

## Airside Visor - Video Analysis Agent

Unwavering vigilance logging and analysing every move



## Revolutionizing Airside Operations

In the fast-paced and highly regulated world of mission critical airport operations, maintaining safety, security, and efficiency is paramount.

Airside Visor, an innovative AI-powered video surveillance solution revolutionizes airside operations management by providing real-time insights and actionable intelligence.

Designed to seamlessly integrate into existing airside operations, Visor empowers airports to mitigate risks, optimize workflows, and ensure compliance with regulatory standards while driving operational excellence.

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## **1. Enhancing Safety**

One of Visor's primary benefits is its ability to enhance airside safety. Using advanced AI algorithms, Visor continuously monitors live video feeds from critical areas, such as runways, taxiways, aprons, and fuel farms, to detect unauthorized personnel, vehicles, or wildlife in real time. This proactive approach minimizes the risk of accidents, such as ground collisions or wildlife strikes, by enabling swift intervention. Additionally, Visor's capability to detect foreign object debris (FOD) ensures that runways remain clear and safe for operations.

## **2. Strengthening Security**

Security breaches can have severe consequences for airports. Visor's intelligent surveillance system provides a robust layer of protection by monitoring restricted zones, cargo areas, and perimeter boundaries. The system's real-time alerts ensure that unauthorized access or suspicious activities are immediately flagged for operator review. By integrating with existing access control systems, Visor creates a comprehensive security ecosystem that safeguards sensitive airside areas from potential threats.

## **3. Optimizing Operational Efficiency**

Airports are complex environments where efficiency is key to minimizing delays and ensuring seamless operations. Visor's advanced analytics provide valuable insights into ground handling activities, such as the movement of ground support equipment (GSE) and turnaround times for aircraft. By identifying bottlenecks and inefficiencies, airport operators can make data-driven decisions to streamline workflows and improve resource allocation. Additionally, Visor's ability to monitor apron activity ensures that safety protocols are followed, reducing the likelihood of delays caused by incidents.

## **4. Environmental and Regulatory Compliance**

As sustainability becomes a critical focus for airports worldwide, Visor supports environmental initiatives by monitoring airside areas for potential hazards, such as fuel spills or emissions from ground vehicles. This capability not only helps airports meet environmental compliance standards but also demonstrates a commitment to sustainability. Moreover, Visor's real-time documentation and reporting features ensure compliance with aviation safety and security regulations, reducing the burden of manual inspections and audits.

## **5. Seamless Integration and Scalability**

Visor is designed with flexibility in mind, allowing it to integrate seamlessly into existing airside infrastructure. Whether deployed in small regional airports or large international hubs, Visor's scalable architecture ensures that it can meet the unique needs of any airport. By leveraging Google Cloud Platform's robust ecosystem, Visor delivers unparalleled performance, reliability, and security.

## Use Cases

Visor's AI-driven capabilities make it an indispensable tool across a wide range of airside applications. From enhancing perimeter security to optimizing ground support equipment tracking, Visor addresses the challenges that airports face daily.

Its ability to detect unauthorized activity, foreign object debris (FOD), and wildlife on runways ensures safer and smoother operations. Additionally, Visor's intelligent analytics provide critical insights for improving efficiency and adherence to safety protocols, benefiting both large international hubs and smaller regional airports.

The versatility of Visor is evident in its support for dozens of distinct use cases, each tailored to address specific airside challenges. Whether it's monitoring fuel farms for hazardous spills, managing apron activities, or ensuring compliance with environmental regulations, Visor's technology provides actionable intelligence that empowers operators to respond proactively.

By integrating seamlessly into airside workflows, Visor not only enhances operational safety but also drives long-term efficiency and sustainability, making it a transformative asset for modern airports.

### 1. Airside Perimeter Security

- **Use Case:** Detecting breaches along the airside perimeter, including unauthorized personnel, vehicles, or wildlife entering restricted areas.
- **Benefit:** Prevent security incidents and maintain compliance with aviation safety regulations.

- **Use Case:** Monitor aircraft parking stands for unauthorized personnel or vehicles, ensuring that only approved ground crews are present.
- **Benefit:** Improve operational safety and reduce risks of ground handling errors or security breaches.

### 2. Runway and Taxiway Incursion Detection

- **Use Case:** Detecting foreign object debris (FOD), wildlife, or unauthorized vehicles on runways and taxiways (Runway Incursion) in real-time.
- **Benefit:** Reduce the risk of accidents and ensure uninterrupted operations.

