

# Fort Cavazos (Hood)

## National Security Exposure Assessment

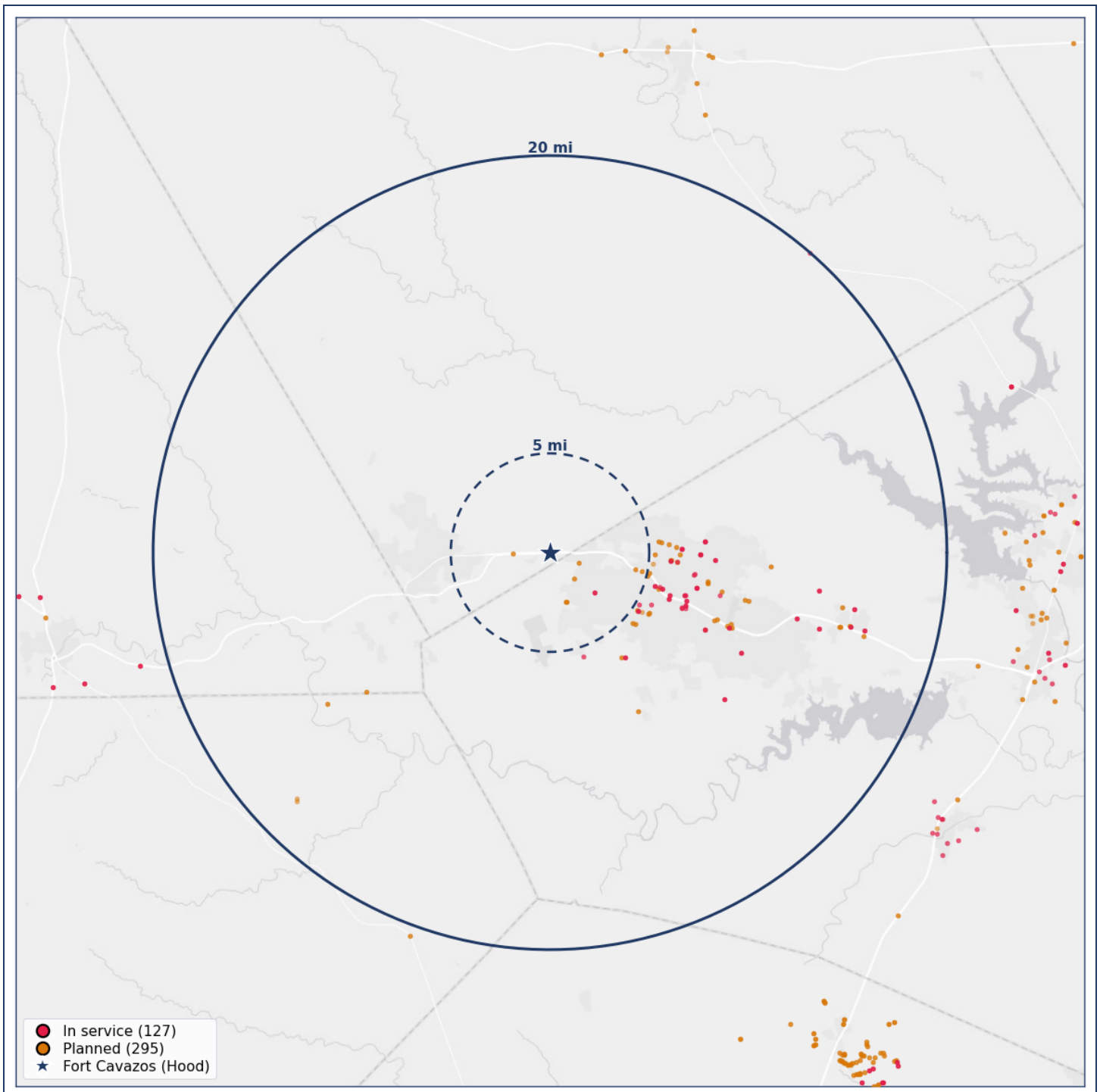
Joshua Michael

Email: [josh@nexanet.ai](mailto:josh@nexanet.ai)



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## Executive Assessment

Fort Cavazos (Hood) in Texas is the headquarters of III Armored Corps and the 1st Cavalry Division — the Army’s main post for training and sending heavy forces. Crews, maintainers, and trucks starting to move together could be the tell that an armored brigade is getting ready to leave.

This study asks a simple question: if someone drove from a nearby home to a gate and back, would they pass a Flock camera? The numbers are a model of possible drives, not a count of real people.

At 20 miles, about 85.7% of those modeled trips pass a camera. 4.5% avoid them, and 9.2% could not be determined. Even at 5 miles, about 88.3% of those trips still pass a camera. This is a model of routes, not proof that anyone was watched.

## HEADLINE RESULT · MODELED TRIPS TO A GATE

### 20 MILES OUT



- 85.7%** **Passes a camera**  
A confirmed camera sits on every plausible road to a gate.
- 0.7%** **Might pass**  
Almost every trip could be called a clear pass or a clear miss.
- 4.5%** **Avoids all cameras**  
No confirmed camera on any plausible road.
- 9.2%** **Couldn't determine**  
The model could not finish a legal round trip for these draws.

### 5 MILES OUT



**88.3%** Passes **1.0%** Might pass **5.3%** Avoids **5.4%** Couldn't determine

## Installation Context

The canonical study retains the label Fort Cavazos (Hood), while the current official Army site uses Fort Hood. The installation is the headquarters of III Armored Corps and is publicly described as the Army's premier installation for training and deploying heavy forces [E100, E101]. Official Army sources identify the 1st Cavalry Division and a wide range of corps-level intelligence, signal, sustainment, engineering, air-defense, medical, and security organizations on the post [E156, E157].

Two publicly acknowledged communities create distinct ALPR risks. The 1st Cavalry Division states that it deploys combat-ready forces in support of the Joint Force worldwide [E158]. The 504th Expeditionary Military Intelligence Brigade publicly describes deployable, tailorable intelligence packages providing HUMINT, SIGINT, processing, analysis, and ISR support to III Armored Corps and other task forces [E159].

