

CASE FILE 33 / 237UAP00049

# 237UAP00049

High-altitude public UAP report; score 60

HIGH-VALUE UNRESOLVED

REPORT NO.	UAP-OM-33-237UAP00049	DISPOSITION	HIGH-VALUE UNRESOLVED
PRIMARY CASE	237UAP00049	GENERATED	2026-05-20 18:32 UTC
REPORT TIME	2021-04-26T05:45:00+00:00	OBSERVER	36.36438, -81.31332
SOURCE CASE IDS	237UAP00049		

## 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

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237UAP00049 was screened against historical Starlink orbital elements at the extracted time and observer coordinate. The screen did not produce enough mundane evidence to close the case under the normal-object favored standard. Hard features retained for follow-up: multiple witnesses/facilities, hard maneuver language.

## 1.1 Key Findings

- Source score 60 based on: multiple aircraft/facility witnesses, high-altitude report, maneuvering/motion anomaly, UAP/UFO language.
- Report time used: 2021-04-26T05:45:00+00:00.
- External object layer used: Starlink.
- Disposition standard: UNRESOLVED requires case-specific causal fit. Satellite density above the horizon is context only and cannot by itself resolve the report.
- Remaining hard features: multiple witnesses/facilities; hard maneuver language.
- Objects above horizon: 46; at/above 10 deg: 17.
- 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

**HIGH-VALUE UNRESOLVED:** Hard report features remain after the normal-object screens, such as primary/radar evidence, multiple witnesses, footage references, or motion language that still conflicts with the available object layer.

# 2. Source Control

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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
237UAP00049	05:45 04/26/2021 Callsign: N39RC Origin: PBI	ZDC Operator: Operator Type: General Aviation	text extract present	<a href="#">237UAP00049.pdf</a>

### 3. Original Report Evidence

PRIMARY EXCERPT USED FOR MATCHING	PIC of N39RC and JBU1380 reported a UFO described as a white, rapidly circling light at approximately FL450 in the vicinity of IAD231240 out of the right side of the ACFs. Both pilots reported it was short in duration and disappeared at the same time. AWO/JH notified.
REPORT TIME USED	2021-04-26T05:45:00+00:00
OBSERVER COORDINATE USED	36.36438, -81.31332
OBSERVER SOURCE BASIS	aviation_radial:IAD231240 (public text extract 237UAP00049)

### 4. Methodology

- 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.
- External object dataset.** The object layer used historical Space-Track/TLE-derived Starlink element rows. The analytic mode for this case is historical Starlink element propagation and same-launch/designator sky grouping.
- 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.
- 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.
- 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.
- 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.

STARLINK CATALOG IDS CONSIDERED	1373	HISTORICAL ELEMENT ROWS	1373
ABOVE HORIZON AT REPORT MINUTE	46	AT/ABOVE 10 DEG	17
LARGEST SAME-SKY CLUSTER	2		

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 Starlink Objects by Elevation

OBJECT	AZ	EL	RANGE KM	APPARENT MOTION	LAUNCH DATE
STARLINK-1217	276.75	63.89	606.53	westward, setting	2020-02-17
STARLINK-1514	266.27	40.39	806.29	eastward, rising	2020-08-07
STARLINK-1544	65.02	29.43	1006.34	westward, setting	2020-08-07
STARLINK-1232	38.04	25.02	1124.91	eastward, setting	2020-02-17
STARLINK-1377	357.34	24.43	1143.45	eastward, setting	2020-04-22
STARLINK-1675	113.49	24.18	1146.9	westward, setting	2020-10-06
STARLINK-1309	147.74	24.0	1151.28	westward, setting	2020-03-18
STARLINK-1725	274.46	19.93	1296.04	westward, rising	2020-09-03
STARLINK-1719	104.88	19.81	1300.68	eastward, setting	2020-09-03
STARLINK-1764	181.38	19.04	1327.69	westward, setting	2020-09-03
STARLINK-1762	327.2	17.21	1414.85	eastward, rising	2020-09-03
STARLINK-1565	215.33	12.65	1641.5	westward, rising	2020-08-07

### 5.5 Largest Sky Clusters

#	COUNT	AZIMUTH SPAN	ELEVATION SPAN	MOTION LABELS
1	2	104.88-113.49 deg	19.81-24.18 deg	eastward, setting, westward, setting
2	2	354.3-357.34 deg	12.2-24.43 deg	eastward, rising, eastward, setting
3	2	327.2-339.87 deg	11.15-17.21 deg	eastward, rising, eastward, setting
4	2	289.27-299.68 deg	11.24-11.8 deg	