### 3. Ground Support Equipment (GSE) Tracking

- **Use Case:** Monitor movement and usage of ground support equipment like baggage carts, fuel trucks, and catering vehicles to ensure proper utilization and prevent unauthorized use.
- **Benefit:** Optimize equipment usage and improve operational efficiency.

#### 4. Cargo Area Security

- **Use Case:** Detect unauthorized access to cargo handling and storage areas.
- **Benefit:** Prevent theft, ensure secure handling of sensitive cargo, and maintain compliance with cargo security regulations.

#### 5. Passenger Boarding and Disembarkation Monitoring

- **Use Case:** Monitor passenger boarding bridges for unusual activities, such as unauthorized personnel or tampering.
- **Benefit:** Enhance passenger safety and reduce potential security risks.

#### 6. Emergency Response Coordination

- **Use Case:** Use real-time video feeds to coordinate emergency responses during incidents such as fire outbreaks, medical emergencies, or security threats.
- **Benefit:** Improve situational awareness for faster, more effective response.

#### 7. Apron Activity Monitoring

- **Use Case:** Analyze activities on the apron to ensure adherence to safety protocols and reduce incidents like accidental equipment collisions.
- **Benefit:** Enhance safety and reduce delays caused by apron incidents.

#### 8. Parking Lot and Access Control

- **Use Case:** Monitor parking areas and access gates for unauthorized vehicles or suspicious activities.
- **Benefit:** Enhance security for airside personnel and prevent unauthorized access.

#### 9. Wildlife Management

- **Use Case:** Detect and track wildlife activity near the airside to implement mitigation strategies and reduce risks of bird strikes or other wildlife interference.
- **Benefit:** Ensure flight safety and comply with wildlife hazard management requirements.

#### 10. Fuel Farm and Hazardous Material Monitoring

- **Use Case:** Monitor fuel storage and hazardous material areas for unauthorized access or unusual activity, such as spills or tampering.
- **Benefit:** Ensure safety and compliance with environmental and safety standards.

## 11. Operational Efficiency Analytics

- **Use Case:** Analyze video feeds to identify bottlenecks or inefficiencies in airside operations, such as prolonged turnaround times or congested taxiways.
- **Benefit:** Optimize workflows and improve overall efficiency.

## 12. Training and Quality Assurance

- **Use Case:** Record and analyze airside activities to review and improve ground crew training and adherence to standard operating procedures (SOPs).
- **Benefit:** Enhance team performance and operational consistency.

## 13. Passenger Flow Management

- **Use Case:** Monitor passenger flow in terminal-airside interfaces, such as boarding gates or shuttle services, to detect delays or overcrowding.
- **Benefit:** Improve passenger experience and streamline boarding processes.

## 14. Environmental Monitoring

- **Use Case:** Monitor airside areas for environmental hazards such as fuel spills, water pooling, or excessive emissions from ground vehicles.
- **Benefit:** Promote sustainable operations and meet environmental compliance standards.

By adapting the video surveillance system to these use cases, **Airside** can achieve greater operational safety, security, and efficiency, while reducing risks and ensuring regulatory compliance. Additionally, leveraging AI for predictive analytics (e.g., identifying trends or anomalies over time) can further enhance proactive decision-making.

Visor is more than just a surveillance tool; it is a transformative technology that redefines what is possible in airside management.

By enhancing safety, strengthening security, optimizing efficiency, and supporting environmental and regulatory compliance, Visor provides airport operators with the confidence to meet today's challenges and prepare for the future.

As an invaluable add-on to airside operations, Visor empowers airports to achieve their goals while maintaining the highest standards of operational excellence.

## Technology Architecture

Baseline's AI-powered video surveillance agent is built entirely within the Google Cloud Platform (GCP) using the following resources:

### 1. Live Video Capture and Streaming

**1.1 Cloud Storage** Store live video feeds for later review or processing.

**1.2 Media Streaming** Use MediaStream API or Cloud Video Intelligence for live video ingestion. Alternatively, FFmpeg and Google Kubernetes Engine (GKE) can handle custom video ingestion pipelines.

### 2. Video Processing and AI Analysis

**2.1 AI Platform (Vertex AI):** Use pre-trained models or build custom models for motion detection and anomaly detection using TensorFlow or PyTorch.

