

LLRC-1

Low Latency Radio Camera
Datasheet



1. Overview

This low-latency vision system integrates a rolling-shutter camera, an embedded edge compute module for on-device video processing and encoding, and a high-performance mesh radio to deliver real-time HD video anywhere it's needed.

Designed for demanding field operations, the system combines robust hardware, intelligent software, and a modular architecture that adapts to diverse environments and mission profiles.

Whether deployed underground, in industrial spaces, or on mobile robotic platforms, it delivers reliable, high-speed vision without external compute or cloud connectivity.

The platform enables a wide range of applications, from inspection and robotics to teleoperation and live situational awareness, where low latency and dependable wireless performance are critical.

Notes:

- This document outlines the system's current prototype capabilities and is intended to support early evaluation of potential use cases, integration paths, and areas where co-development may be appropriate. All specifications are indicative and reflect prototype performance or behaviours validated to date.
- This work originated from a customer request to explore ultra-low-latency video over mesh radio links. We referenced the Doodle Labs [Smart Radio Video Streaming and URLLC Tutorial](#) (2020) as background on the challenges of video transport over constrained RF networks.



2. Key Capabilities (Validated)

- Optimised for low-latency capture and real-time streaming
- High-speed imaging (up to 120 FPS / 60 ms latency supported)
- HD streaming + recording
- Rolling shutter performance
- Mesh network integration
- Portable, battery-powered operation
- Suitable for machine vision and dynamic scenes

3. Current Prototype Hardware

Image Sensor

- **Model:** onsemi AR0234CS
- **Type:** Global shutter
- **Resolution:** 1920 × 1200 (2.3 MP)

Compute Platform

- NVIDIA Jetson Nano

Camera Interface

- MIPI-CSI2

Power System

- **Input range:** 5–20V (via Ugreen power sources)
- **Power model:** Battery-powered; external supply
- **Indicative consumption:** Varies by compute module
- **Status visibility:** On-device LED power indication

Radio Integration

- **Mesh radios:** Doodle Labs (validated)
- **Link type:** Ethernet (RJ45 on camera board to Ethernet JST on Doodle Labs radio)
- **Supported topologies:** Point-to-point, mesh, multi-hop

4. Integration Requirements (Prototype)

- One CSI-compatible image sensor connection
 - The camera connects to Doodle Labs radios via standard Ethernet (using RJ45 on the camera board to the radio's Ethernet JST port.)
 - Battery or regulated DC input (5–20V)
 - Viewer device accessible on the same network or mesh (laptop, tablet, or custom HMI)
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5. Demonstrated Performance

Metric	Result	Notes
Latency	60–100 ms	Office/controlled test environment
Resolution	1080p	Stable over Doodle Labs radios
Frame rate	60–120 FPS	Depends on compute module / encoder
Thermal	~45°C under sustained streaming	Jetson Nano, fan-assisted
Radio link	Stable across rooms/floors	Long-range testing TBD

6. Configurable / Flexible Elements

The system is designed for modularity. The following elements can be adapted depending on partner needs:

- Compute platform
- Optics / FOV
- Power architecture
- Enclosure
- Streaming protocol
- Recording
- Diagnostics

7. Potential Deployments

	Option 1	Option 2	Option 3
Form Factor	Bare circuit board	Enclosed ruggedised unit	Enclosed ruggedised unit with integrated lighting
Purpose	Integration on UAVs using onboard edge compute	For situational awareness applications	Initial mesh-node creation in tunnels; illumination + comms

8. Contact & Collaboration

This datasheet is intended to support discussions with potential partners exploring collaboration, evaluation, or co-development opportunities. More detailed specifications can be generated once target use cases are confirmed.

Contact info@subterranean.ie for more information.