#	COUNT	AZIMUTH SPAN	ELEVATION SPAN	MOTION LABELS
				eastward, rising, westward, rising
5	1	276.75-276.75 deg	63.89-63.89 deg	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	30
TOP OWNERS	US: 30		
OBJECT TYPES	PAYLOAD: 30		

### 5.7 Space-Track Metadata for Top Propagated Objects

NORAD	OBJECT NAME	TYPE	OWNER	LAUNCH DATE	DECAY DATE
45226	STARLINK-1217	PAYLOAD	US	2020-02-17	2025-10-20
46046	STARLINK-1514	PAYLOAD	US	2020-08-07	2022-07-17
46031	STARLINK-1544	PAYLOAD	US	2020-08-07	2024-12-27
45213	STARLINK-1232	PAYLOAD	US	2020-02-17	2023-12-13
45547	STARLINK-1377	PAYLOAD	US	2020-04-22	2024-09-08
46575	STARLINK-1675	PAYLOAD	US	2020-10-06	2025-11-27
45414	STARLINK-1309	PAYLOAD	US	2020-03-18	n/a
46334	STARLINK-1725	PAYLOAD	US	2020-09-03	2025-02-13
46331	STARLINK-1719	PAYLOAD	US	2020-09-03	n/a
46343	STARLINK-1764	PAYLOAD	US	2020-09-03	n/a
46342	STARLINK-1762	PAYLOAD	US	2020-09-03	n/a
46037	STARLINK-1565	PAYLOAD	US	2020-08-07	2025-04-30

### 5.9 NASA / NOAA / ADS-B Expansion Layer

This source layer adds free NASA context that was previously missing from most packet cases. It is contextual evidence; it does not replace aircraft, satellite, balloon, or radar causation tests.

HOURL UTC	2021042605
CLOUD AMOUNT	0.54%
PRECIPITATION	0.0 mm/hr
10 M WIND	1.94 m/s
TEMPERATURE	4.65 C
RELATIVE HUMIDITY	100.0%
DONKI +/-1 DAY	CME: unavailable; FLR: unavailable; GST: unavailable; HSS: unavailable; IPS: unavailable; MPC: unavailable; RBE: unavailable; SEP: unavailable; WSAEnliSimulations: unavailable

### 5.10 Horizons Sky Geometry Context

OBJECT	AZ	EL	APP MAG
Sun	6.94	-39.78	-26.73
Moon	203.54	44.72	-12.53

OBJECT	AZ	EL	APP MAG
Venus	356.95	-38.00	-3.90
Mars	312.83	-11.29	1.48
Jupiter	88.52	-24.25	-2.17
Saturn	100.81	-15.11	0.67

- Sun elevation was -39.8 deg, so this was a dark-sky/nighttime sighting.
- Moon was above horizon at azimuth 203.5 deg / elevation 44.7 deg.
- No checked bright planets were above the horizon at the primary coordinate/time.
- NASA POWER cloud amount for the hour was 0.54%, with precipitation 0.0 mm/hr.

### 5.11 Free Source Availability and Remaining Work

LAYER	STATUS	CASE-SPECIFIC NOTE
ADSB.LOL HISTORICAL RELEASE LISTING	not yet exhausted	v2021-04-26-planes-readsb-prod-0, v2021-04-26-planes-readsb-prod-1, v2021-04-26-planes-readsb-staging-0, v2021-04-26-planes-readsb-mlatonly-0
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 no public ADSB.lol annual repo found for 2021-04-26, then filter +/-60 min and 250 nmi around 36.3644,-81.3133.
- NASA POWER/Horizons/DONKI: batch context for 237UAP00049 at 2021-04-26T05:45:00+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	GOES16
GOES ABI PREFIX	<a href="https://noaa-goes16.s3.amazonaws.com/ABI-L2-CMIPF/2021/116/05/">https://noaa-goes16.s3.amazonaws.com/ABI-L2-CMIPF/2021/116/05/</a>
GOES GLM LIGHTNING PREFIX	<a href="https://noaa-goes16.s3.amazonaws.com/GLM-L2-LCFA/2021/116/05/">https://noaa-goes16.s3.amazonaws.com/GLM-L2-LCFA/2021/116/05/</a>

### 5.13 Nearest Weather-Airport Candidates

STATION	NAME	DISTANCE KM	COORDINATE
KHKY	Hickory Regional Airport	69.60	35.74, -81.39
KTRI	Tri-Cities Regional TN/VA Airport	98.70	36.48, -82.41
KINT	Smith Reynolds Airport	101.20	36.13, -80.22
KBLF	Mercer County Airport	104.00	37.30, -81.21
KJQF	Concord-Padgett Regional Airport	121.50	35.39, -80.71

