Fort Lee

National Security Exposure Assessment

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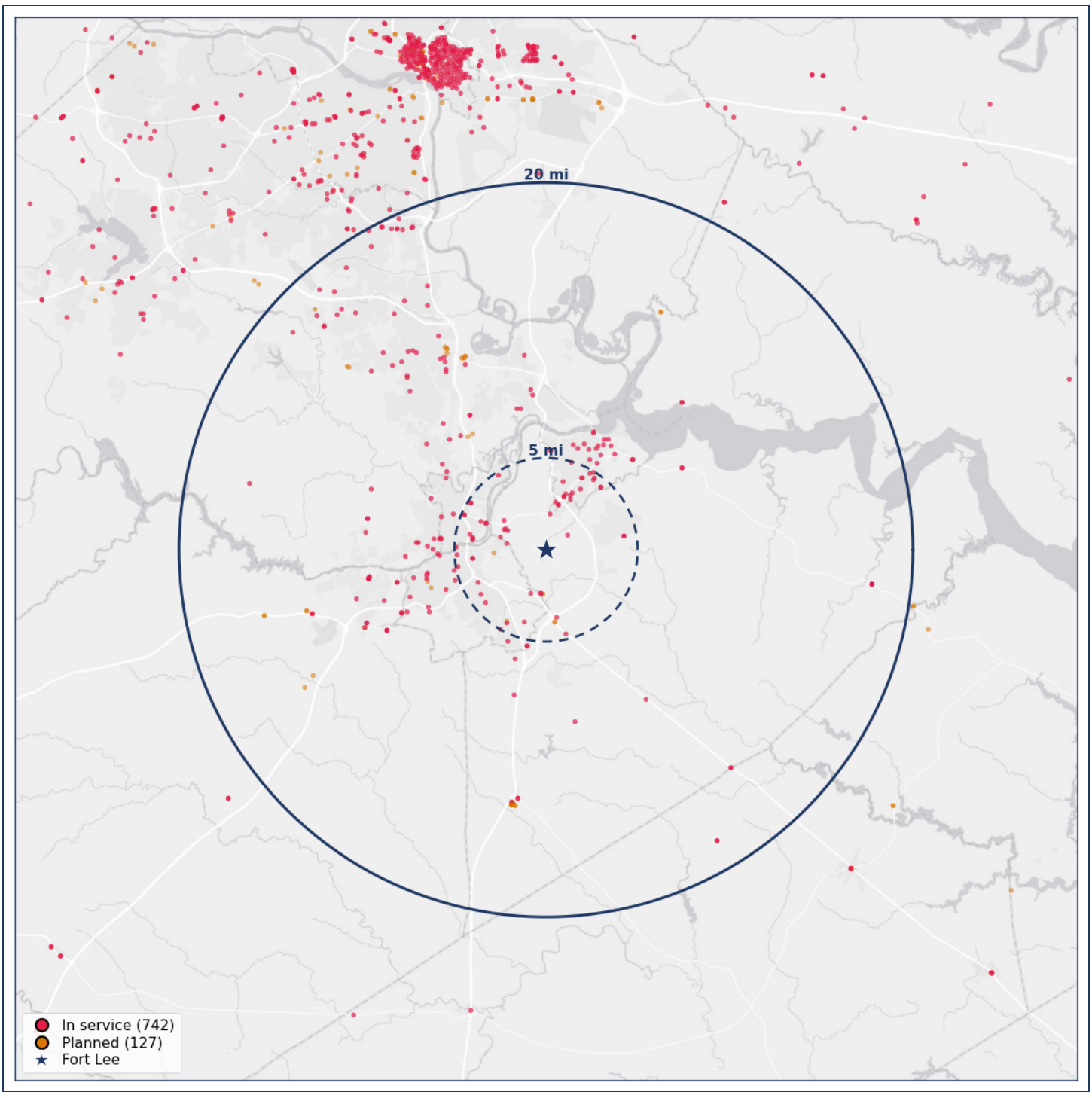

Executive Assessment

Fort Lee, Virginia is the Army's home of sustainment: the Combined Arms Support Command trains tens of thousands of logisticians a year for large-scale war. If sustainment instructors, capability developers, and senior logisticians all showed up together off-pattern, that could mean the Army's supply enterprise had entered a contingency-planning cycle.

