

Joint Base Andrews

National Security Exposure Assessment

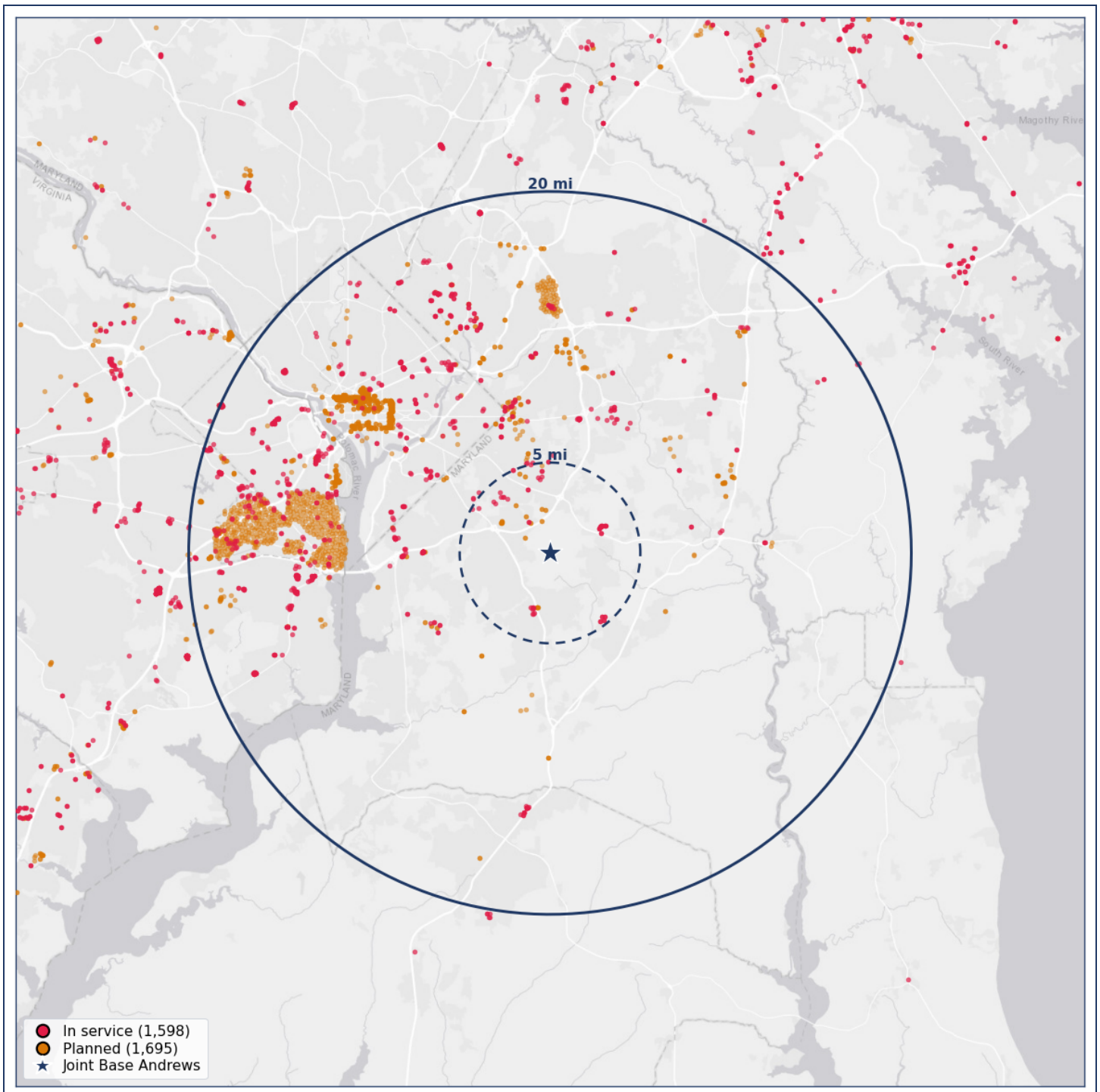
Joshua Michael

Email: josh@nexanet.ai



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Executive Assessment

Joint Base Andrews outside Washington is where the 89th Airlift Wing flies Special Air Mission aircraft for the President, Vice President, and cabinet. If aircrew, maintainers, communications, and security people started moving together, that could be the tell that a senior-leader flight was spinning up — before Air Force One was on TV.