Those facts do not identify a deployment, readiness level, unit roster, or commuter. The study did not associate a plate with the 1st Cavalry Division, 504th EMIB, or any other Fort Cavazos organization. Seven reviewed gates are included in the model, but real units and individuals may use them differently from the synthetic routes.

## Installation-Specific Intelligence Scenarios

The study demonstrates Tier A deployment and modeled route exposure only. Both scenarios below require Tier B historical time-stamped observations and Tier C identity or organizational enrichment that were not obtained.

### Scenario 1: Detecting the Preparation and Departure of a 1st Cavalry Division Armored Brigade

Assume that a hostile intelligence service acquires long-term vehicle observations on public roads serving Fort Cavazos and gradually separates recurring clusters associated with a 1st Cavalry Division brigade, its maintainers, headquarters staff, medical support, and sustainment organizations. The service would not initially need unit rosters. Public exercises and deployments could provide labeled examples for learning which movement changes accompany routine training and which precede a major departure.

The operational signature might begin with extended maintenance and logistics attendance, increased command activity, additional transportation and contractor presence, and changed weekend or nighttime patterns. A smaller cluster associated with crews and key leaders could then disappear from its normal commuting routine while some sustainment personnel remain active. The combination could indicate that a heavy formation is moving from preparation into deployment [E100, E101, E156-E158].

The adversary might not know the destination or operation. It could still estimate when the brigade became unavailable at home station, the probable scale of the deploying element, which support communities were involved, and when the formation returned. Correlation with rail, airlift, port, exercise, diplomatic, or overseas reporting could narrow the likely theater and mission.

Repeated observation could also distinguish a command-post exercise from a real rotation. An exercise may produce a short surge followed by a rapid return to baseline. A real deployment may produce a similar preparatory pattern followed by prolonged absence among a specific crew and leadership cluster. The history itself trains the adversary's model.

The 2025 joint advisory on GRU Unit 26165 provides a direct precedent. Russian military intelligence targeted internet-connected cameras near military installations and border crossings to monitor and track military-aid shipments [E148]. The campaign demonstrates that a state will compromise distributed civilian cameras to understand military movement and logistics without first accessing operational orders.

The present study does not show that a 1st Cavalry Division brigade deployed or that any unit vehicle was observed. It establishes Tier A modeled route exposure only. The scenario requires Tier B history, Tier C unit attribution, and validation that the observed roads and gates actually serve the relevant population.

## **Scenario 2: Identifying the 504th Expeditionary Military Intelligence Brigade's Deployable Teams**

The 504th Expeditionary Military Intelligence Brigade creates a different risk because its public mission involves tailorable intelligence packages, including HUMINT, SIGINT, ISR, processing, and analysis [E159]. A foreign service would have strong incentive to distinguish these personnel from the much larger Fort Cavazos population.

Historical plate clustering could identify vehicles that repeatedly appear together during corps exercises, share secondary destinations, overlap with headquarters or signal organizations, and disappear during the same operational periods. Over time, the analyst could infer probable intelligence collectors, analysts, maintainers, linguists, communications specialists, or leaders belonging to a deployable package.

That inference could reveal which intelligence capability is preparing to support an armored formation, when it becomes operationally unavailable at home station, and when it returns. It could also expose the people most likely to understand collection priorities, communications architecture, technical limitations, or the intelligence preparation supporting a corps-level operation.

The counterintelligence consequence extends to homes and families. Once probable identities are assigned, historical observations can reveal residences, secondary household vehicles, routine destinations, and deployment-related absences. Those details can support targeted phishing, recruitment, surveillance, coercion, or theft of devices and credentials.

The OPM breach provides a direct precedent for state collection against cleared U.S. personnel. GAO documented compromise of background-investigation data affecting 21.5 million people, and the FBI has attributed the theft of OPM records to Chinese actors [E149, E150]. OPM records supplied identity and vulnerability context; ALPR history could add current location, associations, and operational absence.

This study did not identify a 504th EMIB member, access a unit roster, or obtain plate-read history. The scenario is a defensive illustration of how unclassified commuting records could become a targeting layer for a publicly acknowledged expeditionary intelligence unit when combined with identity data.

### Combined Significance

The armored-brigade scenario reveals force availability and deployment timing. The 504th EMIB scenario reveals the intelligence specialists enabling that force. Together they show how an adversary could reconstruct both the maneuver formation and the supporting collection network from ordinary movement outside the installation.

## Primary Reachability Findings

**Modeled route-coverage estimate**, reported for both scopes with its uncertainty ranges.

| Field                   | 5-mile near-base             | 20-mile primary              |
|-------------------------|------------------------------|------------------------------|
| Result label            | V7 modeled estimate          | V7 modeled estimate          |
| Publication status      | Modeled estimate (4 caveats) | Modeled estimate (4 caveats) |
| Headline channel        | robust_lattice               | robust_lattice               |
| Primary H0 U/C/P/R      | 5.4%/89.9%/0.9%/3.8%         | 4.5%/87.2%/0.4%/7.9%         |
| Robust H0/H1/H2 U/C/P/R | 5.3%/88.3%/1.0%/5.4%         | 4.5%/85.7%/0.7%/9.2%         |
| H0 validation           | single-reviewer check        | single-reviewer check        |

The complete modeled result record for both scopes - all sensitivity intervals, gate/direction/range sweeps, camera-cluster influence, modeling caveats, seeds, and SHA-256 hashes - is in the V7 Modeled Result Record under Evidence and Reproducibility below.

20-mile minus 5-mile weighted unobserved-rate difference: primary conditional H0 **-0.9** percentage points; separate robust H0/H1/H2 lattice **-0.8** percentage points. These channels answer different questions and are not averaged. [L41]

## Legislative Significance

Fort Cavazos demonstrates why heavy-force installations need safeguards against aggregate readiness inference. Legislators should require heightened controls for ALPR systems covering mobilization corridors and military communities, including short non-hit retention, limits on bulk and reverse-location searches, restricted nationwide sharing, vendor-security audits, and prompt counterintelligence notification after credential or repository compromise. Public reporting should not identify the least observed gate or route.

