CIRCULAR EXTERNA
20254000000867
24-12-2025

Bogotá D.C.

PARA: **ALCALDES MUNICIPALES Y DISTRITALES - GOBERNADORES - ORGANISMOS Y AUTORIDADES DE TRÁNSITO - CUERPOS DE AGENTES DE TRÁNSITO – CIUDADANÍA EN GENERAL.**

DE: **MINISTERIO DE TRANSPORTE Y SUPERINTENDENCIA DE TRANSPORTE**

ASUNTO: **PROCEDIMIENTO CONTRAVENCIONAL DE CONTROL EN VÍA APOYADO EN DISPOSITIVO ELECTRÓNICO.**

1. COMPETENCIA

En desarrollo de lo dispuesto en el artículo 2 de la Constitución Política, en el sentido de proteger la vida, honra y bienes de todas las personas residentes en el país, para asegurar el cumplimiento de los deberes sociales del Estado y de los particulares, así como servir a la comunidad, promover la prosperidad general y garantizar la efectividad de los principios, derechos y deberes consagrados en la Constitución; alineado con lo señalado por el artículo 24 de la Constitución Política, en el cual se establece que todo colombiano tiene derecho a circular libremente por el territorio nacional, pero está sujeto a la intervención y reglamentación de las autoridades para garantía de la seguridad y comodidad de los habitantes; por lo que las entidades del Estado, de acuerdo con sus competencias, deben garantizar la protección de la vida, la integridad personal y la salud de todos los residentes en el territorio nacional, así como la libre circulación de las personas y vehículos y en consecuencia las autoridades de tránsito deben velar por el cumplimiento del régimen normativo, de conformidad con lo establecido en el Código Nacional de Tránsito.

Adicionalmente, el artículo 365 de la Carta Política, somete la prestación de los servicios públicos, como el tránsito y transporte, a la regulación, control y vigilancia del Estado para garantizar su prestación eficiente y, de manera primordial, segura, fundamentado en el artículo 24 de la Constitución Política que consagra el derecho fundamental a la locomoción.

En concordancia con lo anterior, la Ley 769 de 2002, "*Por la cual se expide el Código Nacional de Tránsito Terrestre y se dictan otras disposiciones*", en el artículo 1 establece que le corresponde al Ministerio de Transporte, como autoridad suprema de tránsito definir, orientar, vigilar e inspeccionar la ejecución de la política nacional en materia de tránsito.

Así mismo, artículo 3 del Código Nacional de Transito establece que la Superintendencia General de Puertos y Transporte es autoridad de tránsito, y que en el parágrafo 1, además de estar envestido de autoridad, reitera la facultad constitucional de esta Entidad, como vigilar y controlar a las autoridades, los organismos de tránsito, las entidades públicas o privadas que constituyan organismos de apoyo. Al tiempo, la Ley 769 de 2022 prohíbe de manera categórica la circulación de vehículos que no cumplan condiciones de homologación, matrícula, amparo de seguro obligatorio de accidentes de tránsito y revisión técnico mecánica.

El Ministerio de Transporte, con base en los numerales 2.12 y 2.15 del artículo 2 del Decreto 087 de 2011 tiene a su cargo las funciones de *"Coordinar, promover, vigilar y evaluar las políticas del Gobierno Nacional en materia de tránsito y transporte…"* y de *"Orientar y coordinar conforme a lo establecido en el presente decreto y en las disposiciones vigentes a las entidades adscritas…",* encargándose por ello de la formulación y adopción de las políticas, planes, programas, proyectos y regulación económica en materia de transporte, tránsito e infraestructura de los modos de transporte en general.

La Superintendencia de Transporte, en ejercicio de las facultades que le han sido conferidas, en especial las que le asignó el Decreto 2409 de 2018, posee la competencia para *"1. Inspeccionar, vigilar y controlar la aplicación y el cumplimiento de las normas que rigen el sistema de tránsito y transporte.* " (Numeral 1, Artículo 4). Así mismo, los numerales 2 y 15 del artículo 7 facultan a la Superintendencia para "*adoptar las políticas, metodologías y procedimientos, así como expedir los reglamentos, manuales e instructivos que sean necesarios para ejercer la vigilancia, inspección y control a su cargo*"

Las dos entidades expiden la presente circular con el fin de impartir instrucciones precisas en lo referente al Control en Vía Apoyado en Dispositivos Electrónicos reglamentados por la Resolución 20203040011245 del 2020 expedida por el Ministerio de Transporte.

2. ANTECEDENTES NORMATIVOS PARA LA INSPECCIÓN Y VIGILANCIA DE LAS AUTORIDADES Y ORGANISMOS DE TRÁNSITO EN CUANTO A LOS PROCEDIMIENTOS DE CONTROL Y VIGILANCIA DEL TRÁNSITO

La Ley 1843 del 2017, al regular la instalación y puesta en marcha de sistemas automáticos, semiautomáticos y otros medios tecnológicos para la detección de infracciones en su artículo 3 recalcó la facultad de la Superintendencia de Transporte para adelantar, de oficio o a petición de parte, acciones tendientes a verificar el cumplimiento de los criterios técnicos definidos por el Ministerio de Transporte y la Agencia de Seguridad Vial. Señaló también que, en el evento de encontrar incumplimientos por parte de la autoridad de tránsito en dichos criterios podrá iniciar investigación correspondiente la cual podrá concluir con la suspensión de las ayudas tecnológicas hasta tanto cumplan los criterios técnicos

definidos.

Así mismo, la Ley 2251 del 2022[1] adicionó al Código Nacional de Transito el artículo el artículo 158A incluyendo una nueva potestad a la Superintendencia de Transporte, de sancionar a las autoridades de tránsito con multa equivalente al doble del valor recaudado por concepto de las multas impuestas en los procesos sancionatorios derivados de las infracciones detectadas con ayudas tecnológicas, en aquellos casos en que se utilicen dichas ayudas, sin el cumplimiento de los criterios de seguridad vial para su instalación y operación establecidos por el Ministerio de Transporte y la Agencia Nacional de Seguridad Vial en cumplimiento de la Ley 1843 de 2017, incluyendo medidas de revocación oficiosa de tales actuaciones y multa a favor del presupuesto de la Superintendencia de Transporte.

Si bien todo servidor público del orden territorial es sujeto de mecanismos de vigilancia administrativa, la Superintendencia de Transporte es entonces autoridad en relación con las autoridades y organismos de tránsito en cuanto al ejercicio de las funciones que las Leyes 769 y modificatorias y la Ley 1843 les ha asignado.

En virtud de lo anterior, corresponde al Ministerio de Transporte y a la Superintendencia de transporte, orientar e instruir a las autoridades y organismos de tránsito en torno a la interpretación de la definición del Control en Vía apoyado en dispositivos electrónicos planteado de manera expresa en la resolución reglamentaria de la Ley 1843 del 2017 como excluido de las formalidades de los Sistemas SAST, a efectos de esclarecer la legalidad y la aplicabilidad de este tipo de procedimientos con dispositivos electrónicos.