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 68.8% of those modeled trips pass a camera. Another 9.1% might pass one, 9.1% avoid them, and 13.0% could not be determined. Even at 5 miles, about 80.5% 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



- 68.8%** **Passes a camera**
A confirmed camera sits on every plausible road to a gate.
- 9.1%** **Might pass**
A camera is nearby, but facing could not be confirmed. The file's rotationAngle is a housing-orientation field, not travel direction, so unnamed or poorly oriented cameras are not counted as hits.
- 9.1%** **Avoids all cameras**
No confirmed camera on any plausible road.
- 13.0%** **Couldn't determine**
Extra driveway or side-road options could not be fully routed, so those trips stay unresolved instead of being guessed.

5 MILES OUT



80.5% Passes **2.7%** Might pass **5.8%** Avoids **11.0%** Couldn't determine

Couldn't determine is 11.0% here because extra driveway or side-road options could not be fully routed, so those trips stay unresolved instead of being guessed.

Installation Context

Joint Base Andrews supports multiple wings, headquarters, and more than eighty tenant organizations while providing National Capital Region contingency response and security for a high-visibility flight line [E66]. The 89th Airlift Wing publicly provides global Special Air Mission airlift, logistics, and communications for the President, Vice President, cabinet members, and other senior leaders, with alert and continuous-support responsibilities [E67].

That mission creates two distinct movement risks. A recurring combination of aircrew, maintenance, communications, security, medical, weather, logistics, and command personnel may provide warning that a Special Air Mission is entering an active support window. The same history can identify the small human package that repeatedly supports senior-leader travel even when itineraries and passenger lists remain protected.

The study did not identify an aircraft, aircrew member, passenger, senior leader, protective detail, itinerary, vehicle, or mission. Its one reviewed gate and synthetic routes cannot establish how the 89th Airlift Wing or any tenant actually travels.

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: Predicting Activation of a Presidential or Senior-Leader Special Air Mission

Assume that a foreign service obtains a long history of vehicle observations around Joint Base Andrews and identifies a recurring set of plates whose activity correlates with publicly known senior-leader travel. The set may include probable aircrew, mission communications personnel, maintainers, logistics support, medical staff, security personnel, and command representatives. The service would not need an official crew roster.

After enough observations, the service may learn a sequence that frequently precedes an active mission window. A small crew cluster arrives, technical and maintenance support increases, communications and security personnel converge, and the pattern persists outside ordinary hours. The analyst may not know the passenger or destination, but it can assess that a high-visibility aircraft and support package are preparing to operate [E66, E67].

That warning can be strategically valuable. Correlation with White House schedules, diplomatic developments, military crises, or foreign-government activity could narrow the likely purpose and destination. A foreign government may increase surveillance, change a meeting location, alter air-defense posture, or prepare propaganda before the movement is publicly confirmed.

Repeated patterns may also distinguish routine training from real senior-leader support. Training may end with the same personnel returning to normal schedules. A real mission may produce prolonged absence among aircrew and support personnel or a different security and communications signature.

Operation Anarchist provides a direct aviation-intelligence precedent. Reporting based on Snowden documents described U.S. and British intelligence intercepting video feeds from Israeli military drones and aircraft to understand operations and possible strike preparations [E142]. The collection medium was an aircraft downlink rather than road cameras, but the objective was the same: use external signatures surrounding a sensitive aviation capability to determine when and how it was operating.

The present study does not show that any Special Air Mission was activated or predicted. The scenario requires historical observations, reliable links between vehicles and functional roles, and repeated validation against public events. It deliberately omits exact launch timing, routes, or security procedures.

Scenario 2: Identifying the Recurring Aircrew and Protective-Support Package Behind Senior-Leader Travel

A second risk is personnel identification. Special Air Mission support depends on a recurring, highly experienced community rather than an anonymous mass workforce. Long-term plate associations may reveal which vehicles repeatedly arrive together, disappear during the same travel windows, and return after the same missions.

The resulting cluster could include pilots, flight engineers or attendants, communications specialists, maintainers, security personnel, medical support, logistics staff, or mission managers. The adversary may not know each exact job, but it can reconstruct the stable human network behind the aircraft and prioritize the individuals who appear across the greatest number of missions.

Historical records can then expose probable residences, family vehicles, routine off-base destinations, and periods when a crew member is away. Those details support tailored cyber collection, surveillance, recruitment, coercion, or targeting of family members. They may also reveal when a particular capability is unavailable because its recurring crew is absent elsewhere.

The reported exploitation of Tehran's traffic cameras is a direct precedent for mapping senior officials and the people who protect or accompany them. AP sources described camera-derived intelligence on addresses, routes, parking locations, protective personnel, and moments when multiple officials were present together [E141]. That case is not evidence of compromise at Andrews, but it demonstrates the intelligence value of recurring support and protection patterns.