Neither recommendation depends on a claim that a current operator acted improperly. The policy issue is whether a longitudinal commercial movement archive surrounding a sensitive national-security site should be retained, broadly shared, or exposed through vendor and subcontractor systems without controls proportionate to the intelligence value of the aggregate record.

## Four Reported Vulnerabilities

| Finding | Observed condition                                                                                                                               | Evidence boundary                                                                                                                                                         | Disclosure and remediation status                                                                                                    | Source(s)       |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1       | An active ArcGIS Default API key was hardcoded in a public development/demo asset and repeated key material was found across development assets. | The validation establishes key scope and private item grants; it does not prove that every granted item was read or altered by another party.                             | Reported 2025-06-11; remediation reported 2025-07-01.                                                                                | L2, L5, L8, L20 |
| 2       | FlockSafety development application and module-federation bundles were served before the correct authentication boundary.                        | The bundles expose application logic, routes, models, and permission concepts; frontend visibility does not prove anonymous access to every backend or production record. | Reported 2025-11-13 with follow-ups on 2025-11-14 and 2025-11-19; no closure or remediation detail appears in the disclosure record. | L2, L5, L11-L13 |

| Finding | Observed condition                                                                                                                                           | Evidence boundary                                                                                                                                                                                        | Disclosure and remediation status                                                                                                    | Source(s)         |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 3       | Planner/Beefeater endpoints issued ArcGIS and Google mapping credentials before login, including a production-scope path used to obtain the analyzed export. | Wire records prove anonymous HTTP 200 token responses and establish provenance; they do not prove every downstream service permitted every operation.                                                    | Reported 2025-11-13 with follow-ups on 2025-11-14 and 2025-11-19; no closure or remediation detail appears in the disclosure record. | L2, L14, L15, L37 |
| 4       | FlockNova application bundles were served before the correct access boundary and revealed search, pivot, fusion, and client-side permission assumptions.     | The exposed code establishes application structure and data-source concepts; it does not establish that every modeled backend endpoint lacked authorization or that every modeled dataset was populated. | Reported 2025-12-05; no reply or remediation detail appears in the disclosure record.                                                | L2, L4, L35       |

The findings are distinct but composable. Findings 2 and 4 exposed the vocabulary and architecture of search, alerting, mapping, and fusion workflows. Findings 1 and 3 exposed two different credential failures: a static production-scoped ArcGIS key and a pre-login credential-issuance path. Finding 3 supplied the provenance for the production map-point export used here. The combination supports a conclusion about systemic credential and environment-boundary weakness during the research period, while remaining narrower than a claim of universal platform compromise [L2, L8, L37].

The disclosure record also cannot establish a negative. Responsible reporting and a known remediation date for Finding 1 do not prove that no other person accessed the exposed surfaces, just as the absence of a returned closure notice for Findings 2 through 4 does not prove that they remain exploitable today. The reports preserve the observed condition, collection date, and known response status so that legal and technical reviewers can distinguish evidence from present-tense assumptions.

## Methodology

### Research and Data Basis

This assessment follows four separate disclosures involving credentials, development assets, environment boundaries, and a data-fusion application. A public development artifact contained an active ArcGIS credential; other development bundles exposed application structure before the expected

access boundary; a Planner/Beefeater path issued production-scope mapping credentials before login; and FlockNova bundles exposed the structure of a broader fusion and search environment [L2, L4, L5, L8, L37]. None of those findings alone proves universal backend access. Together, they justified examining what sensitive geospatial information became available and what defensive questions it could support.

The production ArcGIS export captured on December 14, 2025 contains 335,701 records spanning multiple device types and statuses; it is not a count of simultaneously active cameras. The status fields record 214,073 `inService`, 83,427 `inPlanning`, 38,190 decommissioned, and 11 unknown records. The route study loads detection-eligible `inService` and `inPlanning` records and preserves a separate `inService`-only floor. The `active` integer is not the study filter [L14, L15].

Exposed application materials model plate and vehicle search, camera selection, hit history, alerts, people-search paths, map layers, CAD and AVL concepts, Raven/audio sensors, device access, and identity-adjacent fusion permissions [L4, L11-L13, L35]. Flock's patent describes a dynamic surveillance and object-query architecture, but a patent describes claimed architecture rather than proving deployment of each patented capability [E37]. The report therefore separates observed code and export fields from product descriptions and hypothetical intelligence use.

The force-protection concern arises because personnel assigned to Fort Cavazos (Hood) routinely use civilian roads outside a protected perimeter. National evidence indicates that many service members live in local communities and use civilian housing markets when government quarters are not provided [E44-E46]. Those national facts do not reveal where a person assigned to Fort Cavazos (Hood) lives; they establish only that off-installation movement is a legitimate research surface.

Longitudinal location information can expose associations and patterns that isolated observations do not. Supreme Court decisions concerning long-term GPS tracking and historical location records provide relevant policy and legal context without deciding the legality of this vendor, dataset, or study [E20, E21]. The constitutional and privacy implications belong in legal and policy review, not in unsupported declarations that every collection or search is unlawful.

My analytical judgment is that commercial growth and procurement convenience must not displace United States national-security, counterintelligence, force-protection, constitutional, and public-accountability obligations. That is a normative conclusion, not evidence that profit caused a particular breach or that a specific customer misused data.

### Estimand and Synthetic Origins

The V7 primary estimand is the occupied-housing-weighted distribution across unobserved, confirmed exposure, possible exposure, and unresolved model under one predeclared, camera-blind H0 access-and-route policy. H0 defines the pinned origin, eligible unchanged saved gates, 5/20-road-mile frame,

final per-leg scope, and primary conditional result. Every in-frame sampled weight remains in the four-class denominator; proven out-of-frame origins are excluded before sampling, while frame-unknown, unresolved-model, and artifact-error states remain explicit.

Each directed outbound and return leg must be no more than the declared radius. A qualifying round trip can therefore approach 10 miles in the 5-mile scope or 40 miles in the 20-mile scope. This is not a total-round-trip cap of 5 or 20 miles.

H1/H2 remain identity-keyed alternative access policies used only for the separate robustness lattice and fixed-H0-gate access sensitivity. H1/H2 cannot rescue a failed H0, set the primary status, change H0 frame membership, or contribute cameras to the H0 result. The two channels are co-located and never averaged [L41].