- KHKY: [IEM ASOS/METAR daily CSV query](#)
- KTRI: [IEM ASOS/METAR daily CSV query](#)

- KINT: [IEM ASOS/METAR daily CSV query](#)

### 5.14 Nearest Radiosonde Stations

STATION	NAME	DISTANCE KM	COORDINATE
USM00072318	BLACKSBURG; VA.	123.00	37.20, -80.41
USM00072317	GREENSBORO/G.-HIGH PT.; NC.	126.40	36.10, -79.94
USM00072208	CHARLESTON/MUN.; SC.	403.30	32.90, -80.03
USM00072426	WILMINGTON; OH.	404.90	39.42, -83.82
USM00072305	NEWPORT; NC.	438.40	34.78, -76.88

### 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
KHKY	69.60	2021-04-26T05:53:00 +00:00	10.00	CLR, M, M, M	0.00 / 0.00	KHKY 260553Z AUTO 00000KT 10SM CLR 08/06 A3007 RMK AO2 SLP169 T00830056 10167 20072 52006
KTRI	98.70	2021-04-26T05:53:00 +00:00	10.00	CLR, M, M, M	0.00 / 0.00	KTRI 260553Z 00000KT 10SM CLR 05/04 A3012 RMK AO2 SLP187 T00500039 10156 20050 51013
KINT	101.20	no retained observation	n/a	n/a	n/a / n/a	

### 5.16 NOAA IGRA Radiosonde Wind Profile

Nearest sounding implies mean 0-12 km wind drift toward 270.8 deg at 15.11 m/s; a passive balloon could drift about 108.8 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
USM00072318	BLACKSBURG; VA.	123.00	2021-04-26T00:00 :00+00:00	270.80	15.11	108.80	34.80 at 21249.00 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	GOES16	BUCKET	noaa-goes16
ABI SAMPLE FILES	12	GLM SAMPLE FILES	12

#### ABI sample objects:

- [ABI-L2-CMIPF/2021/116/05/OR\\_ABI-L2-CMIPF-M6C01\\_G16\\_s20211160500196\\_e20211160509504\\_c20211160509578.nc](#)
- [ABI-L2-CMIPF/2021/116/05/OR\\_ABI-L2-CMIPF-M6C01\\_G16\\_s20211160510196\\_e20211160519504\\_c20211160519576.nc](#)
- [ABI-L2-CMIPF/2021/116/05/OR\\_ABI-L2-CMIPF-M6C01\\_G16\\_s20211160520196\\_e20211160529504\\_c20211160529579.nc](#)
- [ABI-L2-CMIPF/2021/116/05/OR\\_ABI-L2-CMIPF-M6C01\\_G16\\_s20211160530196\\_e20211160539504\\_c20211160539567.nc](#)

### GLM lightning sample objects:

- [GLM-L2-LCFA/2021/116/05/OR\\_GLM-L2-LCFA\\_G16\\_s20211160500000\\_e20211160500205\\_c20211160500225.nc](#)
- [GLM-L2-LCFA/2021/116/05/OR\\_GLM-L2-LCFA\\_G16\\_s20211160500200\\_e20211160500405\\_c20211160500427.nc](#)
- [GLM-L2-LCFA/2021/116/05/OR\\_GLM-L2-LCFA\\_G16\\_s20211160500400\\_e20211160501005\\_c20211160501025.nc](#)
- [GLM-L2-LCFA/2021/116/05/OR\\_GLM-L2-LCFA\\_G16\\_s20211160501000\\_e20211160501205\\_c20211160501225.nc](#)

## 6. Annotated Evidence Figure





## 7. Analytic Comparison

CRITERION	REPORT EVIDENCE	ANALYTIC TREATMENT
TIME CONSTRAINT	2021-04-26T05:45:00+00:00	Directly used in propagation; this is a hard filter, not descriptive context.
LOCATION CONSTRAINT	36.36438, -81.31332	Directly used as observer point for azimuth/elevation/range computation.
COUNT / PATTERN	not explicit	No compact same-launch count match; retained for unresolved report features.
MOTION LANGUAGE	circling, disappear	Reported motion remains only partly explained; this is a principal reason for high-value unresolved status.
RADAR / OFFICIAL CHECK	not specified	Radar or hard maneuvering language is treated as a conflict/collection gap, not hand-waved away.
ANALYTIC DISPOSITION	unresolved	237UAP00049 was screened against historical Starlink orbital elements at the extracted time and observer coordinate. The screen did not produce enough mundane evidence to close the case under the normal-object favored standard. Hard features retained for follow-up: multiple witnesses/facilities, hard maneuver language.

