Technical Brief: San Diego Ubicquia Smart Streetlight + Flock ALPR Deployment
Abraxas3d

San Diego deployed 500 Ubicquia smart streetlight cameras paired with Flock Safety's ALPR technology starting in December 2023, becoming operational in early 2024 [Cities TodayInside San Diego](#). This system replaced the controversial GE CityIQ network that was deactivated in 2020. Many aspects of the Ubicquia + ALPR system were shaped by the reactions to the GE CityIQ system.

System Architecture

Ubicquia UbiHub Platform

Hardware Components

UbiCell controller - Mounts on LED streetlight poles
Camera module - Video surveillance capability
Power interface - 120/277V AC, 60Hz
Connectivity - LTE cellular backhaul (not 6LoWPAN mesh like the old system)
Integration point - Must operate in conjunction with LED streetlight

Key Specifications (from Ubicquia literature)
Real-time monitoring of 32+ critical data points per hour including tilt, vibration, damage, and power quality [UbicquiaUbicquia](#)
Compatible with cobra head and decorative luminaires, 0-10V, DALI, and D4i [Ubicquia](#)
Line and load-side metering, sag and swell resilience, last gasp notifications [Ubicquia](#)

Deployment Method
Cameras can only operate in conjunction with an LED streetlight. If the location

is not LED-equipped, SDPD works with Transportation Department to replace with LED [FOX 5 San Diego](#)[Inside San Diego](#)

After installation, SDPD's Special Projects and Legislative Affairs Unit individually reviews each camera's viewpoint to digitally mask private property [FOX 5 San Diego](#)

Flock Safety ALPR System

Functionality

Automated License Plate Recognition

Vehicle make, model, and color identification

Real-time alerts for vehicles on "hotlist"

Integration with NCIC (National Crime Information Center)

Data Specifications

Video recordings deleted after 13 days unless used in investigation [FOX 5 San Diego](#)

Plate recognition data deleted after 30 days unless used in investigation [FOX 5 San Diego](#)

License plates suspected of or associated with crime can only be entered by members of SPLA Unit and only remain on "hotlist" for 72 hours [Inside San Diego](#)

Deployment Details

Scale and Timeline

Contract Terms

Five-year agreement with Ubicquia Inc. paired with Flock Safety's ALPR technology [CBS8](#)

Total cost: approximately $12 million over five years [CBS8](#)

First year cost: $3.5 million ($1.5M installation/maintenance + $2M hardware/

software/connectivity) CBS8

Annual cost after first year: approximately $2 million CBS8

Deployment Progress

City Council approval: November 2023 Cities Today

Installation began: December 2023 Cities Today

100+ cameras installed by February 2024 FOX 5 San Diego

Target: 500 cameras by June 2024 FOX 5 San DiegoInside San Diego

Geographic Distribution

High-Density Areas

Clairemont Mesa Boulevard, Ruffin Road, Downtown San Diego, beach areas
CBS8

District 8 (Barrio Logan, Logan Heights, Otay Mesa, San Ysidro) has highest
concentration - about 8 cameras per 10,000 people, nearly double some other
districts San Diego Union-Tribune

Hillcrest: 22 total locations (8 existing + 14 new as of July 2024) NBC 7 San Diego

Installation Challenges

SDPD discovered deficiencies at more than 40 locations including poles with
insufficient voltage/power, buildings, signs, or trees blocking camera view, or
poles entirely removed at designated locations Inside San DiegoUbicquia

Public Access

All installed locations added to searchable map on SDPD's Technology website
City of San DiegoUbicquia

Interactive map: https://webmaps.sandiego.gov/portal/apps/webappviewer/
index.html?id=a70a4dc00702448da5948992b144a98f

Use Cases and Performance

Claimed Effectiveness (2024 data)

Crime Statistics

229 criminal cases in 2024, resulting in 166 arrests [Inside San DiegoUbicquia](#)
22+ investigations involving homicides, robberies, burglaries, assaults, stolen vehicles by early January 2024 [Inside San Diego](#)
12 stolen vehicles recovered, 11 suspects in custody by early January [Inside San Diego](#)
163 stolen vehicles recovered by October 2024 [Inside San Diego](#)

Specific Case Examples

Two-time attempted kidnapping near Mission Valley Mall - ALPR helped locate suspect's vehicle leading to swift arrest [Inside San DiegoUbicquia](#)
Gunpoint robbery in Nestor neighborhood where victim was pulled over by impersonator with police style lights - Flock ALPR system identified and located suspect [Inside San Diego](#)
Stolen rental car from San Diego Airport - officer entered plate into Flock system, received notification near UTC Mall [Inside San Diego](#)

Official Use Policies

Access Controls

Footage only reviewed for felony criminal investigations, critical public threats, or to locate at-risk missing people [SandiegoInside San Diego](#)
Officers and investigators must take required training before access granted [Inside San Diego](#)
Case or event number required when searching the system; SPLA Unit constantly auditing [Inside San Diego](#)