### **Reviewed 24/7 Gates**

The paired study used Gate 1, Gate 2, Gate 3, Gate 4, Gate 5, Gate 6, and Gate 7 as the reviewed gate set. Only gates treated during setup as continuously open to authorized traffic are eligible. A part-time, visitor-only, commercial-only, or schedule-limited gate would create a modeled route that disappears outside its operating window, so including it as continuously available would overstate practical access. The gate decision concerns availability, not secrecy; coordinates and identifiers remain in the unredacted annexes.

The same gate set was used at both radii. The saved study state also contained 0 analyst-defined road blocks. Gates and blocks are inputs rather than outputs. A high or low unobserved rate does not validate the gate review, so an installation reviewer should read the exact saved identifiers and artifact warnings when judging whether the modeled access assumptions match local practice.

### **Cameras, Roads, and Routing**

The V7 route and gate policy receives no camera coordinates, encounter results, or camera-derived costs. It uses the frozen routing and inventory assumptions bound into the completed cohort (`valhalla-3.6.3-auto-frozen-osm-camera-blind-directed-overlay-v6`). Outbound and return routes are legal directed requests and are evaluated independently against the declared per-leg scope.

Camera encounters remain geometry, corridor, bearing, lifecycle-status, and capture-model inferences rather than observed plate reads. The H0 point channel retains direction and spatial/grade sensitivity separately. Camera influence is computed by physical camera cluster so colocated compute/support records are not counted as independent roadside sensors. Planned-device and in-service-only status variants remain sensitivity evidence rather than claims of confirmed real-world operation [L41].

## Why Five and Twenty Miles

DoD Manual 4165.63 permits housing-market boundaries based on a twenty-mile or one-hour peak-traffic commute, with military and public information and installation-command input supporting local adjustment [E49]. The study predeclared the distance limb as a uniform, transparent approximation of the broader off-installation housing and commuting area. It does not assert that most personnel at Fort Cavazos (Hood) live exactly twenty miles away, and it does not model one hour of peak traffic.

Five miles isolates the immediate area where travel converges toward a limited gate set. Twenty miles adds the broader housing-market stratum while retaining every near-base draw unchanged. Reporting both shows whether corridor concentration near the facility differs from the surrounding occupied-housing geography without changing the near-base sample.

## Limitations and Non-Claims

This is a model over dated deployment, Census, and road snapshots. Occupied housing is a residential-distribution proxy, not an installation workforce roster; it does not weight origins by military assignment, employer, rank, duty status, shift, or measured traffic. National off-base housing evidence supports the scope choice but cannot identify where personnel assigned to Fort Cavazos (Hood) live [E44-E46].

Camera location and status fields can be incomplete, stale, planned, duplicated, moved, or differently interpreted. OSM roads and address points can omit valid travel or include obsolete topology. Gate availability and cantonment geometry depend on analyst review. The route engine models corridor blocking, accepted alternatives, and a geometric field-of-view capture; it does not model OCR probability, optical obscuration, weather, plate condition, device uptime, data retention, customer sharing, legal process, or whether a backend user queried a record.

A V7 unobserved H0 classification is a conditional modeled-policy result: under the frozen H0 access, gate, routing, inventory-status, and capture rules, the legal directed round trip had no qualifying modeled encounter. It is not a share of people, drivers, commuters, households, actual trips, or empirical camera reads. The separate robust lattice and access, gate-choice, direction, spatial/grade, range, deployment-status, sampling, and camera-cluster sensitivities must remain visible qualifications. Source omissions, device uptime, weather, plate visibility, temporary road conditions, and camera movement can change real-world collection.

## Evidence and Reproducibility

The V7 drafting packet was built from the complete validated cohort for `fort_cavazos_hood`. It binds cohort `reachability-v7-audit-92bd2e6a45c3a7c6`, pair `fort_cavazos_hood-aca53dba660e5702`, seed `3867591554`, index SHA-256 `3d0755cb6fcc7dd165c6b9dd53ade8bfe5402773231904ea3807d1f17dc3b96b`,

five-mile summary SHA-256 `cbd6489bf9ca360c039b61af832daa8bb43806e40542f53e451a69873d7b8954`, and twenty-mile summary SHA-256 `69be74d19cb9cea497af624dd9001a609f75a660b3ff3ff64fe0bcb2479582db`. [L41].

Both scopes retain the primary H0 and robust-lattice partitions, full frame accounting, per-policy outcomes and failures, directed route geometry, modeled camera encounters, split uncertainty intervals, gate-choice sensitivity, physical-camera-cluster influence, frozen source snapshot, and independent QA. All QA flags and warnings remain unsuppressed in the hash-bound V7 snapshot [L41].

The narrative is subordinate to those structured artifacts. If a sentence, table cell, or later export conflicts with a canonical summary or origin-level record, the validated structured record controls and the narrative must be corrected. Joshua Michael independently reviews each material claim, citation, inference, and numerical value as the accountable author.

## V7 Modeled Result Record

### Modeled route-coverage estimate [L41].

| Field                          | 5-mile near-base                                                              | 20-mile primary                                                               |
|--------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Result label                   | V7 modeled estimate                                                           | V7 modeled estimate                                                           |
| Publication status             | Modeled estimate (4 caveats)                                                  | Modeled estimate (4 caveats)                                                  |
| V7 cohort                      | reachability-v7-audit-92bd2e6a45c3a7c6                                        | reachability-v7-audit-92bd2e6a45c3a7c6                                        |
| Pair ID                        | fort_cavazos_hood-aca53dba660e5702                                            | fort_cavazos_hood-aca53dba660e5702                                            |
| Pair seed                      | 3867591554                                                                    | 3867591554                                                                    |
| Generated at                   | 2026-08-12T10:05:39.896229+00:00                                              | 2026-08-12T10:05:39.896229+00:00                                              |
| Summary SHA-256                | <code>cbd6489bf9ca360c039b61af832daa8bb43806e40542f53e451a69873d7b8954</code> | <code>69be74d19cb9cea497af624dd9001a609f75a660b3ff3ff64fe0bcb2479582db</code> |
| Routing engine                 | valhalla-3.6.3-auto-frozen-osm-camera-blind-directed-overlay-v6               | valhalla-3.6.3-auto-frozen-osm-camera-blind-directed-overlay-v6               |
| Synthetic draws                | 1000                                                                          | 2000                                                                          |
| Headline channel               | robust_lattice                                                                | robust_lattice                                                                |
| Primary H0 U/C/P/R counts      | 54/899/9/38                                                                   | 93/1750/9/148                                                                 |
| Primary H0 U/C/P/R             | 5.4%/89.9%/0.9%/3.8%                                                          | 4.5%/87.2%/0.4%/7.9%                                                          |
| Robust H0/H1/H2 U/C/P/R counts | 53/883/10/54                                                                  | 92/1720/14/174                                                                |
| Robust H0/H1/H2 U/C/P/R        | 5.3%/88.3%/1.0%/5.4%                                                          | 4.5%/85.7%/0.7%/9.2%                                                          |
| Direction H0 interval          | 5.4% to 10.1%                                                                 | 4.5% to 12.8%                                                                 |