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 89.2% of those modeled trips pass a camera. 10.7% could not be determined. Even at 5 miles, about 89.4% 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

89.2% **Passes a camera**
A confirmed camera sits on every plausible road to a gate.

0.1% **Might pass**
Almost every trip could be called a clear pass or a clear miss.

0.0% **Avoids all cameras**
No confirmed camera on any plausible road.

10.7% **Couldn't determine**
No complete legal route to a reviewed gate could be established for these trips.

5 MILES OUT

89.4% Passes **0.4%** Might pass **0.1%** Avoids **10.1%** Couldn't determine

Couldn't determine is 10.1% here because no complete legal route to a reviewed gate could be established for these trips.

Installation Context

Fort Lee, Virginia is the Army's home of sustainment and hosts the Combined Arms Support Command and Sustainment Center of Excellence. The command's official mission is to train and develop sustainment professionals while generating and integrating Army and Joint sustainment capabilities, concepts, and doctrine for large-scale combat operations in a multidomain environment. Its official installation page states that CASCOM provides resident training for approximately 60,000 students each year, including joint and international students, and exercises proponency over six branches and dozens of enlisted, warrant-officer, and officer specialties. Its subordinate organizations include Army Sustainment University and the Quartermaster, Ordnance, and Transportation schools [E139].

Army Sustainment University adds a senior-leader and analytical dimension. The university publicly describes itself as a composite campus for DoD uniformed and civilian leader education, including joint, multinational, and interagency logistics education. Its programs educate officers from lieutenant through colonel and develop expertise in enterprise logistics, data analysis, requirements development, and operations research and systems analysis [E140].

This mission mix creates ordinary recurring travel by permanent cadre, rotating students, joint and international learners, Army civilians, contractors, visiting officials, and other sustainment-enterprise participants. A single vehicle observation would not identify any person's role. Longitudinal observations combined with reliable identity or organizational information could nevertheless make stable and rotating groups increasingly distinguishable.

The study uses these public mission facts only to identify realistic consequences if Tier B historical observations and Tier C identity or organizational enrichment became available. It did not identify a Fort Lee employee, student, household, plate, course, organization, or mission. The route model covers the reviewed Fort Lee gate set; it does not establish where any real person lives or which gate any real traveler uses.

Installation-Specific Intelligence Scenarios

The quantitative study establishes Tier A coverage and deployment information: where included devices were recorded and how synthetic occupied-housing-weighted routes intersected their modeled observation corridors. The scenarios below require additional data not obtained in the research, including historical time-stamped plate observations and reliable links between vehicles and people, commands, organizations, schools, or households.

Scenario 1: Detecting Activation of the Army Sustainment Enterprise During a Major Contingency

Assume that a foreign intelligence service obtains a sufficiently long history of vehicle observations around Fort Lee and gradually associates recurring plates with probable CASCOM and Sustainment Center leadership, planning and capability-development personnel, Army Sustainment University faculty, branch-school leaders, and recurring government or industry visitors. The service would not need a complete roster. Repetition could distinguish ordinary training-day traffic from vehicles that repeatedly appear during senior reviews, working groups, exercises, or other publicly observable sustainment events.

The highest-value signal would be an abnormal convergence across normally separate functional communities. Suppose vehicles associated with transportation, quartermaster, ordnance, logistics education, capabilities development, and senior leadership begin arriving outside their established patterns and continue through evenings or a weekend. A single arrival would prove little. A sustained convergence involving several recurring clusters could indicate that the Army's sustainment enterprise had shifted from routine education and doctrine work into an unusual contingency-planning or integration cycle.

