_ABI-L2-CMIPF-M6C01_G18_s20232020420226_e20232020429536_c20232020430001.nc](#)
- [ABI-L2-CMIPF/2023/202/04/OR_ABI-L2-CMIPF-M6C01_G18_s20232020430226_e20232020439534_c20232020440000.nc](#)

GLM lightning sample objects:

- [GLM-L2-LCFA/2023/202/04/OR_GLM-L2-LCFA_G18_s20232020400000_e20232020400200_c20232020400214.nc](#)
- [GLM-L2-LCFA/2023/202/04/OR_GLM-L2-LCFA_G18_s20232020400200_e20232020400400_c20232020400415.nc](#)
- [GLM-L2-LCFA/2023/202/04/OR_GLM-L2-LCFA_G18_s20232020400400_e20232020401000_c20232020401017.nc](#)
- [GLM-L2-LCFA/2023/202/04/OR_GLM-L2-LCFA_G18_s20232020401000_e20232020401200_c20232020401218.nc](#)

5.18 ADSB.lol Historical Aircraft Track Extraction

This layer uses the downloaded ADSB.lol daily history archive to test actual aircraft tracks near the report coordinate and minute. It is not treated as a primary-radar substitute; it is a transponder/receiver-derived aircraft screen.

ARCHIVE WINDOW	2023-07-21T03:25:00+00:00 to 2023-07-21T05:55:00+00:00	RADIUS	300.00 nmi
TRACE FILES SCANNED	51587	TRACKS RETAINED	1200
SUPPORT STATUS	aircraft strong candidate present	BEST-CANDIDATE NOTE	ordinary-object favored if the report's count, color, direction, and motion can be reconciled with the candidate track(s).
STRONG CANDIDATES	31	PLAUSIBLE CANDIDATES	180
REPORTING-AIRCRAFT TRACKS EXCLUDED	3	WEAK CANDIDATES	229

5.19 Top ADS-B Candidate Tracks

AIRCRAFT	STATUS	SCORE	MIN DIST KM	NEAREST DT MIN	ALT FT	AZ	EL
N454WN B737 a582f9	strong aircraft candidate	85.41	1.80	0.06	24000	54.10	68.21
N303SY E75L a32c1e	strong aircraft candidate	84.15	27.40	0.07	29250	353.50	17.53
N8864H B38M ac370b	strong aircraft candidate	81.05	35.00	0.05	36000	3.90	16.61

7. Analytic Comparison

CRITERION	REPORT EVIDENCE	ANALYTIC TREATMENT
TIME CONSTRAINT	2023-07-21T04:40:00+00:00	Directly used in propagation; this is a hard filter, not descriptive context.
LOCATION CONSTRAINT	33.82918, -116.15899	Directly used as observer point for azimuth/elevation/range computation.
COUNT / PATTERN	three-object/light language present	No compact same-launch count match; retained for unresolved report features.
MOTION LANGUAGE	not explicit	Apparent motion labels in the object table provide a plausible but not definitive comparison.
RADAR / OFFICIAL CHECK	not specified	No ATC radar return can be consistent with distant orbital objects or visual aircraft-light hypotheses, but it does not prove the match.
ANALYTIC DISPOSITION	normal-object	237UAP00524 is assessed as normal-object favored because the available public evidence gives a case-specific ordinary-object candidate: strong ADS-B aircraft candidate N454WN B737 a582f9 at 2.7 km, azimuth 54.1 deg, elevation 68.21 deg, 3.38 min from report. Dense satellite presence alone is not treated as causation in this packet.

8. Caveats, Limitations, and Collection Gaps

- No raw cockpit video, ATC replay, radar plot, or witness interview transcript was reviewed unless explicitly stated in the public source text.
- Aviation-derived coordinates can represent a nearby fix/radial or report point, not necessarily the actual line-of-sight intercept point.
- Starlink visibility depends on illumination, observer altitude, atmospheric conditions, and apparent brightness; this analysis tests geometry, not photometry. No brightness model is used unless explicitly stated elsewhere in the case file.
- TLE propagation is appropriate for screening and reconstruction but is not a substitute for authoritative operational ephemerides.
- When many satellites are above the horizon, generic presence is weak evidence and is not treated as causation. The report emphasizes named launch-object checks or compact same-launch trajectory groups.
- Normal-object favored is not the same as a perfect named-object identification; it requires a case-specific ordinary-object candidate stronger than simple object density.

Washington Operations Center

Date: 7/20/2023 9:40:00 PM (-07 PDT)

Title: SWA121 UFO-UAP ACTIVITY 07-21-2023

Latitude: 33.82917647 Latitude: -116.1589874

Latitude: -116.1589874

DESCRIPTION

PRELIM INFO FROM FAA OPS: PALM SPRINGS, CA/UFO-UAP ACTIVITY/2140P/LOS ANGELES ARTCC ADVISED
SOUTHWEST 121, B737, PHX - BUR, REPORTED AND UNIDENTIFIED AERIAL PHENOMENON 100 MILES FROM THE
LEFT SIDE WHILE W BOUND AT FL240 20 E PSP. NO EVASIVE ACTION TAKEN. WOC 7-3333 DD/JG