At Andrews, the danger would arise from combining plate history with registration, property, commercial identity, airline, hotel, or breached-personnel records. No individual source would need to contain a classified itinerary. The combined pattern could still reveal the personnel and support structure surrounding sensitive travel.

The study did not obtain crew identities, passenger data, registration records, or historical reads. It establishes Tier A route exposure only. The scenario explains why protecting itinerary content is insufficient if the recurring people supporting the itinerary remain observable in a persistent civilian movement archive.

Combined Significance

Scenario 1 provides early warning that sensitive senior-leader aviation is activating. Scenario 2 identifies the recurring people and support network behind that aviation. Together they show how an adversary could learn both that a mission is imminent and which individuals make it possible without accessing a flight plan or classified communications.

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 (3 caveats)	Modeled estimate (4 caveats)
Headline channel	robust_lattice	robust_lattice
Primary H0 U/C/P/R	7.0%/90.1%/2.2%/0.7%	11.6%/77.1%/8.7%/2.6%
Robust H0/H1/H2 U/C/P/R	5.8%/80.5%/2.7%/11.0%	9.1%/68.8%/9.1%/13.0%
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 **+4.6** percentage points; separate robust H0/H1/H2 lattice **+3.3** percentage points. These channels answer different questions and are not averaged. [L41]

Legislative Significance

Joint Base Andrews should receive heightened statutory protection as an executive-airlift and continuity site. Required safeguards should include strict non-hit retention, restricted external sharing, high-threshold historical and reverse-location queries, immutable audit records, vendor and subcontractor controls, and immediate notification to Air Force, Secret Service, and counterintelligence authorities after compromise. Public summaries should not disclose exact launch indicators, gate pressure, or route gaps.

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 Joint Base Andrews 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 Joint Base Andrews 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 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 Joint Base Andrews 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 Joint Base Andrews 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 `joint_base_andrews`. It binds cohort `reachability-v7-audit-92bd2e6a45c3a7c6`, pair `joint_base_andrews-d659efa55f8c42cd`, seed `3187123066`, index SHA-256 `3d0755cb6fcc7dd165c6b9dd53ade8bfe5402773231904ea3807d1f17dc3b96b`,

five-mile summary SHA-256 `a1144dec96565c8894041335a65dab46ef5987b6cb2119d9b57fff4e71c7f4fc`, and twenty-mile summary SHA-256 `5cd8a212a349dc1628ac607737f544dc15c342c59663b51c6e9e8996c41e5fb3`. [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 (3 caveats)	Modeled estimate (4 caveats)
V7 cohort	reachability-v7-audit-92bd2e6a45c3a7c6	reachability-v7-audit-92bd2e6a45c3a7c6
Pair ID	joint_base_andrews-d659efa55f8c42cd	joint_base_andrews-d659efa55f8c42cd
Pair seed	3187123066	3187123066
Generated at	2026-08-12T11:48:26.261039+00:00	2026-08-12T11:48:26.261039+00:00
Summary SHA-256	<code>a1144dec96565c8894041335a65dab46ef5987b6cb2119d9b57fff4e71c7f4fc</code>	<code>5cd8a212a349dc1628ac607737f544dc15c342c59663b51c6e9e8996c41e5fb3</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	70/901/22/7	188/1667/111/34
Primary H0 U/C/P/R	7.0%/90.1%/2.2%/0.7%	11.6%/77.1%/8.7%/2.6%
Robust H0/H1/H2 U/C/P/R counts	58/805/27/110	150/1489/120/241
Robust H0/H1/H2 U/C/P/R	5.8%/80.5%/2.7%/11.0%	9.1%/68.8%/9.1%/13.0%
Direction H0 interval	7.0% to 9.9%	11.6% to 22.9%