| Field                                 | 5-mile near-base                                                                                                                                                                                                                                                        | 20-mile primary                                                                                                                                                                                                                                                         |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fixed-gate access interval            | 5.3% to 10.8%                                                                                                                                                                                                                                                           | 4.5% to 13.9%                                                                                                                                                                                                                                                           |
| Joint interval                        | 5.3% to 11.7%                                                                                                                                                                                                                                                           | 4.5% to 14.3%                                                                                                                                                                                                                                                           |
| Spatial H0 interval                   | 5.4% to 8.9%                                                                                                                                                                                                                                                            | 4.5% to 12.1%                                                                                                                                                                                                                                                           |
| Gate reselection diagnostic           | fixed 5.4%; reselected 5.4%; absolute difference 0.0 pp                                                                                                                                                                                                                 | fixed 4.5%; reselected 4.5%; absolute difference 0.0 pp                                                                                                                                                                                                                 |
| H0 gate near-tie sensitivity          | 60s: 3.6% disagreement weight; 120s: 4.7% disagreement weight; 300s: 9.4% disagreement weight                                                                                                                                                                           | 60s: 1.5% disagreement weight; 120s: 2.1% disagreement weight; 300s: 4.6% disagreement weight                                                                                                                                                                           |
| H0 range sensitivity U/C/P/R          | 75ft: 12.8%/83.4%/0.0%/3.8%; 150ft: 5.4%/89.9%/0.9%/3.8%; 250ft: 5.4%/90.0%/0.8%/3.8%                                                                                                                                                                                   | 75ft: 7.7%/84.4%/0.0%/7.9%; 150ft: 4.5%/87.2%/0.4%/7.9%; 250ft: 4.5%/87.2%/0.3%/7.9%                                                                                                                                                                                    |
| H0 direction sensitivity U/C/P/R      | 25deg: 5.4%/89.9%/0.9%/3.8%; 30deg: 5.4%/89.9%/0.9%/3.8%; 35deg: 5.4%/89.9%/0.9%/3.8%; 40deg: 5.4%/89.9%/0.9%/3.8%; 45deg: 5.4%/89.9%/0.9%/3.8%; 60deg: 5.4%/89.9%/0.9%/3.8%                                                                                            | 25deg: 4.5%/87.2%/0.4%/7.9%; 30deg: 4.5%/87.2%/0.4%/7.9%; 35deg: 4.5%/87.2%/0.4%/7.9%; 40deg: 4.5%/87.2%/0.4%/7.9%; 45deg: 4.5%/87.2%/0.4%/7.9%; 60deg: 4.5%/87.2%/0.4%/7.9%                                                                                            |
| Deployment-status sensitivity U/C/P/R | declared_policy: 5.4%/89.9%/0.9%/3.8%; in_service_only: 64.6%/27.7%/3.9%/3.8%                                                                                                                                                                                           | declared_policy: 4.5%/87.2%/0.4%/7.9%; in_service_only: 66.1%/21.4%/4.6%/7.9%                                                                                                                                                                                           |
| Physical-camera-cluster influence     | maximum removal shift 10.0 pp; 2 material clusters                                                                                                                                                                                                                      | maximum removal shift 16.3 pp; 1 material cluster                                                                                                                                                                                                                       |
| H0 validation                         | single-reviewer check                                                                                                                                                                                                                                                   | single-reviewer check                                                                                                                                                                                                                                                   |
| Modeling caveats                      | 1. corridor routing is a single-reviewer accuracy check (~89.5%; see the report's Appendix O)2. primary H0 unresolved weight is 3.800%3. fixed-gate access-policy interval spans 5.500 pp4. one or more physical camera clusters exceed the influence materiality limit | 1. corridor routing is a single-reviewer accuracy check (~89.5%; see the report's Appendix O)2. primary H0 unresolved weight is 7.903%3. fixed-gate access-policy interval spans 9.432 pp4. one or more physical camera clusters exceed the influence materiality limit |
| QA and artifact warnings              | None                                                                                                                                                                                                                                                                    | None                                                                                                                                                                                                                                                                    |

20-mile minus 5-mile weighted unobserved-rate difference: primary conditional H0 **-0.9** percentage points; separate robust H0/H1/H2 lattice **-0.8** percentage points. These channels answer different questions and are not averaged. [L41]

## Reachability Results

### Five-Mile Near-Base Scope

**Publication state:** Modeled estimate (4 caveats).

The 5-mile primary H0 channel contains 1,000 draws on the full in-frame sampled denominator: 54 unobserved (5.4%), 899 confirmed exposure (89.9%), 9 possible exposure (0.9%), 38 unresolved model (3.8%). The separate robust H0/H1/H2 lattice reports 53 unobserved (5.3%), 883 confirmed exposure (88.3%), 10 possible exposure (1.0%), 54 unresolved model (5.4%). Neither channel drops or renormalizes unresolved-model weight.

H0 uncertainty intervals: direction-H0 5.4% to 10.1%; fixed-H0-gate access 5.3% to 10.8%; joint 5.3% to 11.7%; spatial/grade-H0 5.4% to 8.9%. These are distinct sensitivity results and are not averaged.