## 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.
- This case is retained as high-value unresolved because the hardest reported behavior is not resolved by the current normal-object layers.

# Appendix A. Public Report Text Extracts

## 237UAP00049

SKYWATCH INCIDENT REPORT

PRIMARY CODE: OTHER	Callsign: N39RC	Origin: PBI
Date: 05:45 04/26/2021	Aircraft: C560	Destination: ABE
Status: Closed	Tail Number:	New Destination:
POD: DEN	Operator:	Operator Type: General Aviation
Reporting Facility: ZDC	Paged: YES	MOR Init: YES
		MOR ID: ZDC-M-2021/04/26-0001

REMARKS

PIC of N39RC and JBU1380 reported a UFO described as a white, rapidly circling light at approximately FL450 in the vicinity of IAD231240 out of the right side of the ACFTs. Both pilots reported it was short in duration and disappeared at the same time. AWO/JH notified.

## 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.

```
{
  "report_time_utc": "2021-04-26T05:45:00+00:00",
  "source_excerpt": "PIC of N39RC and JBU1380 reported a UFO described as a white, rapidly circling light at approximately FL450 in the vicinity of IAD231240 out of the right side of the ACFTs. Both pilots reported it was short in duration and disappeared at the same time. AWO/JH notified.",
  "historical_starlink_element_rows": 1373,
  "observer": {
    "lat": 36.36437953231839,
    "lon": -81.31332215861636,
    "source": "aviation_radial:IAD231240 (public text extract 237UAP00049)"
  },
  "case_id": "237UAP00049",
  "starlink_above_horizon_at_report_time": 46,
  "starlink_catalog_ids_considered": 1373,
  "largest_same-sky_cluster_count": 2,
  "starlink_at_or_above_10_deg": 17,
  "top_starlinks": [
    {
      "azimuth_deg": 276.75,
      "azimuth_plus_2m_deg": 149.75,
      "azimuth_plus_5m_deg": 140.81,
      "element_age_hours": 2.6,
      "element_epoch": "2021-04-26T08:21:05.847840+00:00",
      "elevation_deg": 63.89,
      "elevation_plus_2m_deg": 36.83,
      "elevation_plus_5m_deg": 7.66,
      "epoch_altitude_km": 553.31,
      "ground_track_bearing_deg": 134.2,
      "ground_track_label": "SE",
      "launch_date": "2020-02-17",
      "name": "STARLINK-1217",
      "norad_id": "45226",
      "range_km": 606.53,
      "sky_motion_label": "westward, setting",
      "subpoint_lat": 36.5937,
      "subpoint_lon": -84.0418
    },
    {
      "azimuth_deg": 266.27,
      "azimuth_plus_2m_deg": 5.84,
      "azimuth_plus_5m_deg": 38.32,
      "element_age_hours": 7.75,
      "element_epoch": "2021-04-26T13:30:15.400800+00:00",
      "elevation_deg": 40.39,
      "elevation_plus_2m_deg": 45.08,
      "elevation_plus_5m_deg": 11.16,
      "epoch_altitude_km": 553.9,
      "ground_track_bearing_deg": 45.78,
      "ground_track_label": "NE",
      "launch_date": "2020-08-07",
      "name": "STARLINK-1514",
      "norad_id": "46046",
      "range_km": 806.29,
      "sky_motion_label": "eastward, rising",
      "subpoint_lat": 35.8681,
      "subpoint_lon": -87.5728
    },
    {
      "azimuth_deg": 65.02,
      "azimuth_plus_2m_deg": 54.35,
      "azimuth_plus_5m_deg": 49.99,
      "element_age_hours": 7.73,
      "element_epoch": "2021-04-26T13:28:55.822080+00:00",
      "elevation_deg": 29.43,
      "elevation_plus_2m_deg": 11.2,
      "elevation_plus_5m_deg": -1.91,
      "epoch_altitude_km": 553.62,
      "ground_track_bearing_deg": 48.92,
      "ground_track_label": "NE",
      "launch_date": "2020-08-07",
      "name": "STARLINK-1544",
      "norad_id": "46031",
      "range_km": 1006.34,
      "sky_motion_label": "westward, setting",
      "subpoint_lat": 39.1447,
      "subpoint_lon": -72.8208
    },
    {
      "azimuth_deg": 38.04,
      "azimuth_plus_2m_deg": 76.54,
```

```

    "azimuth_plus_5m_deg": 99.79,
    "element_age_hours": 0.54,
    "element_epoch": "2021-04-26T05:12:40.133952+00:00",
    "elevation_deg": 25.02,
    "elevation_plus_2m_deg": 16.31,
    "elevation_plus_5m_deg": 2.54,
    "epoch_altitude_km": 553.84,