Field	5-mile near-base	20-mile primary
Fixed-gate access interval	5.8% to 17.6%	9.1% to 23.0%
Joint interval	5.8% to 19.5%	9.1% to 31.2%
Spatial H0 interval	7.0% to 7.4%	10.9% to 13.4%
Gate reselection diagnostic	fixed 6.5%; reselected 6.5%; absolute difference 0.0 pp	fixed 10.6%; reselected 10.6%; absolute difference 0.0 pp
H0 gate near-tie sensitivity	60s: 0.0% disagreement weight; 120s: 0.0% disagreement weight; 300s: 0.0% disagreement weight	60s: 0.0% disagreement weight; 120s: 0.0% disagreement weight; 300s: 0.0% disagreement weight
H0 range sensitivity U/C/P/R	75ft: 7.0%/90.1%/2.2%/0.7%; 150ft: 7.0%/90.1%/2.2%/0.7%; 250ft: 7.0%/90.1%/2.2%/0.7%	75ft: 12.6%/77.1%/7.7%/2.6%; 150ft: 11.6%/77.1%/8.7%/2.6%; 250ft: 8.3%/77.5%/11.7%/2.6%
H0 direction sensitivity U/C/P/R	25deg: 8.3%/90.1%/0.9%/0.7%; 30deg: 7.0%/90.1%/2.2%/0.7%; 35deg: 7.0%/90.1%/2.2%/0.7%; 40deg: 7.0%/90.1%/2.2%/0.7%; 45deg: 7.0%/90.1%/2.2%/0.7%; 60deg: 6.5%/90.1%/2.7%/0.7%	25deg: 12.4%/77.1%/7.8%/2.6%; 30deg: 11.9%/77.1%/8.4%/2.6%; 35deg: 11.6%/77.1%/8.7%/2.6%; 40deg: 8.5%/77.1%/11.8%/2.6%; 45deg: 8.5%/77.1%/11.8%/2.6%; 60deg: 8.5%/77.1%/11.8%/2.6%
Deployment-status sensitivity U/C/P/R	declared_policy: 7.0%/90.1%/2.2%/0.7%; in_service_only: 71.8%/5.0%/22.5%/0.7%	declared_policy: 11.6%/77.1%/8.7%/2.6%; in_service_only: 54.6%/30.7%/12.1%/2.6%
Physical-camera-cluster influence	maximum removal shift 28.9 pp; 2 material clusters	maximum removal shift 22.9 pp; 2 material clusters
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. fixed-gate access-policy interval spans 11.800 pp3. 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 2.630%3. fixed-gate access-policy interval spans 13.923 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 **+4.6** percentage points; separate robust H0/H1/H2 lattice **+3.3** percentage points. These channels answer different questions and are not averaged. [L41]

Reachability Results

Five-Mile Near-Base Scope

Publication state: Modeled estimate (3 caveats).

The 5-mile primary H0 channel contains 1,000 draws on the full in-frame sampled denominator: 70 unobserved (7.0%), 901 confirmed exposure (90.1%), 22 possible exposure (2.2%), 7 unresolved model (0.7%). The separate robust H0/H1/H2 lattice reports 58 unobserved (5.8%), 805 confirmed exposure (80.5%), 27 possible exposure (2.7%), 110 unresolved model (11.0%). Neither channel drops or renormalizes unresolved-model weight.

H0 uncertainty intervals: direction-H0 7.0% to 9.9%; fixed-H0-gate access 5.8% to 17.6%; joint 5.8% to 19.5%; spatial/grade-H0 7.0% to 7.4%. 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": "2f90d20988c3f7d300054ec212d70a979795d6a4da0d5bd42db075beb4b102bc", "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": 454, "near": 1263, "outer": 34094, "proven_out_of_frame": 47309}, "per_leg_scope_rule": "outbound_and_return_each_lte_declared_scope_radius", "source_count": 83120, "source_weight": 1482505.0000000007, "weight_by_status": {"frame_unknown": 5336.75, "near": 24741.250000000004, "outer": 677624.1666666673, "proven_out_of_frame": 774802.8333333333}, "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": 24741.24999999943, "weight_by_status": {"artifact_error": 0.0, "frame_unknown": 0.0, "in_frame": 24741.24999999943, "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. fixed-gate access-policy interval spans 11.800 pp3. 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: 188 unobserved (11.6%), 1,667 confirmed exposure (77.1%), 111 possible exposure (8.7%), 34 unresolved model (2.6%). The separate robust H0/H1/H2 lattice reports 150 unobserved (9.1%), 1,489 confirmed exposure (68.8%), 120 possible exposure (9.1%), 241 unresolved model (13.0%). Neither channel drops or renormalizes unresolved-model weight.