The adversary might not learn the plan itself. It could nevertheless infer when the response began, which sustainment functions appeared involved, whether outside government or industry participants were recurring, and whether the activity persisted or expanded. Correlation with an international crisis, mobilization activity, public transportation notices, defense-production developments, or military movements elsewhere could narrow the likely purpose. The resulting warning could help an adversary disperse vulnerable assets, alter logistics routes, intensify collection against transportation and supply networks, or prepare cyber activity against the organizations most likely to support the response.

The personnel consequence is also significant. Once recurring vehicles are associated with senior sustainment leaders, planners, doctrine writers, or specialized technical personnel, historical records can expose probable residences, family vehicles, off-base meetings, and the small number of people who bridge several functional communities. The intelligence value therefore extends from organizational tempo to counterintelligence targeting of the people who design and coordinate the Army's logistics response.

This scenario has a direct contemporary precedent. In May 2025, the United Kingdom, United States, and partner governments attributed to Russian GRU Unit 26165 a cyber-espionage campaign against Western logistics, transportation, defense, and technology organizations. The advisory stated that the unit also targeted internet-connected cameras near military installations and border crossings to monitor and track aid shipments into Ukraine [E110]. The cameras did not need access to operational orders. Their value came from revealing the timing and physical movement of a military logistics system.

The present Fort Lee study does not show that a sustainment planning cell activated or that any CASCOM participant was identified. It demonstrates modeled route exposure around the Army's principal sustainment training, doctrine, and capability-development center. The contingency inference would require Tier B history, Tier C enrichment, a defensible baseline, and corroboration beyond anything collected in this assessment.

Scenario 2: Mapping the Army's Sustainment-Training and International-Partner Network

Fort Lee's training mission creates a different movement signature from that of a deployable combat unit. A stable cadre of instructors, school leadership, curriculum developers, and support personnel is joined by rotating Army, joint, international, civilian, and contractor cohorts. Assume that an analyst uses longitudinal plate observations and reliable identity or employer enrichment to separate vehicles that recur year-round from those that appear in coordinated periods and then disappear at the end of a course, conference, or temporary assignment.

Over time, those patterns could reveal which Army components, government organizations, allied or partner nations, and contractors repeatedly participate in the sustainment education network. A newly appearing cluster of rental or privately owned vehicles, repeated co-arrival with a stable cadre, and coordinated departure weeks later could indicate a common training cohort even if the analyst never learned the classroom content. Repeated observations could also identify the instructors, operations-research specialists, and senior logistics educators who connect otherwise separate groups.

The intelligence value would come from trends and rare overlaps. Changes in the size or composition of cohorts could suggest increased emphasis on transportation, ammunition, maintenance, fuel, distribution, enterprise logistics, or another sustainment problem. Recurring participation by a partner country or a particular government-industry group could reveal capacity-building priorities or preparations that have not yet been publicly emphasized. The analyst would not need a course roster to identify which relationships and specialties deserved further collection.

Once a probable cadre or cohort had been isolated, its members could become priority targets for tailored phishing, recruitment, elicitation, device compromise, corporate espionage, or off-base surveillance. The same records could expose household routines and periods when a student or instructor was away. A training installation can therefore produce both strategic association intelligence and individualized counterintelligence risk even though the underlying travel appears routine.

The historical precedent is Britain's reported Royal Concierge program. Documents disclosed by Edward Snowden indicated that GCHQ monitored reservation confirmations associated with approximately 350 hotels to identify the timing and location of foreign diplomats' travel. The alerts allowed technical or human-intelligence personnel to prepare additional collection before the visitors

arrived [E114]. The program demonstrates that intelligence services value ordinary travel records because rare overlaps among officials, delegations, and locations can reveal relationships before the substance of a meeting is known.