Operational Restrictions

No facial recognition used with this technology [NBC 7 San Diego](#)
Not used for traffic enforcement [NBC 7 San Diego](#)

No gunshot detection included [NBC 7 San Diego](#)

Not used to target specific groups, view private places, record sound, or monitor reproductive health clinics, mosques, or for immigration enforcement [NBC 7 San Diego](#)

"Video masking" permanently scrubs views into private residences or businesses [NBC 7 San Diego](#)

Transparency Measures

Department maintains log documenting when Smart Streetlight data accessed; provided upon request [Inside San Diego](#)

Collaboration with Flock Safety to create "transparency portal" on ALPR data being collected [Inside San Diego](#)

Use policies and related materials published in accordance with TRUST Ordinance on technology website [Inside San Diego](#)

Legal and Regulatory Framework

Governing Ordinances

TRUST Ordinance (Transparent and Responsible Use of Surveillance Technology)

Passed in 2022, requires transparency around technology placement, data access, usage, and storage [Cities Today](#)[KPBS](#)

Requires all new and existing surveillance technology to undergo community engagement, review by privacy advisory board, and City Council approval [Cities Today](#)

Requires review of surveillance technology usage to be provided in 2026 [SDtoday](#)

Privacy Advisory Board (PAB)

Formed as part of surveillance ordinance amendments [SDtoday](#)

In June 2023, PAB recommended rejecting police department's proposal to

reinstate smart streetlights [Cities Today](#)

PAB recommended rejecting Surveillance Use Policy, but City Council ultimately approved it with recommendations to address concerns [SDtoday](#)

Approval Process

City Council Actions

August 2023: Council approved technologies in principle, vendor contracts still needed sign-off [NBC 7 San Diego](#)

Passed authorization 7-2 for streetlights, 6-3 for license plate readers [NBC 7 San Diego](#)

November 2023: Final approval for contracts [Cities Today](#)

Mayor Todd Gloria signed measure into law in November 2023 [Cities Today](#)

Opposition and Concerns

Privacy Advocacy Groups

TRUST SD Coalition (Transparent and Responsible Use of Surveillance Technology San Diego) coordinated with City Council and police to draft surveillance ordinances [CBS8](#)

San Diego Privacy Advisory Board Chair Ike Anyanetu stated use policy and impact report were non-compliant: "We don't have a clear, exhaustive list of uses, no description of equipment, no information about security of service and do not know any AI capabilities" [NBC 7 San Diego](#)

City Council Dissent

City Council President Sean Elo-Rivera expressed frustration at conversation being presented as false choice between safety or civil liberties: "I could not value safety of my constituents any more. Any inference about rest of us not worried about that is disingenuous and counterproductive" [KPBSKPBS](#)

Elo-Rivera said he didn't trust process that sidestepped recommendations from various appointed technology and privacy boards [KPBS](#)

Demographic Concerns

Union-Tribune analysis found more than a fifth of streetlights placed in District 8, which is more than 70% Latino [San Diego Union-Tribune](#)
District 8 would see about 8 cameras per 10,000 people, rate nearly double that of some other districts [San Diego Union-Tribune](#)
Critics expressed concern cameras may be located too close to sensitive locations such as religious institutions or abortion clinics [San Diego Union-Tribune](#)

Flexibility Requests

SDPD intends to request City Council approval for greater flexibility in movement of Smart Streetlights under TRUST Ordinance when structural issues or natural barriers impact camera effectiveness [Inside San DiegoUbicquia](#)
Councilmember Marni von Wilpert noted it takes police officers six to nine months to get permission from City Council to move location of a Smart Streetlight [10 News](#)

Comparison with Previous System (GE CityIQ)

What Changed

Old System (2017-2020):

3,200-4,200 CityIQ nodes (claimed as largest in the US)
6LoWPAN mesh networking for streetlight control
Intel Atom processors, 500GB storage
WiFi and Bluetooth radios (AzureWave CB178NF)
LTE cellular (Sierra Wireless AirPrime MC7304)
Two 1080p cameras, acoustic sensors
Environmental sensors (temp, pressure, humidity, vibration, magnetic fields)
Edge processing with GE Predix cloud
Cameras beyond service life, cannot be reactivated [NBC 7 San Diego](#)

New System (2024-present):

500 Ubicquia cameras + Flock ALPR

LTE cellular only (no 6LoWPAN mesh)

Focused on law enforcement use

Stricter privacy controls via TRUST Ordinance

Much smaller footprint (500 vs 3,200+)

Targeted placement based on crime data

Historical Context

Why Previous System Failed

September 2020: Then-Mayor Kevin Faulconer ordered sensors/cameras deactivated until ordinance in place governing use [Cities Today](#)

Concerns over transparency and police access to camera data [Cities Today](#)

Police began using cameras embedded in nodes fall 2018, using footage in over 200 investigations [IEEE Spectrum](#)

System became tool to surveil Black Lives Matter protests in spring 2020 [Tech Policy Press](#)