H0 uncertainty intervals: direction-H0 11.6% to 22.9%; fixed-H0-gate access 9.1% to 23.0%; joint 9.1% to 31.2%; spatial/grade-H0 10.9% to 13.4%. 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":
  "2f90d20988c3f7d300054ec212d70a979795d6a4da0d5bd42db075beb4b102bc", "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": 454, "near": 1263, "outer": 34094, "proven_out_of_frame": 47309},
  "per_leg_scope_rule": "outbound_and_return_each_lte_declared_scope_radius", "source_count":
  83120, "source_weight": 1482505.0000000007, "weight_by_status": {"frame_unknown": 5336.75,
  "near": 24741.250000000004, "outer": 677624.1666666673, "proven_out_of_frame":
  774802.8333333333}, "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": 702365.4166666543, "weight_by_status": {"artifact_error": 0.0, "frame_unknown": 0.0, "in_frame": 702365.4166666543, "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 2.630% 3. fixed-gate access-policy interval spans 13.923 pp 4. 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 **+4.6** percentage points; separate robust H0/H1/H2 lattice **+3.3** 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, https://www.supremecourt.gov/opinions/17pdf/16-402_h315.pdf - Digital location privacy policy/legal context.
E21	Library of Congress, <i>United States v. Jones</i> , 565 U.S. 400, https://www.loc.gov/item/usrep565400/ - 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, https://patents.google.com/patent/US11416545B1/en - 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, https://www.gao.gov/products/gao-25-106208 - GAO summary states that about two-thirds of service members in the U.S. live off base in local communities . 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), https://www.congress.gov/crs-product/R47728 - CRS reports that about 58% of servicemembers 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, https://www.travel.dod.mil/Allowances/Basic-allowance-for-Housing/ - 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), https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodm/416563m.pdf - 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.
E66	U.S. Air Force, Joint Base Andrews, "About the 316th Wing," https://www.jba.af.mil/About/About-the-316th-Wing/ - Official host-wing context: installation support to multiple wings, headquarters, and tenant organizations; National Capital Region contingency response; and security for a high-visibility flight line. Accessed 2026-07-21.
E67	U.S. Air Force, Joint Base Andrews, "89th Airlift Wing," https://www.jba.af.mil/About/Fact-Sheets/Display/Article/336383/89th-airlift-wing/ - Official description of global Special Air Mission airlift, logistics, and communications for senior U.S. leaders, including alert and continuous-support responsibilities. Used only for public mission framing. Accessed 2026-07-21.
E142	The Guardian, "Snowden files reveal US and UK spied on feeds from Israeli drones and jets," January 29, 2016, https://www.theguardian.com/world/2016/jan/29/snowden-files-us-uk-spied-feeds-israeli-drones-jets - Reported Operation Anarchist precedent for U.S.-British interception and analysis of Israeli military-drone and aircraft video feeds to understand operations and possible strike preparations. Accessed 2026-08-08.

ID	Source and use in this report
E141	Associated Press via PBS NewsHour, "Iran built a vast camera network to control dissent. Israel used it to track targets, AP sources say," March 23, 2026, https://www.pbs.org/newshour/world/iran-built-a-vast-camera-network-to-control-dissent-israel-used-it-to-track-targets-ap-sources-say - Reported precedent for state exploitation of street and traffic cameras to map senior officials, protective personnel, routes, parking locations, and meetings. Accessed 2026-08-08.
L2	Supporting Tools and Docs/ supporting_memoranda/ FlockSafety_Four_Vulnerability_Chain.md ; Supporting Tools and Docs/ supporting_documents/finding_cards/ Finding_01_... - Finding_04_... ; source-evidence: Raw Evidence/Documentation/ My_Four_Vulnerabilities.md - Vulnerability timeline, Cure53-style finding cards, chain framing, remediation status.
L4	Supporting Tools and Docs/ supporting_documents/analyses/ FlockNova_Application_Capability_Enumeration. md - Nova search, access-control, and client-side enforcement-gap findings.
L5	Supporting Tools and Docs/ supporting_documents/analyses/ FlockSafety_Dev_Subdomain_Bundle_Enumeration. md - 370-host headline footprint, dev bundle families, and repeated-key evidence.
L8	Raw Evidence/FlockSafety/ flock_hardcoded_api_check.json - Primary validation artifact for key scope and 50 item grants.
L11	Supporting Tools and Docs/ supporting_documents/analyses/ ArcGIS_Search_App_Data.md - Search app data model, people-search device pool, plate/vehicle/search workflows.
L12	Supporting Tools and Docs/ supporting_documents/analyses/ ArcGIS_Hotlist_App_Data.md - Hotlist, alerts, hit history, and alerting data model.

ID	Source and use in this report
L13	Supporting Tools and Docs/ supporting_documents/analyses/ ArcGIS_Mapped_Attributes.md - FlockOS/map layers and attributes; CAD/AVL, patrol/mobile, body-camera, drone, Raven/audio, and Flock911 surfaces; Flock911 incident-layer state, audio/transcript token classes, per-word start/end timing, selected-event state, and playback/scrub controls.
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].