The Fort Lee route study did not identify an instructor, student, foreign delegation, contractor, or course. It establishes the modeled surveillance surface around an installation that publicly trains large rotating populations, including joint and international students. Mapping that network would require historical records, reliable identity or organizational attribution, and corroboration beyond anything obtained here.

Combined Significance

The two scenarios expose different categories of national-security risk. The first concerns strategic warning: movement changes could reveal that the Army's sustainment enterprise had entered an unusual planning or integration cycle during a crisis. The second concerns counterintelligence and relationship mapping: routine travel could expose the specialized cadre, rotating cohorts, international partners, and government-industry relationships through which sustainment expertise is developed. Together, they show that a logistics and training center can be intelligence-sensitive even though it is not a combat headquarters or operational airfield.

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 (3 caveats)
Headline channel	robust_lattice	robust_lattice
Primary H0 U/C/P/R	0.1%/95.5%/0.0%/4.4%	0.0%/92.0%/0.0%/8.0%
Robust H0/H1/H2 U/C/P/R	0.1%/89.4%/0.4%/10.1%	0.0%/89.2%/0.1%/10.7%
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 **-0.1** percentage points; separate robust H0/H1/H2 lattice **-0.1** percentage points. These channels answer different questions and are not averaged. [L41]

Legislative Significance

Fort Lee demonstrates why ALPR governance should account for the function of the location being observed, not merely whether an individual plate read appears sensitive in isolation. A network surrounding the Army's principal sustainment training, doctrine, and capability-development center can create strategic-warning, coalition-mapping, and personnel-targeting risks even when each observation was lawfully collected for an unrelated public-safety purpose.

Legislators should consider heightened cybersecurity, short default retention, restricted nationwide sharing, particularized historical-search requirements, immutable auditing, and rapid breach notification for ALPR systems whose coverage encompasses military logistics, training, doctrine, and other designated national-security sites. The designation process should be developed with the Department of Defense and should not publicly identify camera gaps, preferred approaches, or routes that would aid evasion.

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 Lee 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, E45, E46]. Those national facts do not reveal where any person assigned to Fort Lee 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 and Gate 2 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 Lee 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 Lee 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_lee`. It binds cohort `reachability-v7-audit-92bd2e6a45c3a7c6`, pair `fort_lee-102b46e638120464`, seed `3581229000`, index SHA-256 `3d0755cb6fcc7dd165c6b9dd53ade8bfe5402773231904ea3807d1f17dc3b96b`, five-mile summary SHA-256 `94c46816258e6ddfce09e2098fc9d9e85e4e30d09de76553c93cccf157f455c9`, and twenty-mile summary SHA-256 `2d8dff1e32e8759277b512868da491c5673e8e03ece941aa9099276c099fe2dd`. [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 (3 caveats)
V7 cohort	reachability-v7-audit-92bd2e6a45c3a7c6	reachability-v7-audit-92bd2e6a45c3a7c6
Pair ID	fort_lee-102b46e638120464	fort_lee-102b46e638120464
Pair seed	3581229000	3581229000
Generated at	2026-08-12T10:47:30.918359+00:00	2026-08-12T10:47:30.918359+00:00
Summary SHA-256	94c46816258e6ddfce09e2098fc9d9e85e4e30d09de76553c93cccf157f455c9	2d8dff1e32e8759277b512868da491c5673e8e03ece941aa9099276c099fe2dd
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	1/955/0/44	1/1866/0/133
Primary H0 U/C/P/R	0.1%/95.5%/0.0%/4.4%	0.0%/92.0%/0.0%/8.0%
Robust H0/H1/H2 U/C/P/R counts	1/894/4/101	1/1786/4/209
Robust H0/H1/H2 U/C/P/R	0.1%/89.4%/0.4%/10.1%	0.0%/89.2%/0.1%/10.7%
Direction H0 interval	0.1% to 4.5%	0.0% to 8.0%
Fixed-gate access interval	0.1% to 10.6%	0.0% to 10.8%
Joint interval	0.1% to 10.6%	0.0% to 10.8%
Spatial H0 interval	0.1% to 4.5%	0.0% to 7.5%