3. CONTROL EN VÍA APOYADO EN DISPOSITIVO ELECTRONICO – DIFERENCIAS CON SISTEMAS AUTOMÁTICOS, SEMIAUTOMÁTICOS Y OTROS MEDIOS TECNOLÓGICOS PARA LA DETECCIÓN DE INFRACCIONES (SAST)

El Control en Vía Apoyado en Dispositivo Electrónico cuenta con una definición normativa en el acto administrativo Reglamentario de la Ley 1843 del 2017, la Resolución No 20203040011245 del 20 Agosto del 2020 expedida por el Ministerio de Transporte, que en su literal D del artículo 3 establece textualmente lo siguiente:

> *"d) Control en vía apoyado en dispositivo electrónico: Procedimiento realizado de manera directa por un agente de tránsito presente y visible en el sitio del evento, apoyado por dispositivo (s) electrónico (s) que opera manualmente para registrar la evidencia de la*

[1] Por la cual se dictan normas para el diseño e implementación de la política de seguridad vial con enfoque de sistema seguro y se dictan otras disposiciones Ley Julián Esteban.

> *presunta infracción al tránsito y para la elaboración en el sitio, de la orden de comparendo, de conformidad con lo dispuesto en el primer inciso del artículo 135 de la Ley 769 de 2002, modificado por el artículo 22 de la Ley 1383 de 2010."*

Según lo expuesto, el literal D del artículo 3 de la Resolución No 20203040011245 del 20 Agosto del 2020 expedida por el Ministerio de Transporte, remite el procedimiento al artículo 135 modificado por el artículo 22 de la Ley 1383 de 2010, disposición que debe interpretarse de forma sistemática e histórica, teniendo en cuenta la modificación legislativa a posteriori que tuvo dicha consigna, creando en una sola disposición dos procedimientos: 1) el primer inciso del articulado manifiesta el procedimiento que venía realizándose con la expedición de la Ley 769 del 2002 sin servicio de medios técnicos y tecnológicos y 2) con la inclusión al procedimiento de los medios técnicos y tecnológicos, los cuales se expondrán de la siguiente forma:

> *"Ante la comisión de una contravención, la autoridad de tránsito debe seguir el procedimiento siguiente para imponer el comparendo: Ordenará detener la marcha del vehículo y le extenderá al conductor la orden de comparendo en la que ordenará al infractor presentarse ante la autoridad de tránsito competente dentro de los cinco (5) días hábiles siguientes. Al conductor se le entregará copia de la orden de comparendo.*
> *…*
> *La orden de comparendo deberá estar firmada por el conductor, siempre y cuando ello sea posible. Si el conductor se negara a firmar o a presentar la licencia, firmará por él un testigo, el cual deberá identificarse plenamente con el número de su cédula de ciudadanía o pasaporte, dirección de domicilio y teléfono, si lo tuviere."*

Este primer procedimiento, expuesto en el artículo 135 de la Ley 769 del 2002 modificado por el artículo 22 de la Ley 1383 de 2010, es el procedimiento tradicional que realizan las unidades de tránsito, sea del organismo de tránsito o de la dirección de tránsito y transporte de la Policía Nacional, que detienen los vehículos en puestos de control, solicitando la documentación correspondiente para la plena identificación del presunto infractor y en el evento de evidenciar una conducta que infrinja las normas de tránsito[2] extienden la o las ordenes de comparendo correspondientes, en la que ordenará al infractor presentarse ante la autoridad de tránsito competente dentro de los cinco (5) días hábiles siguientes.

[2] ARTÍCULO 129. DE LOS INFORMES DE TRÁNSITO. Los informes de las autoridades de tránsito por las infracciones previstas en este código, a través de la imposición de comparendo, deberán indicar el número de la licencia de conducción, el nombre, teléfono y dirección del presunto inculpado y el nombre y número de placa del agente que lo realiza.

El segundo procedimiento del mencionado artículo 135 de la Ley 769 del 2002 modificado por el artículo 22 de la Ley 1383 de 2010, nace con la modificación realizada mediante la Ley 1383 del 2010, en el cual introducen la facultad potestativa de las autoridades de tránsito para contratar medios técnicos y tecnológicos que permitan evidenciar la comisión de infracciones, con la finalidad de mejorar la labor de control e incluir normativamente el uso de tecnologías al procedimiento contravencional de por infracción a las normas de tránsito, lo cual se estipuló jurídicamente de la siguiente forma:

> *"No obstante lo anterior, las autoridades competentes podrán contratar el servicio de medios técnicos y tecnológicos que permitan evidenciar la comisión de infracciones o contravenciones, el vehículo, la fecha, el lugar y la hora. En tal caso se enviará por correo dentro de los tres (3) días hábiles siguientes la infracción y sus soportes al propietario, quien estará obligado al pago de la multa. Para el servicio público además se enviará por correo dentro de este mismo término copia del comparendo y sus soportes a la empresa a la cual se encuentre vinculado y a la Superintendencia de Puertos y Transporte para lo de su competencia."*

Conforme lo anterior, en este procedimiento específico la autoridad de tránsito no ordena detener la marcha del vehículo, ni extiende la orden de comparendo, precisamente al tratarse de un procedimiento que utiliza medios técnicos y tecnológicos que permiten evidenciar la comisión de infracciones o contravenciones, el vehículo, la fecha, el lugar y la hora, sin detener la marcha del vehículo. Y en dichos casos el organismo de tránsito debe enviar por correo dentro de los tres (3) días hábiles siguientes la infracción y sus soportes al propietario, quien estará obligado al pago de la multa.

Durante la vigencia de la citada modificación legislativa, la disposición fue sometida a Control de Constitucionalidad mediante sentencia C-980 del 2010 en que la Honorable Corte Constitucional realizó el estudio de constitucionalidad, bajo ponencia del H. Magistrado Gabriel Mendoza Martelo en la cual declaró la exequibilidad de la mencionada norma y dejó claro que la obligación atribuida al propietario de tener que pagar la multa, solo puede tener lugar, como consecuencia de su vinculación formal a la actuación administrativa, y luego de que se establezca plenamente su culpabilidad en la infracción.

Ahora bien, a diferencia de los Sistemas automáticos, semiautomáticos y otros medios tecnológicos (SAST) para la detección de presuntas infracciones al tránsito y el Control en vía apoyado en Dispositivo Electrónico, este último no requiere autorización de la Agencia Nacional de Seguridad Vial conforme el parágrafo 2 del artículo 5 de la Resolución No 20203040011245 del 20 de agosto del 2020 expedida por el Ministerio de Transporte que expuso lo siguiente:

> *"Parágrafo 2. El uso de equipos para las labores de control en vía apoyado en dispositivo electrónico o para fines exclusivamente disuasivos, pedagógicos y de análisis de tráfico, no requerirá autorización de la Agencia Nacional de Seguridad Vial."* (Subrayado fuera del texto)

Así las cosas, el Control en Vía Apoyado en Dispositivo Electrónico, es una labor de control adicional contemplada en la resolución reglamentaria de la Ley 1843 del 2017, de base legal, con la que potestativamente cuentan las autoridades de tránsito y que puede ser complementaria a los Sistemas automáticos, semiautomáticos y otros medios tecnológicos para la detección de infracciones (SAST) previamente autorizados por la Agencia Nacional de Seguridad Vial, lo cual les permite realizar controles dentro de sus respectivas jurisdicciones con la finalidad de reducir la siniestralidad en aquellos puntos críticos y mejorar la labor de control.

La Ley 769 de 2002 (Código Nacional de Tránsito) limita las condiciones de circulación de los vehículos con base en el artículo 24 de la Constitución, señalando reglas de comportamiento general en cuanto a velocidades máximas, a las instrucciones del semáforo, a los sentidos viales (entre otras); las que dependen de instrucciones a los conductores, contenidas en dispositivos de señalización, que deben situarse en las vías de manera que la ciudadanía sea advertida de la necesidad de adoptar un comportamiento específico, so pena de sanciones también señaladas en la ley.