**2.2 Cloud Video Intelligence API:** For detecting objects and movements in video feeds, particularly if pre-trained AI models meet your needs.

**2.3 Google Cloud Functions** Trigger real-time motion analysis or alerts when specific events are detected.

**2.4 GPU-enabled Compute Engine or GKE** For high-performance, real-time video analysis using custom AI models.

### 3. Data Pipeline and Event Handling

**3.1 Pub/Sub:** Use Pub/Sub to handle event-driven messaging. For example, publish an event when motion is detected in a restricted area.

**3.2 Cloud Dataflow:** Process and transform video data streams in real-time.

### 4. Alerting and Notification

**4.1 Cloud Functions:** Automate notifications to security operators when unauthorized movement is detected.

**4.2 Firebase Cloud Messaging (FCM):** Send real-time notifications to security personnel via mobile apps.

**4.3 Twilio or Email APIs (via Cloud Functions):** Notify operators via SMS or email.

## 5. Storage and Archiving

**5.1 Cloud Storage:** Store video feeds for further review or audit purposes. Use lifecycle policies to delete old footage or transfer it to lower-cost tiers like Nearline or Coldline Storage.

**5.2 BigQuery:** Store metadata from video analysis (e.g., timestamps, detected movements) for reporting and analytics.

## 6. Infrastructure

**6.1 Compute Engine:** For scalable, real-time video processing.

**6.2 Kubernetes Engine (GKE):** Deploy containerized applications for scalable processing of live video feeds.

**6.3 Cloud Load Balancing:** Distribute video processing workloads across multiple instances or regions.

## 7. Networking

**7.1 Cloud CDN:** For efficient video streaming to operators or for review.

**7.2 VPC (Virtual Private Cloud):** Ensure secure and isolated networking for live video streams.

## 8. Security and Compliance

**8.1. Cloud IAM (Identity and Access Management):** Control access to sensitive video data and resources.

**8.2 Cloud Key Management:** Encrypt video files and metadata for secure storage.

**8.3 Cloud Armor:** Protect against DDoS attacks targeting the video surveillance system.

## 9. Monitoring and Logging

**9.1 Cloud Logging and Monitoring:** Monitor system health and performance.

**9.2 Error Reporting:** Detecting and logging issues in real-time.

**9.3 Stackdriver Monitoring:** Get insights into the performance of video ingestion and AI analysis pipelines.



## 10. Optional Enhancements

**10.1 Cloud Vision API:** Detect objects or faces in the video feeds if needed.

**10.2 Dialogflow:** Enable operators to query the system using voice or text-based interactions for additional insights.

## 11. System Workflow

**11.1 Capture Video:** Video streams are ingested from cameras and uploaded to a live processing pipeline.

**11.2 Analyze Video:** AI models detect motion or anomalies in areas marked as restricted.

**11.3 Generate Alerts:** Detected anomalies trigger notifications or alerts via messaging systems.

**11.4 Store and Archive:** Video and event data are securely stored for later review or analysis.

**11.5 Report and Monitor:** Operators can monitor alerts and video feeds in real-time via a dashboard.

This architecture can be tailored further based on specific project requirements such as latency, storage needs, or integration with existing security systems.

## Conclusion: A Compelling Case for WAA's Partnership

Visor presents a unique opportunity for Winnipeg Airports Authority (WAA) to elevate its airside operations to new heights.

By incorporating this state-of-the-art Video AI technology, WAA can address critical operational challenges, from perimeter security to apron activity monitoring, all while aligning with sustainability goals. Partnering with Baseline and Equans in Visor's implementation ensures access to expertise and a proven track record in delivering transformative airport solutions.

Baseline's Airside platform has already established a legacy of excellence in airport ground operations, with seamless deployments in extreme environments like Montreal's YUL.

Equans's extensive system integration capabilities further solidify the foundation for a successful rollout of Visor at WAA. This partnership represents a collaborative effort to not only meet but exceed WAA's operational and safety objectives.

The advantages of adopting Visor are clear: enhanced safety, strengthened security, optimized efficiency, and robust regulatory compliance.

Moreover, its scalable and flexible design ensures that it can evolve with WAA's growing needs. By embracing Visor, WAA has the opportunity to set a new standard in airport management, delivering unparalleled value to passengers, stakeholders, and the broader community.

Together, Baseline, Equans, and WAA can achieve groundbreaking advancements in airside operations, demonstrating leadership and innovation in the aviation industry.