Candidate-frame accounting: {"all\_saved\_gates\_evaluated": true, "certificate\_artifact\_path": "frame\_classification.json", "certificate\_artifact\_sha256": "8e035c558097448be1b3c6352614dfa1ad0bc3527d78e032444979ddf6f46134", "classifier\_contract": "h0-all-saved-gates-directed-per-leg-frame-v1", "classifier\_version": 1, "closure": {"count\_matches\_source": true, "weight\_matches\_source": true}, "count\_by\_status": {"frame\_unknown": 0, "near": 2587, "outer": 2821, "proven\_out\_of\_frame": 2665}, "per\_leg\_scope\_rule": "outbound\_and\_return\_each\_lte\_declared\_scope\_radius", "source\_count": 8073, "source\_weight": 144360.99999999994, "weight\_by\_status": {"frame\_unknown": 0.0, "near": 44192.99999999999, "outer": 58559.24999999999, "proven\_out\_of\_frame": 41608.74999999956}, "weight\_semantics": "pre\_sampling\_occupied\_housing\_candidate\_weight"}. Sampled-frame accounting: {"count\_by\_status": {"artifact\_error": 0, "frame\_unknown": 0, "in\_frame": 1000, "proven\_out\_of\_frame": 0}, "rate\_by\_status": {"artifact\_error": 0.0, "frame\_unknown": 0.0, "in\_frame": 100.0, "proven\_out\_of\_frame": 0.0}, "source\_count": 1000, "source\_weight": 44192.99999999946, "weight\_by\_status": {"artifact\_error": 0.0, "frame\_unknown": 0.0, "in\_frame": 44192.99999999946, "proven\_out\_of\_frame": 0.0}}.

**Modeling caveats:** 1. corridor routing is a single-reviewer accuracy check (~89.5%; see the report's Appendix O)2. primary H0 unresolved weight is 3.800%3. fixed-gate access-policy interval spans 5.500 pp4. one or more physical camera clusters exceed the influence materiality limit**QA and artifact warnings:** None [L41]

### Twenty-Mile Primary Scope

**Publication state:** Modeled estimate (4 caveats).

The 20-mile primary H0 channel contains 2,000 draws on the full in-frame sampled denominator: 93 unobserved (4.5%), 1,750 confirmed exposure (87.2%), 9 possible exposure (0.4%), 148 unresolved model (7.9%). The separate robust H0/H1/H2 lattice reports 92 unobserved (4.5%), 1,720 confirmed exposure (85.7%), 14 possible exposure (0.7%), 174 unresolved model (9.2%). Neither channel drops or renormalizes unresolved-model weight.

H0 uncertainty intervals: direction-H0 4.5% to 12.8%; fixed-H0-gate access 4.5% to 13.9%; joint 4.5% to 14.3%; spatial/grade-H0 4.5% to 12.1%. These are distinct sensitivity results and are not averaged.

Candidate-frame accounting: {"all\_saved\_gates\_evaluated": true, "certificate\_artifact\_path": "frame\_classification.json", "certificate\_artifact\_sha256": "8e035c558097448be1b3c6352614dfa1ad0bc3527d78e032444979ddf6f46134", "classifier\_contract": "h0-all-saved-gates-directed-per-leg-frame-v1", "classifier\_version": 1, "closure": {"count\_matches\_source": true, "weight\_matches\_source": true}, "count\_by\_status": {"frame\_unknown": 0, "near": 2587, "outer": 2821, "proven\_out\_of\_frame": 2665}, "per\_leg\_scope\_rule": "outbound\_and\_return\_each\_lte\_declared\_scope\_radius", "source\_count": 8073, "source\_weight": 144360.99999999994, "weight\_by\_status": {"frame\_unknown": 0.0, "near": 44192.99999999999, "outer": 58559.24999999999, "proven\_out\_of\_frame": 41608.749999999956}, "weight\_semantics": "pre\_sampling\_occupied\_housing\_candidate\_weight"}. Sampled-frame accounting: {"count\_by\_status": {"artifact\_error": 0, "frame\_unknown": 0, "in\_frame": 2000, "proven\_out\_of\_frame": 0}, "rate\_by\_status": {"artifact\_error": 0.0, "frame\_unknown": 0.0, "in\_frame": 100.0, "proven\_out\_of\_frame": 0.0}, "source\_count": 2000, "source\_weight": 102752.250000000252, "weight\_by\_status": {"artifact\_error": 0.0, "frame\_unknown": 0.0, "in\_frame": 102752.250000000252, "proven\_out\_of\_frame": 0.0}}.

**Modeling caveats:** 1. corridor routing is a single-reviewer accuracy check (~89.5%; see the report's Appendix O)2. primary H0 unresolved weight is 7.903%3. fixed-gate access-policy interval spans 9.432 pp4. one or more physical camera clusters exceed the influence materiality limit**QA and artifact warnings:** None [L41]

### *Relationship Between the Two Scopes*

20-mile minus 5-mile weighted unobserved-rate difference: primary conditional H0 **-0.9** percentage points; separate robust H0/H1/H2 lattice **-0.8** percentage points. These channels answer different questions and are not averaged. Each directed outbound and return leg must independently satisfy its declared 5/20-road-mile scope; the total round trip may approach 10/40 miles. An origin with no unchanged saved gate qualifying under H0 is outside that scope before sampling [L41].