Al tiempo, hay también prohibiciones absolutas en todas las vías para circular sin amparo del seguro obligatorio o sin haber realizado la revisión técnico-mecánica después de haberse cumplido los plazos para su realización. En esos dos casos la ley señala la imposibilidad de circular siquiera, por lo que no puede condicionarse el control a una señal o a una instrucción previa de una entidad pública, pues la misma ley no lo previó así frente a tales conductas, contrarias a derecho y atentatorias contra la confianza legítima de los demás conductores, ocupantes de otros vehículos y peatones, a los que expone a daños y a la carencia del mecanismo para anticiparlos y cubrirlos.

La Ley 2161 estableció medidas para promover la adquisición, renovación y no evasión del Seguro Obligatorio de Accidentes de Tránsito (SOAT), señalando en su artículo séptimo que el Ministerio de Transporte (entre otras entidades) en el marco de sus competencias, debería revisar periódicamente el estado y avances del país en materia de seguridad vial, evasión y fraude en la adquisición del Seguro Obligatorio de Accidentes de Tránsito (SOAT), así como los planes de acción que contribuyan a un mejor comportamiento vial de los actores en la vía, promuevan la adecuada atención a las víctimas de accidentes de tránsito y las buenas prácticas en los cobros por estas atenciones.

Finalmente hay que señalar que el control y vigilancia del tránsito es un deber del Estado, que por medio del Congreso de la República ha expedido normas para extender incluso a municipios que no cuentan con organismos de tránsito clasificados, ese deber de control, como lo pone de manifiesto la ley 2197 de 2022, que en sus artículos 57 y 58 tomó medidas que se resumen para los fines de esta circular en que: a) Todo municipio debe tener un esquema básico de control (agentes de tránsito) y de actuación administrativa (inspector de policía o tránsito), y, b) Los cuerpos de agentes de tránsito puedan -en temporadas especiales- ser contratados por prestación de servicios. Así, toda autoridad municipal debe controlar y vigilar el tránsito, pues es una de las formas de protección de la vida, de la salud pública, de los derechos de personas vulnerables y de la propiedad privada y pública que resulta afectada con la siniestralidad.

4. INSTRUCCIONES

Con base en los fundamentos expuestos, se imparten las siguientes instrucciones, que resultan de obligatorio cumplimiento para las Autoridades de Tránsito del Orden Municipal, Departamental, Distrital y/o Metropolitano y Organismos de Tránsito:

4.1. Hacer uso de los mecanismos de control y vigilancia señalados en la Ley 769 de 2002 y las modificatorias de esa normatividad:

4.1.1. Registrar con arreglo al artículo 57 de la Ley 2197 de 2022, ante el Ministerio de Transporte su operación como autoridad de tránsito, su arreglo institucional (inspector de policía y tránsito con superior funcional y cuerpos de agentes de tránsito con la formación y experiencia de la Ley 1310 de 2009).

4.1.2. En caso de carecer de Sistemas automáticos, semiautomáticos y otros medios tecnológicos (SAST) para la detección de presuntas infracciones autorizados por la Agencia Nacional de Seguridad Vial; localizar los puntos o tramos con fatalidades o de alta siniestralidad (lesionados) dentro de sus territorios para el ejercicio del Control en Vía Apoyado en Dispositivos Electrónicos consagrado en el literal D del artículo 3 de la Resolución No 20203040011245 del 20 Agosto del 2020, previo deber de información al Ministerio del Transporte, Agencia Nacional de Seguridad Vial y Superintendencia de Transporte.

4.2. Informar al Ministerio del Transporte, Agencia Nacional de Seguridad Vial y Superintendencia de Transporte:

4.2.1. Número de agentes de tránsito que posee y la naturaleza de su vinculación actualizados a 1 de enero y 1 de julio de cada año.

4.2.2. Operación del mecanismo de Control en Vía Apoyado en Dispositivo Electrónico:

i. Punto o tramo crítico de alta siniestralidad (fatalidad o varios casos de lesionados) dentro de su jurisdicción en el cual operan.
ii. Dispositivo Electrónico a utilizar que cumpla -por analogía- con las condiciones técnicas de idoneidad exigidas para los SAST.
iii. Definición del período en el cual se hará uso del Control.
iv. Pruebas de la señalización en los términos de la Resolución No 20243040045005 del 2024 expedida por el Ministerio de Transporte, para las infracciones diferentes a las referidas en el ordinal precedente y que representen riesgo para la seguridad vial.

4.3. Mantener en la página web del ente territorial:

4.3.1. Copia de la presente circular
4.3.2. La información señalada en el punto 4.2.2. del presente documento
4.3.3. Estadísticas generales del control realizado (conductores y vehículos verificados, tipos de infracciones detectadas con base en las codificaciones existentes y cantidades detectadas por mes)

La Superintendencia de Transporte hará seguimiento a la gestión de las autoridades y organismos de tránsito en pro de vigilar y controlar el cumplimiento del deber de información de este tipo de controles, así como promoverá el inicio de las actuaciones de diversa naturaleza en caso de no ejercerse el control y vigilancia correspondiente.

5. VIGENCIA

La presente circular rige a partir de su publicación en el portal web del ministerio de Transporte y de la Superintendencia de Transporte.

PUBLÍQUESE Y CÚMPLASE

Firmado digitalmente por PIÑERES OLAVE ALFREDO ENRIQUE

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ALCALDÍA DE VALLEDUPAR SECRETARÍA DE TRÁNSITO Y TRANSPORTE	**OPERACIÓN DEL MECANISMO DE CONTROL EN VÍA APOYADO EN DISPOSITIVO ELECTRÓNICO** Valledupar, Cesar.
Objeto	Desarrollar informe de la operación del mecanismo de control en vía apoyado en dispositivo Electrónico en la jurisdicción de la Secretaría de Tránsito y Transporte de Valledupar acorde a los lineamientos establecidos en el numeral 4.2.2 de la Circular 20254000000867 de 24-12-2025
Fecha elaboración:	Junio de 2026

1. INTRODUCCIÓN

El control y la vigilancia del tránsito constituyen funciones esenciales de los organismos de tránsito, orientadas a garantizar el cumplimiento de las normas de circulación, promover comportamientos seguros por parte de los actores viales y contribuir a la protección de la vida, la integridad de las personas y los bienes públicos y privados. En este contexto, las actividades de fiscalización representan una herramienta fundamental para la gestión de la movilidad y la seguridad vial, al permitir prevenir conductas de riesgo, fortalecer el cumplimiento de la normativa vigente y reducir la ocurrencia de siniestros viales.

Dentro de los mecanismos legalmente establecidos para el ejercicio de dichas funciones se encuentra el **control en vía apoyado en dispositivo electrónico**, cuya definición se encuentra consagrada en la Resolución No. 20203040011245 del 20 de agosto de 2020 del Ministerio de Transporte, acto administrativo reglamentario de la Ley 1843 de 2017. En el literal d) del artículo 3 de la citada resolución, esta modalidad es definida como un procedimiento realizado de manera directa por un agente de tránsito presente y visible en el sitio del evento, apoyado dispositivo(s) electrónico(s) operado(s) manualmente para registrar la evidencia de la presunta infracción a las normas de tránsito.