Field	5-mile near-base	20-mile primary
Gate reselection diagnostic	fixed 0.1%; reselected 0.1%; absolute difference 0.0 pp	fixed 0.0%; reselected 0.0%; 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: 0.2% disagreement weight
H0 range sensitivity U/C/P/R	75ft: 0.1%/95.5%/0.0%/4.4%; 150ft: 0.1%/95.5%/0.0%/4.4%; 250ft: 0.1%/95.5%/0.0%/4.4%	75ft: 0.0%/92.0%/0.0%/8.0%; 150ft: 0.0%/92.0%/0.0%/8.0%; 250ft: 0.0%/92.0%/0.0%/8.0%
H0 direction sensitivity U/C/P/R	25deg: 0.1%/95.5%/0.0%/4.4%; 30deg: 0.1%/95.5%/0.0%/4.4%; 35deg: 0.1%/95.5%/0.0%/4.4%; 40deg: 0.1%/95.5%/0.0%/4.4%; 45deg: 0.1%/95.5%/0.0%/4.4%; 60deg: 0.1%/95.5%/0.0%/4.4%	25deg: 0.0%/92.0%/0.0%/8.0%; 30deg: 0.0%/92.0%/0.0%/8.0%; 35deg: 0.0%/92.0%/0.0%/8.0%; 40deg: 0.0%/92.0%/0.0%/8.0%; 45deg: 0.0%/92.0%/0.0%/8.0%; 60deg: 0.0%/92.0%/0.0%/8.0%
Deployment-status sensitivity U/C/P/R	declared_policy: 0.1%/95.5%/0.0%/4.4%; in_service_only: 0.1%/95.5%/0.0%/4.4%	declared_policy: 0.0%/92.0%/0.0%/8.0%; in_service_only: 0.0%/92.0%/0.0%/8.0%
Physical-camera-cluster influence	maximum removal shift 8.4 pp; 2 material clusters	maximum removal shift 2.3 pp; 0 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. primary H0 unresolved weight is 4.400%3. fixed-gate access-policy interval spans 10.500 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 8.005%3. fixed-gate access-policy interval spans 10.740 pp
QA and artifact warnings	None	None

20-mile minus 5-mile weighted unobserved-rate difference: primary conditional H0 **-0.1** percentage points; separate robust H0/H1/H2 lattice **-0.1** 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: 1 unobserved (0.1%), 955 confirmed exposure (95.5%), 0 possible exposure (0.0%), 44 unresolved model (4.4%). The separate robust H0/H1/H2 lattice reports 1 unobserved (0.1%), 894 confirmed exposure (89.4%), 4 possible exposure (0.4%), 101 unresolved model (10.1%). Neither channel drops or renormalizes unresolved-model weight.

H0 uncertainty intervals: direction-H0 0.1% to 4.5%; fixed-H0-gate access 0.1% to 10.6%; joint 0.1% to 10.6%; spatial/grade-H0 0.1% to 4.5%. 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": "0ccac99020f1fe7a6086339692d50619b95db39bda01225eb554afd35155f786", "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": 1, "near": 2357, "outer": 6985, "proven_out_of_frame": 16055}, "per_leg_scope_rule": "outbound_and_return_each_lte_declared_scope_radius", "source_count": 25398, "source_weight": 277161.0, "weight_by_status": {"frame_unknown": 9.0, "near": 18765.333333333325, "outer": 75637.41666666672, "proven_out_of_frame": 182749.24999999997}, "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": 18765.33333333312, "weight_by_status": {"artifact_error": 0.0, "frame_unknown": 0.0, "in_frame": 18765.33333333312, "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 4.400%3. fixed-gate access-policy interval spans 10.500 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 (3 caveats).