    "ground_track_bearing_deg": 127.28,
    "ground_track_label": "SE",
    "launch_date": "2020-02-17",
    "name": "STARLINK-1232",
    "norad_id": "45213",
    "range_km": 1124.91,
    "sky_motion_label": "eastward, setting",
    "subpoint_lat": 42.841,
    "subpoint_lon": -74.2214
  },
  {
    "azimuth_deg": 357.34,
    "azimuth_plus_2m_deg": 24.58,
    "azimuth_plus_5m_deg": 39.89,
    "element_age_hours": 4.5,
    "element_epoch": "2021-04-26T10:15:11.661120+00:00",
    "elevation_deg": 24.43,
    "elevation_plus_2m_deg": 12.09,
    "elevation_plus_5m_deg": -0.48,
    "epoch_altitude_km": 553.77,
    "ground_track_bearing_deg": 56.77,
    "ground_track_label": "ENE",
    "launch_date": "2020-04-22",
    "name": "STARLINK-1377",
    "norad_id": "45547",
    "range_km": 1143.45,
    "sky_motion_label": "eastward, setting",
    "subpoint_lat": 45.0135,
    "subpoint_lon": -81.8777
  },
  {
    "azimuth_deg": 113.49,
    "azimuth_plus_2m_deg": 79.48,
    "azimuth_plus_5m_deg": 60.05,
    "element_age_hours": 6.18,
    "element_epoch": "2021-04-26T11:56:00.407616+00:00",
    "elevation_deg": 24.18,
    "elevation_plus_2m_deg": 14.23,
    "elevation_plus_5m_deg": 1.11,
    "epoch_altitude_km": 554.16,
    "ground_track_bearing_deg": 43.16,
    "ground_track_label": "NE",
    "launch_date": "2020-10-06",
    "name": "STARLINK-1675",
    "norad_id": "46575",
    "range_km": 1146.9,
    "sky_motion_label": "westward, setting",
    "subpoint_lat": 32.5114,
    "subpoint_lon": -71.8673
  },
  {
    "azimuth_deg": 147.74,
    "azimuth_plus_2m_deg": 100.24,
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    "name": "STARLINK-1309",
    "norad_id": "45414",
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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: 237UAP00049
TIME AND OBSERVER COORDINATE	extracted	2021-04-26T05:45:00+00:00 at 36.36438, -81.31332
ORBITAL OBJECT PROPAGATION	screened	Starlink
SPACE-TRACK SATCAT METADATA	screened	30 NORAD IDs checked; 30 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	screened	Hourly weather, sky geometry, and space-weather context where local JSON is present
AIRCRAFT/ADS-B LAYER	not exhausted	ADSB.lol historical release pattern is recorded separately; actual aircraft exhaustion requires targeted trace extraction
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	high-value unresolved	Presence-only satellite density is context only; a stronger case-specific fit is required for normal-object disposition

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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>
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6. Hugging Face dataset. *oxzoid/space-track-tle-history: historical TLE archive used for Starlink screening*. <https://huggingface.co/datasets/oxzoid/space-track-tle-history>
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8. Space-Track.org. *API documentation for SATCAT and catalog metadata classes used for local enrichment*. <https://www.space-track.org/documentation#/api>
9. NASA POWER. *Hourly point API documentation for meteorological context*. <https://power.larc.nasa.gov/docs/services/api/temporal/hourly/>
10. NASA/JPL Solar System Dynamics. *Horizons API documentation for observer geometry and apparent magnitude queries*. <https://ssd-api.jpl.nasa.gov/doc/horizons.html>
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15. OpenSky Network. *Historical data via Trino documentation*. <https://openskynetwork.github.io/opensky-api/trino.html>
16. NASA GIBS. *Global Imagery Browse Services API documentation*. <https://nasa-gibs.github.io/gibs-api-docs/>
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22. Celestrak. *Spacetrack Report No. 3: Models for propagation of NORAD element sets*. <https://celestrak.org/NORAD/documentation/spacetrk.pdf>
23. Celestrak. *Supplemental GP element sets documentation and current endpoint index*. <https://celestrak.org/NORAD/elements/supplemental/>