Esta modalidad de control se diferencia de los Sistemas Automáticos, Semiautomáticos y Otros Medios Tecnológicos para la Detección de Presuntas Infracciones al Tránsito (SAST), toda vez que su operación se desarrolla bajo la intervención directa de la autoridad de tránsito durante el procedimiento de control. En consecuencia, el parágrafo 2 del artículo 5 de la Resolución No. 20203040011245 de 2020 establece expresamente que el uso de

equipos destinados a las labores de control en vía apoyado en dispositivo electrónico, así como aquellos empleados con fines exclusivamente disuasivos, pedagógicos o de análisis de tráfico, no requiere autorización previa de la Agencia Nacional de Seguridad Vial (ANSV).

En este sentido, el control en vía apoyado en dispositivo electrónico constituye un mecanismo de fiscalización con fundamento legal que fortalece las capacidades operativas de los organismos de tránsito para el ejercicio de sus funciones de inspección, vigilancia y control. Su implementación complementa las demás estrategias de control del tránsito y permite optimizar la presencia institucional en la red vial, especialmente en corredores con alta demanda vehicular, zonas de riesgo o puntos críticos de siniestralidad, contribuyendo así al mejoramiento de la seguridad vial, al incremento del cumplimiento de las normas de tránsito y a una gestión más eficiente de la movilidad dentro de la respectiva jurisdicción.

En atención a la importancia de esta modalidad de control y al deber que le asiste al Estado de ejercer una adecuada inspección, vigilancia y control sobre el tránsito terrestre, las autoridades competentes han establecido lineamientos dirigidos a garantizar que su implementación se desarrolle bajo criterios de legalidad, transparencia, trazabilidad y respeto por el debido proceso.

Bajo este contexto, el Ministerio de Transporte y la Superintendencia de Transporte expidieron la Circular No. 20254000000867 del 24 de diciembre de 2025, mediante la cual impartieron instrucciones a los organismos de tránsito respecto de la utilización de la modalidad de Control en Vía Apoyado en Dispositivo Electrónico, estableciendo lineamientos técnicos, operativos y administrativos para su implementación, seguimiento y supervisión, así como las obligaciones relacionadas con el reporte de información derivada de su operación.

En cumplimiento de dichas directrices, el presente documento tiene por objeto desarrollar el informe de la operación del mecanismo de control en vía apoyado en dispositivo electrónico en la jurisdicción de la Secretaría de Tránsito y Transporte de Valledupar, conforme a los lineamientos establecidos en el numeral 4.2.2 de la Circular No. 20254000000867 del 24 de diciembre de 2025.

1.1. OBJETO

Desarrollar un informe de la operación del mecanismo de control en vía apoyado en dispositivo electrónico en la jurisdicción de la Secretaría de Tránsito y Transporte de Valledupar acorde a los lineamientos establecidos en el numeral 4.2.2 de la Circular 20254000000867 de 24-12-2025. Se desarrollan aquí los siguientes puntos:

i. Punto o tramo crítico de alta siniestralidad (fatalidad o varios casos de lesionados) dentro de su jurisdicción en el cual operan.

ii. Dispositivo Electrónico a utilizar que cumpla -por analogía- con las condiciones técnicas de idoneidad exigidas para los SAST.

iii. Definición del período en el cual se hará uso del Control.

iv. Pruebas de la señalización en los términos de la Resolución No 20243040045005 del 2024 expedida por el Ministerio de Transporte, para las infracciones diferentes a las referidas en el ordinal precedente y que representen riesgo para la seguridad vial.

2. CORREDORES OPERACIÓN CONTROL EN VÍA APOYADO EN DISPOSITIVO ELECTRÓNICO

En la presente sección, se desarrolla la información solicitada en el numeral 4.2.2, literal i de la Circular 20254000000867 de 24-12-2025, el cual establece los siguiente:

> ***"i. Punto o tramo crítico de alta siniestralidad (fatalidad o varios casos de lesionados) dentro de su jurisdicción en el cual operan."***

CONTEXTUALIZACIÓN.

Como consideración inicial, resulta pertinente precisar que, a la fecha de elaboración del presente informe, la Secretaría de Tránsito y Transporte de Valledupar no desarrolla labores de control en vía apoyado en dispositivo electrónico para la fiscalización de la infracción C29, relacionada con excedencia de límites de velocidad.

En la actualidad, la utilización de esta modalidad de control operativo se encuentra orientada principalmente a la fiscalización de conductas asociadas al estacionamiento en sitios prohibidos, la ausencia de seguro obligatorio, revisión tecno mecánica vencida y otros, igualmente priorizando aquellos corredores donde el estacionamiento indebido genera afectaciones significativas sobre la movilidad, la capacidad operacional de la infraestructura vial y las condiciones de seguridad de los diferentes actores viales.

Esta estrategia responde a criterios técnicos de gestión del tránsito, considerando variables como la intensidad de circulación vehicular, la presencia de actividades comerciales, la coexistencia de múltiples modos de transporte, los conflictos operacionales derivados de maniobras de estacionamiento y la necesidad de prevenir situaciones que incrementen el riesgo de ocurrencia de siniestros viales.

CONTROL EN VÍA - MOVILIDAD, CONGESTIÓN Y SINIESTRALIDAD EN VALLEDUPAR

La movilidad urbana en el municipio de Valledupar enfrenta actualmente importantes desafíos asociados tanto a la seguridad vial como al funcionamiento operacional de su red vial. En este contexto, la siniestralidad vial continúa representando una de las principales problemáticas de salud pública y de gestión del tránsito, debido a las consecuencias humanas, sociales y económicas derivadas de la ocurrencia de siniestros.

Durante los últimos años, el comportamiento de la siniestralidad fatal ha presentado una tendencia creciente. Mientras en el año 2023 se registraron 71 personas fallecidas por

siniestros viales, en 2024 esta cifra ascendió a 77 víctimas fatales y, para 2025, alcanzó 84 fallecidos, lo que representa un incremento acumulado del 18,3 % durante dicho periodo.

Paralelamente, el crecimiento del parque automotor, la concentración de actividades económicas y de servicios en determinados sectores de la ciudad, así como el incremento sostenido de la demanda de viajes, han generado condiciones recurrentes de congestión vehicular en diversos corredores estratégicos. Estas condiciones reducen la eficiencia operacional de la infraestructura vial, incrementan los tiempos de desplazamiento y favorecen la aparición de conflictos entre los diferentes actores viales.

En consecuencia, la interacción entre altos volúmenes de tránsito, comportamientos inseguros de los usuarios de la vía, estacionamiento indebido, invasión del espacio público y deficiencias en el cumplimiento de las normas de tránsito configura escenarios de riesgo que incrementan la probabilidad de ocurrencia de siniestros viales y afectan el adecuado funcionamiento del sistema de movilidad.

Frente a este panorama, el ejercicio de las funciones de regulación, vigilancia y control por parte de la autoridad de tránsito adquiere un marcado carácter preventivo. Más allá del ejercicio sancionatorio, las actividades de fiscalización buscan reducir los factores de riesgo presentes en la vía, promover el cumplimiento de las normas de tránsito, preservar la funcionalidad de la infraestructura vial y contribuir a la disminución de la siniestralidad mediante intervenciones oportunas en aquellos corredores donde se concentran mayores condiciones de riesgo.

El uso racional del espacio público constituye uno de los principios fundamentales de la planificación y gestión de la movilidad urbana, en tanto la infraestructura vial representa un recurso limitado cuya destinación principal corresponde a garantizar la circulación segura y eficiente de personas y mercancías. En este sentido, la adecuada administración del espacio vial trasciende el ámbito operativo del tránsito y se convierte en un elemento estratégico para el desarrollo urbano sostenible, la accesibilidad y la competitividad de las ciudades.