Originally billed as traffic management tool, became law enforcement surveillance [Tech Policy Press](#)

Regulatory Response

Rules requiring community engagement, privacy board review, and City Council approval finally passed after 2020 shutdown [Cities Today](#)

Grand Jury Report released June 2022 found use of Smart Streetlights by SDPD presented no valid privacy concerns and recommended immediate reinstatement [City of San Diego](#)

Technical Comparison of Old vs New

Feature	GE CityIQ (2017-2020)	Ubicquia/Flock (2024+)
Quantity	3,200-4,200 nodes	500 cameras

Primary Purpose	Traffic and parking data, civic planning	Law enforcement investigations
Networking	6LoWPAN mesh + LTE	LTE only
Processing	Edge + cloud (Predix)	Unknown (likely cloud-based)
Sensors	Video, audio, environmental	Video, ALPR
Data Retention	7 years (environmental)	13-30 days unless investigation
Governance	Minimal initially	TRUST Ordinance mandatory
Cost	$30M total	$12M over 5 years
Coverage	City-wide dense deployment	Targeted high-crime areas

Outstanding Technical Questions That we Can Try and Answer

RF Characteristics
1) **What frequencies does Ubicquia use for LTE?** (Likely AT&T or Verizon bands)
2) **Is there any local mesh networking?** (Appears to be pure cellular backhaul)
3) **What happens during cellular outage?** (Local buffering capacity unknown)

AI/ML Capabilities
1) **What analytics run at edge vs cloud?**
2) **Is facial recognition technically possible but policy-disabled?**
3) **What vehicle characteristics beyond plates are captured?** (Make/model/

color confirmed, but depth unknown)

Data Security
1) **Encryption standards for transmission?**
2) **Who has access keys?**
3) **Third-party vendor access policies?**
4) **Data breach response plan?**

Hardware Details
1) **Exact camera specifications?** (Resolution, frame rate, field of view)
2) **Night vision capabilities?**
3) **Weather resistance ratings?**
4) **Expected service life?**

Monitoring Possibilities

What CAN Be Observed (Passive Monitoring)
1) **LTE cellular signals** - Encrypted but detectable
2) **Physical hardware** - Visible installations
3) **Pole locations** - Public map available
4) **Installation patterns** - Geographic distribution analysis

What CANNOT Be Easily Observed
1) **Video content** - Encrypted cellular transmission
2) **ALPR data** - Not broadcast openly
3) **Control signals** - No open mesh network like old system
4) **Analytics results** - Cloud-based processing

Educational Demonstrations
1) **Visual identification** of Ubicquia hardware vs old CityIQ pods
2) **Spectrum analysis** showing LTE activity (encrypted)
3) **Comparison** of dead 6LoWPAN frequencies vs active cellular

4) Geographic analysis of surveillance density by neighborhood

Legal Challenges and Precedents

San Diego Specific

Current Status
No active lawsuits against new Ubicquia or Flock system found in a web search
System deployed under TRUST Ordinance intended to ensure transparency
around technology use, data collection, and usage [KPBS](#)

Potential Challenge Vectors
Disproportionate deployment in minority communities (District 8 data)
Proximity to sensitive locations despite restrictions
Flexibility requests that may circumvent TRUST Ordinance review process
Non-compliance with Privacy Advisory Board recommendations

National ALPR Legal Landscape

Common Challenges
Fourth Amendment (unreasonable search or seizure)
First Amendment (chilling effect on assembly)
Equal Protection (discriminatory deployment)
State privacy laws
Data retention policies
Third-party data sharing

Precedents to Research:
Leader v. Hutchins (2020) - Norfolk ALPR challenge
Friedman v. Boucher (2020) - Virginia ALPR databases
Various California cases under CALCRIS (California Law Enforcement
Telecommunications System)

References and Resources

Official Documentation
SDPD Technology Website: https://sdpdtech.sandiego.gov
Interactive Camera Map: https://webmaps.sandiego.gov/portal/apps/webappviewer/index.html?id=a70a4dc00702448da5948992b144a98f
City of San Diego Open Data Portal: https://data.sandiego.gov

Vendor Information
Ubicquia: https://www.ubicquia.com
Flock Safety: https://www.flocksafety.com

Advocacy Organizations
TRUST SD Coalition
San Diego Privacy (DEFCON group affiliate)
EFF (Electronic Frontier Foundation)
ACLU San Diego & Imperial Counties

Appendix A: Key Terms to Know
ALPR - Automated License Plate Recognition
TRUST Ordinance - Transparent and Responsible Use of Surveillance Technology
PAB - Privacy Advisory Board
SPLA Unit - Special Projects and Legislative Affairs Unit (SDPD)
SDPD - San Diego Police Department
UbiHub - Ubicquia's streetlight-mounted platform
6LoWPAN - IPv6 over Low-Power Wireless Personal Area Networks (old system)
LTE - Long-Term Evolution (4G cellular)

Document prepared for DEFCON 858/619 for educational purposes only. Last