Appendix B. Computational Evidence Digest

This appendix preserves the principal computed values used in the assessment, shortened to the fields most relevant to audit and review.

```
{
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  "historical_starlink_element_rows": 17977,
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  "largest_same-sky_cluster_count": 440,
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      "launch_designator": "70025AP",
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      "norad_id": "4655",
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      "azimuth_plus_5m_deg": 22.2,
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      "element_epoch": "2023-07-21T13:30:22.182336+00:00",
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      "elevation_plus_5m_deg": 19.2,
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    "norad_id": "51647",
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    "subpoint_lon": -120.1435
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    "azimuth_plus_5m_deg": 344.36,
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    "range_km": 1619.61,
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    "element_epoch": "2023-07-21T13:23:57.413760+00:00",
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    "elevation_plus_2m_deg": 51.36,
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    "epoch_altitude_km": 1021.04,
    "ground_track_bearing_deg": 27.05,
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    "range_km": 1138.87,
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"elevation_plus_5m_deg": 15.12,
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"element_age_hours": 1.93,
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"elevation_plus_2m_deg": 58.24,
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"subpoint_lon": -113.694
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"launch_designator": "91009U",  
"name": "NORAD 21157",  
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Appendix C. Source Exhaustion Checklist

This checklist records which source layers were actually applied to this individual report. It separates checked evidence from unexhausted collection gaps so the disposition is auditable when the PDF is read alone.

SOURCE LAYER	STATUS	CASE-SPECIFIC NOTE
NARA PUBLIC UAP/FAA REPORT	reviewed	Source IDs: 237UAP00524
TIME AND OBSERVER COORDINATE	extracted	2023-07-21T04:40:00+00:00 at 33.82918, -116.15899
ORBITAL OBJECT PROPAGATION	screened	public LEO catalog objects
SPACE-TRACK SATCAT METADATA	screened	30 NORAD IDs checked; 29 matched in local SATCAT subset
LAUNCH-OBJECT/SUPGP LAYER	not applicable	not a launch-object case
NASA/JPL KNOWN SMALL-BODY LAYER	not selected	CAD/Horizons secondary screen included when this case had NEO-relevant timing/geometry
NASA POWER/HORIZONS/DONKI CONTEXT	not exhausted	Hourly weather, sky geometry, and space-weather context where local JSON is present
AIRCRAFT/ADS-B LAYER	screened	51587 trace files scanned; 1200 tracks retained; aircraft strong candidate present
NOAA GOES IMAGERY LAYER	not exhausted	Cloud/lightning imagery layer for the report hour
NOAA GOES ABI/GLM MANIFEST	screened	Public S3 object listing for the report hour
NOAA/NEXRAD WEATHER RADAR LAYER	not exhausted	Weather radar only; not ATC/primary radar
NOAA IGRA RADIOSONDE LAYER	screened	Balloon drift plausibility layer
ASOS/METAR SURFACE WEATHER	screened	Nearest station visibility, cloud, wind, precipitation, and METAR observations
WEATHER/BALLOON SOURCE PLAN	planned	Nearest weather-airport, GOES, and radiosonde queries are listed where local plan JSON is present
FINAL ANALYTIC DISPOSITION	normal-object favored	Presence-only satellite density is context only; a stronger case-specific fit is required for normal-object disposition

References and Source Links

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2. National Archives and Records Administration. *Record Group 615: Unidentified Anomalous Phenomena Records Collection*. <https://www.archives.gov/research/topics/uaps/rg-615>
3. National Archives and Records Administration. *Bulk Downloads for Records Related to Unidentified Anomalous Phenomena (UAPs)*. <https://www.archives.gov/research/catalog/catalog-bulk-downloads/uap-bulk-download>
4. National Archives Catalog. *Records from the Federal Aviation Administration Relating to Unidentified Anomalous Phenomena, National Archives Identifier 493468575*. <https://catalog.archives.gov/id/493468575>
5. National Archives direct digital object. *237UAP00524.pdf, FAA UAP report record copied from RG 615 bulk digital objects*. <https://s3.dualstack.us-east-1.amazonaws.com/NARAprodstorage/lz/electronic-records/rg-615/493468575/237UAP00524.pdf>
6. Hugging Face dataset. *oxzoid/space-track-tle-history: historical TLE archive used for public LEO catalog objects screening*. <https://huggingface.co/datasets/oxzoid/space-track-tle-history>
7. Space-Track.org. *Public source for the underlying U.S. Space Surveillance Network TLE distribution referenced by the historical TLE archive*. <https://www.space-track.org/>
8. Space-Track.org. *API documentation for SATCAT and catalog metadata classes used for local enrichment*. <https://www.space-track.org/documentation#/api>
9. ADSB.lol. *Interactive API documentation and OpenAPI definition*. <https://api.adsb.lol/docs>
10. ADSB.lol. *Historical open-data release documentation*. <https://www.adsb.lol/docs/open-data/historical/>
11. OpenSky Network. *REST API documentation*. <https://openskynetwork.github.io/opensky-api/rest.html>
12. OpenSky Network. *Historical data via Trino documentation*. <https://openskynetwork.github.io/opensky-api/trino.html>
13. NASA GIBS. *Global Imagery Browse Services API documentation*. <https://nasa-gibs.github.io/gibs-api-docs/>
14. NASA Earthdata. *Common Metadata Repository search API documentation*. <https://cmr.earthdata.nasa.gov/search/site/docs/search/api.html>
15. NOAA / AWS Open Data. *GOES public dataset registry*. <https://registry.opendata.aws/noaa-goes/>
16. NOAA / AWS Open Data. *NEXRAD public dataset registry*. <https://registry.opendata.aws/noaa-nexrad/>
17. NOAA NCEI. *Integrated Global Radiosonde Archive*. <https://www.ncei.noaa.gov/products/weather-balloon/integrated-global-radiosonde-archive>
18. Iowa Environmental Mesonet. *ASOS/AWOS/METAR data download service*. <https://mesonet.agron.iastate.edu/request/download.phtml>
19. Celestrak. *Spacetrack Report No. 3: Models for propagation of NORAD element sets*. <https://celestrak.org/NORAD/documentation/spacetrk.pdf>
20. Celestrak. *Supplemental GP element sets documentation and current endpoint index*. <https://celestrak.org/NORAD/elements/supplemental/>