Bajo este enfoque, la optimización del uso de la infraestructura vial constituye una responsabilidad de las entidades territoriales, quienes deben adoptar medidas encaminadas a preservar la funcionalidad de la red vial y minimizar aquellas actividades que reduzcan su capacidad operacional o incrementen los factores de riesgo para los usuarios.

En concordancia con lo anterior, el literal d) del artículo 1 del Decreto 80 de 1987, "*Por el cual se asignan unas funciones a los municipios en relación con el transporte urbano",* establece como competencia de los municipios racionalizar el uso de la red vial urbana y adecuarla a las necesidades del territorio. Esta disposición constituye uno de los fundamentos para la implementación de estrategias de regulación y control orientadas a garantizar que la infraestructura vial cumpla efectivamente su función principal de facilitar la movilidad de todos los actores viales.

En este contexto, la gestión del estacionamiento adquiere especial relevancia dentro de la planificación del tránsito, debido a que la disponibilidad y regulación de espacios destinados al parqueo inciden directamente sobre la capacidad de las vías, el nivel de servicio, la seguridad vial y el funcionamiento general del sistema de movilidad. En consecuencia, la Secretaría de Tránsito y Transporte de Valledupar desarrolla acciones orientadas a promover un uso eficiente del espacio público, privilegiando el interés general y el adecuado funcionamiento de la infraestructura vial.

Desde el ámbito del ordenamiento territorial, el Plan de Ordenamiento Territorial del municipio de Valledupar, adoptado mediante el Acuerdo No. 011 del 5 de junio de 2015, establece en su artículo 278 que toda edificación debe cumplir con una cuota mínima de estacionamientos, de acuerdo con el uso del suelo y las características del proyecto. De igual forma, el artículo 282 dispone que los establecimientos comerciales deben garantizar la disponibilidad de estacionamientos al interior de sus predios para uso exclusivo de clientes y empleados, evitando trasladar dicha demanda hacia la vía pública y generar externalidades negativas sobre la operación del sistema vial.

Estas disposiciones reflejan que la atención de la demanda de estacionamiento debe resolverse prioritariamente mediante infraestructura asociada a los diferentes usos del suelo y no mediante la ocupación permanente de carriles destinados a la circulación vehicular.

De manera complementaria, el artículo 76 de la Ley 769 de 2002 establece la prohibición de estacionar vehículos sobre vías arterias, autopistas, zonas de seguridad, intersecciones y demás lugares determinados por la autoridad de tránsito, reconociendo que estas prácticas comprometen la seguridad vial y afectan la funcionalidad de la infraestructura destinada a la circulación.

Las restricciones de estacionamiento implementadas en determinados corredores obedecen a criterios técnicos relacionados con la preservación de la capacidad vial, la optimización del nivel de servicio y la reducción de conflictos operacionales. La ocupación

de carriles de circulación por vehículos estacionados disminuye la capacidad efectiva de la vía, genera cuellos de botella, incrementa las demoras y favorece la formación de congestión, especialmente en corredores con elevados volúmenes de tránsito.

Adicionalmente, las maniobras de estacionamiento y reincorporación a la corriente vehicular producen múltiples puntos de conflicto entre vehículos en movimiento, motociclistas, ciclistas y peatones. Estas maniobras implican desaceleraciones, cambios de carril, detenciones inesperadas y reducción de la visibilidad, condiciones que incrementan significativamente la probabilidad de ocurrencia de siniestros viales.

En corredores urbanos con alta actividad comercial y elevada presencia de peatones, el estacionamiento indebido también afecta la seguridad de los usuarios vulnerables, al obstruir la visibilidad en intersecciones, pasos peatonales, accesos vehiculares y zonas de ascenso y descenso de pasajeros. De igual manera, dificulta la operación del transporte público, restringe el acceso de vehículos de emergencia y reduce la eficiencia operacional de toda la red vial.

En consecuencia, el control del estacionamiento en sitios prohibidos no responde exclusivamente al cumplimiento de una disposición sancionatoria, sino que constituye una medida de gestión del tránsito orientada a preservar la funcionalidad de la infraestructura vial, reducir factores de riesgo asociados a la circulación y fortalecer las condiciones de seguridad vial en aquellos corredores donde confluyen altos volúmenes de tránsito y múltiples interacciones entre actores viales.

En este contexto, la utilización del Control en Vía Apoyado en Dispositivo Electrónico constituye una herramienta complementaria para el ejercicio de las funciones de control operacional, permitiendo optimizar la identificación de conductas infractoras, fortalecer la presencia institucional en corredores críticos y mejorar la eficiencia de las actuaciones desarrolladas por los agentes de tránsito.

Lo anterior guarda concordancia con lo señalado en la Circular No. 20254000000867 del 24 de diciembre de 2025, según la cual esta modalidad corresponde a una labor de control adicional contemplada en la reglamentación de la Ley 1843 de 2017, mediante la cual los organismos de tránsito pueden fortalecer las actividades de fiscalización en el territorio bajo su jurisdicción.

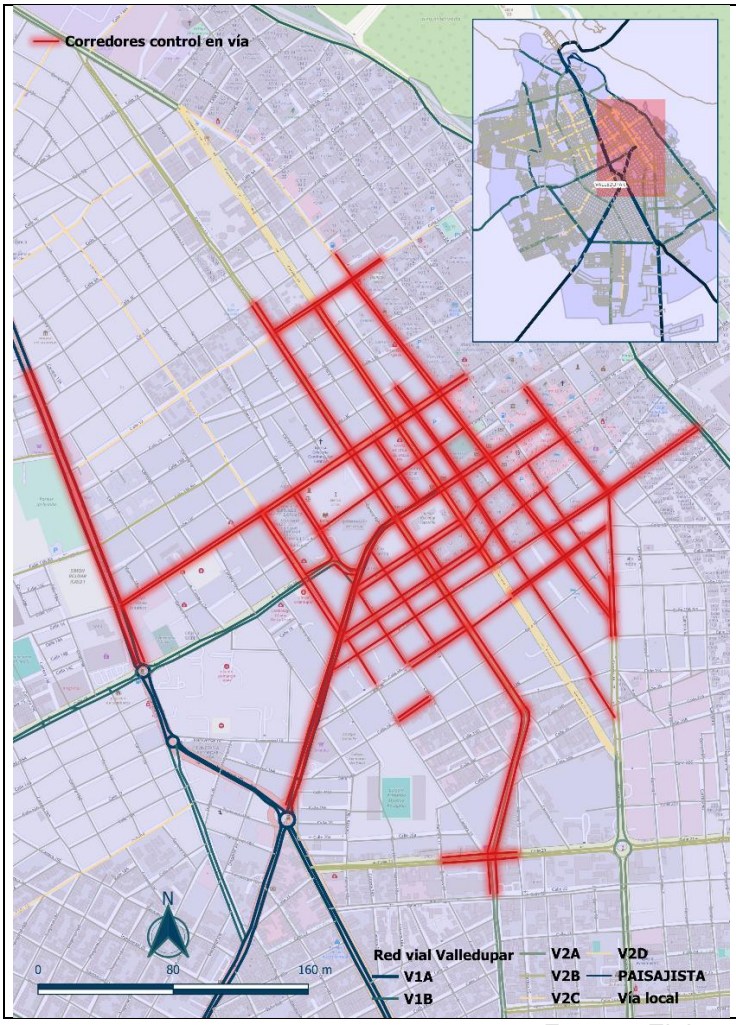
CORREDORES DE OPERACIÓN DE CONTROL EN VÍA EN VALLEDUPAR