## References

| ID  | Source and use in this report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E20 | U.S. Supreme Court, <i>Carpenter v. United States</i> opinion, <a href="https://www.supremecourt.gov/opinions/17pdf/16-402_h315.pdf">https://www.supremecourt.gov/opinions/17pdf/16-402_h315.pdf</a> - Digital location privacy policy/legal context.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| E21 | Library of Congress, <i>United States v. Jones</i> , 565 U.S. 400, <a href="https://www.loc.gov/item/usrep565400/">https://www.loc.gov/item/usrep565400/</a> - GPS tracking/location surveillance policy/legal context.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| E37 | Flock Group Inc., U.S. Patent No. 11,416,545 B1, “System and Method for Object-Based Query of Video Content Captured by a Dynamic Surveillance Network,” issued Aug. 16, 2022, <a href="https://patents.google.com/patent/US11416545B1/en">https://patents.google.com/patent/US11416545B1/en</a> - Flock’s own patent. Confirmed language: a “dynamic surveillance network” that is device-agnostic and ingests video from “unrelated surveillance devices” (neighborhood, residential, business, traffic, portable/mobile cameras); a “dynamic surveillance and object-based query” (DSOQ) server/system; object-based query of video “based on content of the video footage and not just time and location”; attribute profiling of people (“male, female, race,” height/weight/clothing) and vehicles (make/model/color/plate); and “face recognition data points”/facial-similarity feature-vector matching. Used only for the vendor’s own described architecture and intended capability; the report does not claim Flock has deployed any specific patented function, including facial recognition. Accessed 2026-07-13. |
| E44 | U.S. Government Accountability Office, <i>Military Housing: DOD Should Address Critical Supply Shortages</i> (GAO-25-106208), product page, <a href="https://www.gao.gov/products/gao-25-106208">https://www.gao.gov/products/gao-25-106208</a> - GAO summary states that about <b>two-thirds of service members in the U.S. live off base in local communities</b> . Used for national off-base housing share context for force-protection commute exposure. Not an installation-level census. Accessed 2026-07-16.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| E45 | Congressional Research Service, <i>Military Housing</i> (CRS Report R47728), <a href="https://www.congress.gov/crs-product/R47728">https://www.congress.gov/crs-product/R47728</a> - CRS reports that about <b>58% of servicemembers</b> receive a tax-free housing allowance (BAH) and obtain housing from the local housing market outside their installation. Complements E44 (slightly different metric: BAH recipients vs “live off base”). Used for off-base housing / civilian-market commute framing. Accessed 2026-07-16.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| ID   | Source and use in this report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E46  | DoD Travel Management Office / Defense Travel Management Office, Basic Allowance for Housing overview, <a href="https://www.travel.dod.mil/Allowances/Basic-allowance-for-Housing/">https://www.travel.dod.mil/Allowances/Basic-allowance-for-Housing/</a> - Official BAH framing: compensation based on local civilian housing markets when government quarters are not provided; members choose off-base housing in the civilian market. Used only for policy mechanism (BAH → civilian infrastructure), not for a percentage. Accessed 2026-07-16.                                                                                                                                                                                        |
| E49  | U.S. Department of Defense, DoD Manual 4165.63, <i>DoD Housing Management</i> , incorporating Change 3, April 1, 2025, Enclosure 3, section 1.c.(2), <a href="https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodm/416563m.pdf">https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodm/416563m.pdf</a> - Official housing-market-analysis guidance: market-area boundaries may use a 20-mile or one-hour peak-traffic commute, with military/public information and installation-command recommendations supporting local adjustment. Used to justify a predeclared 20-road-mile primary reachability scope, not to claim that most personnel at a particular installation live within that distance. Accessed 2026-07-20. |
| E100 | U.S. Army Fort Hood, "Mission and Vision," <a href="https://home.army.mil/hood/about/mission-and-vision">https://home.army.mil/hood/about/mission-and-vision</a> - Official description of III Armored Corps' global multi-domain mission and the garrison's role enabling units to train and deploy while supporting Soldiers, families, civilians, and retirees. The canonical study retains its saved label, Fort Cavazos (Hood), while the current official site uses Fort Hood. Accessed 2026-07-29.                                                                                                                                                                                                                                    |
| E101 | U.S. Army Fort Hood, "Home," <a href="https://home.army.mil/hood/">https://home.army.mil/hood/</a> - Current official installation context describing Fort Hood as the Army's premier installation for training and deploying heavy forces, supporting multiple units, a corps headquarters, and a mobilization mission across 214,968 acres. Used for public mission and scale context, not current unit movement. Accessed 2026-07-29.                                                                                                                                                                                                                                                                                                     |
| E148 | United Kingdom National Cyber Security Centre, "UK and allies expose Russian intelligence campaign targeting western logistics and technology organisations," May 21, 2025, <a href="https://www.ncsc.gov.uk/news/uk-partners-expose-russian-intelligence-campaign">https://www.ncsc.gov.uk/news/uk-partners-expose-russian-intelligence-campaign</a> - Joint-government attribution that GRU Unit 26165 targeted logistics and transportation organizations and internet-connected cameras near military installations and border crossings to monitor and track aid shipments. Accessed 2026-08-08.                                                                                                                                        |

| ID   | Source and use in this report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E149 | U.S. Government Accountability Office, <i>Information Security: OPM Has Improved Controls, but Further Efforts Are Needed</i> (GAO-17-614), August 3, 2017, <a href="https://www.gao.gov/products/gao-17-614">https://www.gao.gov/products/gao-17-614</a> - Official account that the 2015 OPM breaches affected 21.5 million individuals and involved sensitive personnel and security-clearance-investigation information. Accessed 2026-08-08.                                                                                                                                                                                                                                                                                  |
| E150 | Federal Bureau of Investigation, "The Threat Posed by the Chinese Government and the Chinese Communist Party to the Economic and National Security of the United States," July 7, 2020, <a href="https://www.fbi.gov/news/speeches-and-testimony/the-threat-posed-by-the-chinese-government-and-the-chinese-communist-party-to-the-economic-and-national-security-of-the-united-states">https://www.fbi.gov/news/speeches-and-testimony/the-threat-posed-by-the-chinese-government-and-the-chinese-communist-party-to-the-economic-and-national-security-of-the-united-states</a> - FBI attribution and counterintelligence context for Chinese theft of OPM and other large U.S. personal-data repositories. Accessed 2026-08-08. |
| E156 | U.S. Army Fort Hood, "III Armored Corps," <a href="https://home.army.mil/hood/units-tenants/iii-corps">https://home.army.mil/hood/units-tenants/iii-corps</a> - Official corps and subordinate-organization context, including intelligence, signal, sustainment, and maneuver formations. Accessed 2026-08-08.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| E157 | U.S. Army Fort Hood, "Units/Tenants," <a href="https://home.army.mil/hood/units-tenants">https://home.army.mil/hood/units-tenants</a> - Official public listing of major Fort Hood units and tenant organizations. Accessed 2026-08-08.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| E158 | U.S. Army, "1st Cavalry Division," <a href="https://www.army.mil/1stcav">https://www.army.mil/1stcav</a> - Official mission statement that the division deploys combat-ready forces in support of the Joint Force. Accessed 2026-08-08.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| E159 | U.S. Army Fort Hood, "504th Expeditionary Military Intelligence Brigade," <a href="https://home.army.mil/hood/units-tenants/504th-military-intelligence-brigade">https://home.army.mil/hood/units-tenants/504th-military-intelligence-brigade</a> - Official mission context for deployable HUMINT, SIGINT, ISR, processing, and analytical force packages supporting III Armored Corps and other task forces. Accessed 2026-08-08.                                                                                                                                                                                                                                                                                                |