The 20-mile primary H0 channel contains 2,000 draws on the full in-frame sampled denominator: 1 unobserved (0.0%), 1,866 confirmed exposure (92.0%), 0 possible exposure (0.0%), 133 unresolved model (8.0%). The separate robust H0/H1/H2 lattice reports 1 unobserved (0.0%), 1,786 confirmed exposure (89.2%), 4 possible exposure (0.1%), 209 unresolved model (10.7%). Neither channel drops or renormalizes unresolved-model weight.

H0 uncertainty intervals: direction-H0 0.0% to 8.0%; fixed-H0-gate access 0.0% to 10.8%; joint 0.0% to 10.8%; spatial/grade-H0 0.0% to 7.5%. 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": "0ccac99020f1fe7a6086339692d50619b95db39bda01225eb554afd35155f786", "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": 1, "near": 2357, "outer": 6985, "proven_out_of_frame": 16055}, "per_leg_scope_rule": "outbound_and_return_each_lte_declared_scope_radius", "source_count": 25398, "source_weight": 277161.0, "weight_by_status": {"frame_unknown": 9.0, "near": 18765.333333333325, "outer": 75637.41666666672, "proven_out_of_frame": 182749.24999999997}, "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": 94402.74999999844, "weight_by_status": {"artifact_error": 0.0, "frame_unknown": 0.0, "in_frame": 94402.74999999844, "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 8.005%3. fixed-gate access-policy interval spans 10.740 pp**QA and artifact warnings:** None [L41]

Relationship Between the Two Scopes

20-mile minus 5-mile weighted unobserved-rate difference: primary conditional H0 **-0.1** percentage points; separate robust H0/H1/H2 lattice **-0.1** 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, Carpenter v. United States opinion, https://www.supremecourt.gov/opinions/17pdf/16-402_h315.pdf - Digital location privacy policy/legal context.

ID	Source and use in this report
E21	Library of Congress, United States v. Jones, 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, *Military Housing: DOD Should Address Critical Supply Shortages* (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, *Military Housing* (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, *DoD Housing Management*, 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.
E139	U.S. Army Garrison Fort Lee, “CASCOM,” https://home.army.mil/lee/units-tenants/cascom - Official mission and organization context for the Combined Arms Support Command/Sustainment Center of Excellence, approximately 60,000 annual resident students including joint and international students, branch proponency, and the Quartermaster, Ordnance, Transportation, and Army Sustainment University organizations. Accessed 2026-08-08.
E140	U.S. Army Garrison Fort Lee, “Army Sustainment University,” https://home.army.mil/lee/units-tenants/cascom/asu - Official context for DoD uniformed and civilian leader education, joint/multinational/interagency sustainment education, officer professional military education, enterprise logistics, data analysis, requirements development, and operations research/systems analysis. Accessed 2026-08-08.

ID	Source and use in this report
E110	United Kingdom National Cyber Security Centre, “UK and allies expose Russian intelligence campaign targeting western logistics and technology organisations,” May 21, 2025, https://www.ncsc.gov.uk/news/uk-partners-expose-russian-intelligence-campaign - Joint-government attribution that GRU Unit 26165 targeted logistics and transportation organizations and internet-connected cameras near military installations and border crossings to monitor aid shipments. Accessed 2026-08-08.
E114	The Guardian, “Snowden cache reveals diplomats’ hotel bookings being tracked by GCHQ,” November 17, 2013, https://www.theguardian.com/world/2013/nov/17/edward-snowden-diplomats-hotel-bookings-documents - Reported Royal Concierge precedent for using hotel-reservation alerts to identify diplomats’ travel timing and locations and cue additional technical or human intelligence collection. 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.

ID	Source and use in this report
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.
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.

ID	Source and use in this report
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.
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 `reachability-v7-audit-92bd2e6a45c3a7c6` (index SHA-256 `3d0755cb6fcc7dd165c6b9dd53ade8bfe5402773231904ea3807d1f17dc3b96b`); 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 `../Supporting Tools and Docs/project_support/planning_and_qa/reachability_v7_audit_development_snapshot.json` .

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].