En virtud de lo expuesto, la Secretaría de Tránsito y Transporte de Valledupar implementa la modalidad de control en vía apoyado en dispositivo electrónico en corredores una serie de premisas asociadas a la dinámica de movilidad, ocupación del espacio público y funcionamiento urbano en distintos sectores de la ciudad de Valledupar. Estos criterios permiten identificar zonas donde el estacionamiento vehicular incide de manera significativa en la operación del sistema vial y en la calidad del espacio público. Entre los principales factores analizados se encuentran los siguientes:

- Congestión vehicular: En algunos sectores de la ciudad se presentan episodios recurrentes de congestión asociados a la limitada capacidad de las vías, situación que se ve agravada por el estacionamiento sobre la calzada y por las maniobras de ingreso y salida de los vehículos.
- Ocupación temporal de carriles de circulación: La limitada disponibilidad de soluciones formales de estacionamiento fuera de la vía, sumada al desconocimiento de la localización de los espacios existentes y a comportamientos inadecuados de algunos conductores, propicia la presencia de vehículos estacionados en carriles de circulación. Esta situación reduce la capacidad operativa de las vías y aumenta los riesgos asociados a maniobras imprevistas.
- Ocupación indebida del espacio público: En diversos sectores se evidencia la ocupación de andenes, antejardines, bahías y otros espacios públicos por parte de vehículos estacionados. Esta práctica genera afectaciones al entorno urbano, deterioro del espacio público y conflictos con la movilidad peatonal, obligando en muchos casos a los peatones a desplazarse por la calzada, lo que incrementa los riesgos de accidentalidad.
- Concentración de usos de alto impacto urbano: La presencia de actividades comerciales, institucionales, financieras y de servicios genera una alta atracción de viajes y una importante demanda de estacionamiento. En muchos casos, la oferta de estacionamiento asociada a estos usos resulta insuficiente para atender la demanda generada, lo que incentiva la utilización informal del espacio público y de las vías cercanas para el estacionamiento de vehículos.
- Características de los perfiles viales y jerarquía de las vías: Existen corredores con perfiles viales reducidos que presentan dificultades para soportar simultáneamente la circulación vehicular, la movilidad peatonal y el estacionamiento sobre la vía. Esta situación es especialmente crítica en vías que cumplen funciones de conexión entre distintos sectores de la ciudad, donde la ocupación parcial de los carriles reduce significativamente la eficiencia del sistema de movilidad.

Expuesto lo anterior, y en atención a las instrucciones de la circular asunto del presente informe, a continuación, se presentan los corredores en los cuales la Secretaría de Tránsito y Transporte de Valledupar desarrolla la operación del control en vía apoyado en dispositivo electrónico:

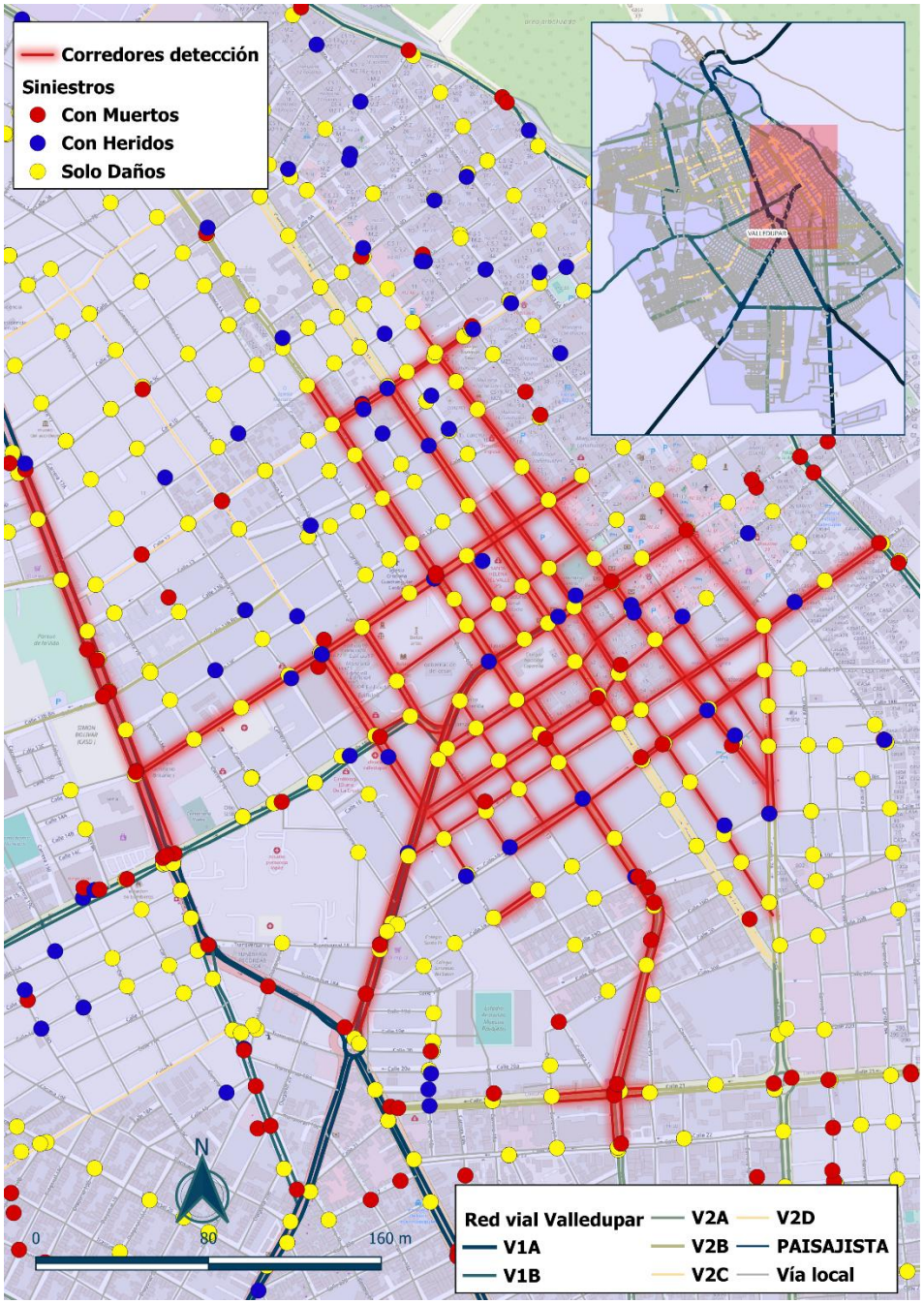
Figura 1 Registro principales corredores operación Control en Vía Apoyado en Dispositivo Electrónico