| ID  | Source and use in this report                                                                                                                                                                                                                                                                                                                                                                           |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| L2  | <p>Supporting Tools and Docs/<br/>supporting_memoranda/<br/>FlockSafety_Four_Vulnerability_Chain.md ;<br/>Supporting Tools and Docs/<br/>supporting_documents/finding_cards/<br/>Finding_01_... - Finding_04_... ; source-evidence: Raw<br/>Evidence/Documentation/<br/>My_Four_Vulnerabilities.md - Vulnerability timeline,<br/>Cure53-style finding cards, chain framing, remediation<br/>status.</p> |
| L4  | <p>Supporting Tools and Docs/<br/>supporting_documents/analyses/<br/>FlockNova_Application_Capability_Enumeration.<br/>md - Nova search, access-control, and client-side<br/>enforcement-gap findings.</p>                                                                                                                                                                                              |
| L5  | <p>Supporting Tools and Docs/<br/>supporting_documents/analyses/<br/>FlockSafety_Dev_Subdomain_Bundle_Enumeration.<br/>md - 370-host headline footprint, dev bundle families, and<br/>repeated-key evidence.</p>                                                                                                                                                                                        |
| L8  | <p>Raw Evidence/FlockSafety/<br/>flock_hardcoded_api_check.json - Primary validation<br/>artifact for key scope and 50 item grants.</p>                                                                                                                                                                                                                                                                 |
| L11 | <p>Supporting Tools and Docs/<br/>supporting_documents/analyses/<br/>ArcGIS_Search_App_Data.md - Search app data model,<br/>people-search device pool, plate/vehicle/search workflows.</p>                                                                                                                                                                                                              |
| L12 | <p>Supporting Tools and Docs/<br/>supporting_documents/analyses/<br/>ArcGIS_Hotlist_App_Data.md - Hotlist, alerts, hit<br/>history, and alerting data model.</p>                                                                                                                                                                                                                                        |
| L13 | <p>Supporting Tools and Docs/<br/>supporting_documents/analyses/<br/>ArcGIS_Mapped_Attributes.md - FlockOS/map layers<br/>and attributes; CAD/AVL, patrol/mobile, body-camera,<br/>drone, Raven/audio, and Flock911 surfaces; Flock911<br/>incident-layer state, audio/transcript token classes, per-<br/>word start/end timing, selected-event state, and playback/<br/>scrub controls.</p>            |

| ID  | Source and use in this report                                                                                                                                                                                                                                                                     |
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| L14 | Raw Evidence/ArcGIS/flocksafety_prod_arcgis_data/analysis_summary.json ; source dump: Raw Evidence/ArcGIS/flocksafety_prod_arcgis_data/features_*.json - 2025-12-14 ArcGIS export summary: 335,701 records, status/device-family counts from the package feature dump.                            |
| L15 | Raw Evidence/ArcGIS/flocksafety_prod_arcgis_data/count_verification.json - Field verification: total/status breakdown; active=1 (214,233) vs status=inService (214,073) split; confirms scale claims use status , not active .                                                                    |
| L20 | Raw Evidence/Documentation/My_Four_Vulnerabilities.md ; P1 - Repository disclosure record and published article for my 53-exposure research, Finding 1 scope analysis, and public ArcGIS corroboration method.                                                                                    |
| L35 | Raw Evidence/Screenshots/permissions_dronetoo.png ; Raw Evidence/FlockNova/nova_flockdemo_com/js/nova_flockdemo_com_App.js - Permission vocabulary including canCaravanSearch , Aerodome access, device tunnels, AVL sharing, nationwide lookup, and ArcGIS sign-in.                              |
| L37 | Raw Evidence/FlockSafety/dev_app_flocksafety_com/dev-beefeater ; Raw Evidence/FlockSafety/dev_app_flocksafety_com/prod-beefeater - Burp XML wire records for Finding 3: anonymous GETs to Beefeater /api/v1/token/esri and /token/google returning HTTP 200 with tokens; no cookie/authorization. |

| ID  | Source and use in this report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| L40 | Superseded earlier detailed run; the full per-origin paired study records are retained by the researcher offline for authorized review and are not shipped in this package. - The granular per-origin records (synthetic origins, gates, blocks, selected and attempted routes, blocked-camera observations, outcome records, seeds, and summary hashes) come from an earlier method run. They were removed from the shipped package because they were superseded by the V7 run and contain exact per-origin routes near the installations. The canonical V7 route-coverage estimates and their SHA-256 summary bindings are in L41 and control any transcription conflict. |
| L41 | Complete V7 snapshot and staged cohort <code>reachability-v7-audit-92bd2e6a45c3a7c6</code> (index SHA-256 <code>3d0755cb6fcc7dd165c6b9dd53ade8bfe5402773231904ea3807d1f17dc3b96b</code> ); primary conditional H0 and robust H0/H1/H2 results, methodology, frame accounting, split uncertainty, QA flags and warnings, hashes, and annexes. Canonical source: the hash-bound V7 snapshot at <code>../Supporting Tools and Docs/project_support/planning_and_qa/reachability_v7_audit_development_snapshot.json</code> .                                                                                                                                                    |

## Per-site records

The V7 result for this installation - primary conditional H0 and robust H0/H1/H2 outcomes, frame accounting, uncertainty intervals, QA flags, seeds, and SHA-256 summary bindings - is recorded in the hash-bound V7 snapshot [L41]. The large per-origin staging artifacts (route geometry, frame classification, review packets) are not shipped in this package; the full records are retained by the researcher offline for authorized review [L40].