Carrera 9 [Cra. 7A - Cll. 12] (Der)	Calle 16B [Cra. 15 - Cra. 11] (Der)
Carrea 9 [Cra. 7A - Cll. 12] (Izq)	Calle 16B [Cra. 15 - Cra. 11] (Izq)
Carrera 9 [Cll. 12 - Cll.13] (Der)	Calle 16B [Cra. 11 - Cra. 8] (Der)
Carrera 8 [Cll 16A - Cra. 7A) (Der)	Calle 17 [Cra. 4 - Cra. 7] (Der)
Carrera 10 [Cll. 13C - Cll. 17] (Der)	Calle 17 [Cra. 4 - Cra. 7] (Izq)
Carrera 10 [Cll. 13C - Cll. 17] (Izq)	Calle 17 [Cra. 7 - Cra. 9] (Der)
Carrera 10 [Cll. 17 - Cll. 19C] (Izq)	Calle 17 [Cra. 7 - Cra. 9] (Izq)
Carrera 10 [Cll. 19C - Cra. 7A] (Der)	Calle 17 [Cra. 9 - Dg. 16] (Der)
Carrera 11 [Cll. 12 - Cll 17] (Der)	Calle 19 [Cra. 14 - Cra. 15] (Izq)
Carrera 11 [Cll. 12 - Cll 17] (Izq)	Calle 19 [Cra. 14 - Cra. 15] (Der)
Carrera 11A [Cll. 14 - Cll. 16] (Der)	Calle 15 [Cra. 11 - Cra. 14] (Der)
Carrera 11A [Cll. 14 - Cll. 16] (Izq)	Carrera 7 [Cll. 17 - Cll. 15] (Der)
Carrera 11A [Cll. 16A - Cll. 16B] (Der)	Carrera 7 [Cll. 17 - Cll. 15] (Izq)
Carrera 12 [Cll. 11 - Cll. 19D] (Der)	Calle 16 [Cra. 9 - Cra. 7] (Der)
Carrera 12 [Cll. 11 - Cll. 19D] (Izq)	Calle 16 [Cra. 9 - Cra. 7] (Izq)
Transversal 12 [Cll. 19D - Cll. 21] (Der)	Carrera 14 [Cll. 15 - Dg. 16] (Izq)
Transversal 12 [Cll. 19D - Cll. 21] (Izq)	Carrera 14 [Cll. 15 - Dg. 16] (Der)
Carrera 16 [Cll. 22 - Cll.21] (Der)	Carrera 14 [Cll. 15 - Cll. 16] (Der)
Carrera 16 [Cll. 22 - Cll.21] (Izq)	Carrera 14 [Cll. 14 - Cll. 15] (Izq)
Carrera 13 [Dg. 16 - Cll.18] (Der)	Carrera 14 [Cll. 14 - Dg. 15] (Der)
Carrera 14 [Cll. 16A - Cll.16B] (Der)	Calle 14 [Cra. 8 - Cra. 15] (Der)
Carrera 14 [Cll. 16B - Cll. 18] (Izq)	Calle 14 [Cra. 8 - Cra. 15] (Izq)
Calle 18 [Cra. 14 - Cra. 12] (Der)	Calle 15 [Cra. 9 - Cra. 11] (Der)
Calle 18 [Cra. 14 - Cra. 12] (Izq)	Carrera 15 [Dg. 16 - Cll 14] (Der)
Calle 18 [Cra. 12 - Cra. 11] (Der)	Carrera 15 [Dg. 16 - Cll 14] (Izq)
Calle 18 [Cra. 11 - Cra. 7A] (Der)	Carrera 19 [Cll. 16 - Cll. 9C] (Der)
Calle 18 [Cra. 11 - Cra. 7A] (Izq)	Carrera 19 [Cll. 16 - Cll. 9C] (Izq)
Carrera 7A [Calle 19B - Cra 8] (Izq)	Calle 14 [Cra. 15 - Cra. 19] (Der)
Carrera 7A [Calle 19B - Cra 8] (Der)	Calle 14 [Cra. 15 - Cra. 19] (Izq)
Carrera 7A [Cra. 9 - Cll. 17] (Der)	Calle 12 [Cra. 8 - Cra. 12] (Izq)
Carrera 15 [Cll. 16b - Cll. 18] (Der)	Calle 12 [Cra. 8 - Cra. 12] (Der)
Calle 16 [Cra. 12 - Cra 9] (Der)	Diagonal 16 [Glorieta Músicos - Carrera 12] (Der)
Calle 16 [Cra. 12 - Cra 9] (Izq)	Diagonal 16 [Glorieta Músicos - Carrera 12] (Izq)
Calle 16A [Cra. 14 - Cra. 11] (Der)	Calle 16 [Cra. 14 - Cra. 15] (Der)
Calle 16A [Cra. 14 - Cra. 11] (Izq)	Calle 21 [Cra. 15 - Cra. 17] (Izq)
Calle 16A [Cra. 10 - Cra. 11] (Der)	Calle 21 [Cra. 15 - Cra. 17] (Der)
Calle 16A [Cra. 7 - Cra. 10] (Izq)	

Fuente: Elaboración propia

Figura 2 Registros siniestralidad zona de influencia corredores de control en vía: periodo 2016 - 2026



Fuente: Elaboración propia

3. DISPOSITIVO UTILIZADO

En la presente sección, se desarrolla la información solicitada en el numeral 4.2.2, literal ii de la Circular 20254000000867 de 24-12-2025, el cual establece los siguiente:

> *"Dispositivo Electrónico a utilizar que cumpla -por analogía- con las condiciones técnicas de idoneidad exigidas para los SAST."*

Sea lo primero indicar que, en el Municipio de Valledupar, actualmente se adelantan actividades de control en vía apoyados en dispositivos electrónicos. Dicho control es realizado directamente por el cuerpo de agentes adscritos a la secretaria, los cuales se apoyan en un dispositivo electrónico que operan manualmente y que sirven para captar evidencias que soportan la elaboración de la orden de comparendo y los cuales se usan como pruebas[1] dentro del proceso contravencional que es adelantado ante la autoridad competente que es la Inspección de Tránsito municipal. Este procedimiento se fundamenta en lo establecido en el literal d) del artículo 7.8.3. de la Resolución 20223040045295 del 04 de agosto del 2022, expedida por el Ministerio de Transporte, que reza lo siguiente:

> "*d) Control en vía apoyado en dispositivo electrónico: Procedimiento realizado de manera directa por un agente de tránsito presente y visible en el sitio del evento, apoyado por dispositivo (s) electrónico (s) que opera manualmente para registrar la evidencia de la presunta infracción al tránsito y para la elaboración en el sitio, de la orden de comparendo, de conformidad con lo dispuesto en el primer inciso del artículo 135 de la Ley 769 de 2002, modificado por el artículo 22 de la Ley 1383 de 2010"*

Como es sabido, dicho dispositivos no requieren de autorización por parte de la ANSV, lo anterior, de conformidad con lo establecido en el parágrafo 2 del artículo 5 de la Resolución No. 20203040011245 del 20 de agosto de 2020, expedida por el Ministerio de Transporte, el cual dispone lo siguiente:

> *"Parágrafo 2. El uso de equipos para las labores de control en vía apoyado en dispositivo electrónico o para fines exclusivamente disuasivos, pedagógicos y*

[1] parágrafo 2 del artículo 129 de la misma normatividad: "*Las ayudas tecnológicas como cámaras de vídeo y equipos electrónicos de lectura que permitan con precisión la identificación del vehículo o del conductor serán válidos como prueba de ocurrencia de una infracción de tránsito y por lo tanto darán lugar a la imposición de un comparendo"*

de análisis de tráfico, no requerirá autorización de la Agencia Nacional de Seguridad vial"

El dispositivo utilizado es de referencia LaserCam 4, diseñado por el fabricante Kustom Signals, INC. El mencionado dispositivo operado manualmente por un agente de tránsito, como lo indican sus características técnicas, cumple por analogía con las condiciones de idoneidad exigidas para los SAST. La justificación para el uso de este dispositivo se encuentra dada en el inciso cuarto del artículo 135 de la Ley 769 de 2002, que establece: "*No obstante lo anterior, las autoridades competentes podrán contratar el servicio de medios técnicos y tecnológicos que permitan evidenciar la comisión de infracciones o contravenciones, el vehículo, la fecha, el lugar y la hora"*.

Es preciso aclarar que el dispositivo LaserCam 4 cuenta con la capacidad técnica para realizar la medición y el registro de la velocidad de los vehículos. No obstante, dicha funcionalidad no es utilizada por el cuerpo de agentes de tránsito del Municipio de Valledupar dentro de los procedimientos de control operativo que actualmente desarrolla la Secretaría de Tránsito y Transporte. En consecuencia, la medición de velocidad no hace parte de las actividades para las cuales el dispositivo es empleado, ni se generan registros o evidencias relacionadas con esta funcionalidad, por tal motivo, no se requiere de su calibración.

Para todos los efectos, se anexa el manual de operación del dispositivo (*Véase ANEXO 01 MANUAL DE OPERACIÓN DISPOSITIVO*)

4. PERÍODO DENTRO DEL CUAL SE REALIZA CONTROL

En la presente sección, se desarrolla la información solicitada en el numeral 4.2.2, literal iii de la Circular 20254000000867 de 24-12-2025, el cual establece los siguiente:

"Definición del período en el cual se hará uso del Control."

En cumplimiento de las funciones constitucionales y legales atribuidas a los agentes de tránsito adscritos a la Secretaría de Tránsito y Transporte de Valledupar, las actividades de regulación, control y vigilancia del tránsito se desarrollan de manera permanente, continua e ininterrumpida, con el propósito de garantizar la seguridad vial, proteger la vida e integridad de todos los actores viales, promover el cumplimiento de las normas de tránsito y contribuir a una movilidad segura y ordenada dentro de la jurisdicción del municipio.

Ahora bien, en lo que respecta a las actividades de control en vía apoyadas mediante dispositivos electrónicos, particularmente el dispositivo referido en el punto anterior, estas se desarrollan conforme a la programación operativa establecida por la Secretaría, en un horario comprendido entre las 7:00 a.m. y las 7:00 p.m., de lunes a sábado, período durante el cual los agentes de tránsito realizan de manera presencial las labores de control, vigilancia y verificación del cumplimiento de las normas de tránsito, haciendo uso de dichas herramientas tecnológicas como elementos de apoyo para el ejercicio de sus funciones.

5. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN No. 20243040045005 DEL 2024

En la presente sección, se desarrolla la información solicitada en el numeral 4.2.2, literal iv de la Circular 20254000000867 de 24-12-2025, el cual establece los siguiente:

> *"Pruebas de la señalización en los términos de la Resolución No 20243040045005 del 2024 expedida por el Ministerio de Transporte, para las infracciones diferentes a las referidas en el ordinal precedente y que representen riesgo para la seguridad vial."*

Como se aclara en la sección 2 del presente informe, es pertinente aclarar que a la fecha en la Secretaría de Tránsito y Transporte de Valledupar **NO realiza labores de control en vía apoyado en dispositivo electrónico para la fiscalización de la infracción "C29"**, tal como se describe en la Resolución No 20243040045005 del 2024.

De esta manera, y en términos de lo expuesto en la sección 2, y en cumplimiento de lo dispuesto en la Resolución No 20243040045005 del 2024 expedida por el Ministerio de Transporte y normatividad asociada, la señalización necesaria asociada a la conducta fiscalizada corresponde a la señalización SR-28 con los respectivos indicativos de leyenda, horario y detección electrónica.

De esta manera, en atención al numeral 4.2.2, literal iv de la Circular 20254000000867 de 24-12-2025, en el ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024, se relaciona inventario prueba de la señalización asociada a la labor de control en vía apoyado en dispositivo electrónico en el área urbana jurisdicción del Municipio de Valledupar.

6. ANEXOS

- ANEXO 01. MANUAL DE OPERACIÓN DISPOSITIVO.
- ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024.

Kustom Signals, Inc.

LaserCam 4
Operator's Manual

for v3.077

KUSTOM SIGNALS, INC.

PN: 006-1070-00 Rev 8

Kustom Signals, Inc.
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Lenexa, KS 66219-2406

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Sales Fax: 913-492-1703

Technical Support: 1-800-835-0156 or 1-620-431-2700

Web: www.kustomsignals.com

Important/Notable Information

While all of the information in this manual is important, there are some pieces of information where special attention needs to be paid to avoid equipment damage, or specific information needs to be emphasized. This information will be handled as follows:

WARNING! ***INDICATES THAT THE OPERATION MAY AFFECT OTHER EQUIPMENT.***

IMPORTANT ***Indicates an operating procedure, practice, or condition that, if not strictly followed, may cause equipment damage.***

Note: *Indicates additional information or emphasizes a topic related to the subject being discussed.*

Field Service

Kustom Signals, Inc. can provide field service for start-up assistance, training, maintenance, and replacement/spare parts for new and existing equipment. Contact a Kustom Signals, Inc. representative by calling 1-800-835-0156 or 1-620-431-2700.

LaserCam 4
Table of Contents

List of Figures

Chapter 1 - Product Description

1.0 General Description

This chapter provides a high-level product description of the LaserCam 4 traffic safety LIDAR with integrated video. The LaserCam 4 is the fourth generation hand-held digital video laser from Kustom Signals, and is powered by the latest generation ProLaser® 4 LIDAR. The LaserCam 4 provides the versatility of target speed and range measurement in a hand-held device integrated with high resolution digital video camera, which delivers a complete record of the officer's target tracking history.

NOTE: This manual applies to LaserCam 4 systems with v3.077 firmware.

The LaserCam 4 traffic safety LIDAR includes:

- LaserCam 4 powered by ProLaser® 4
- Wireless printing to Bluetooth® printer enabled
- Compass
- Inclinometer
- GPS
- 3.8 VDC Li-ion Polymer (LIP) rechargeable battery
- AC battery charger
- LaserCam 4 to PC Cable (Commercial off-the-shelf (COTS) USB cable 1 meter long A to mini-B USB 2.0 compatible)
- 16GB of video memory providing over 8 hours of video storage
- Rugged carry case
- ProLog Lite video & image evidence management software
- Operator's Manual on CD
- Quick Start Guide
- Eye safety certification
- Accuracy calibration certification

Note: *Typical configurations listed, custom configurations may vary.*

1.1 Optional Components

- Tripod kit (includes tripod, fluid video head, and tripod mount)
- Rugged, mobile Bluetooth® printer for wireless roadside printing
- Optional battery kit for mobile printer
- Video memory upgrade providing more hours of record time – may only be installed at the factory. 32 GB > 17 hrs, 64 GB > 33 hrs.
- 2.8 meter (9 ft.) 12 VDC corded handle insert with cigarette adapter
- Additional 3.8 VDC Li-ion Polymer (LIP) rechargeable battery
- LaserCam 4 tripod mount adapter (tripod and tripod video head sold separately)
- Shoulder stock
- Padded soft carry case with shoulder strap & battery pocket
- Long Range yoke option with 2.2x zoom lens for long range capture
- ProLog Standard evidence management software
- ProLog Standard Client for use with additional PC(s) that will access a common ProLog Standard database)

1.2 Control Locations

Operation of the LaserCam 4 primarily involves using the User Interface buttons in the integrated rear display and the control buttons that are located on the back panel of the unit, the control buttons on the side of the housing and the trigger that is used to fire the unit.

1.3 Physical Description

The following figures depict the exterior features of the LaserCam 4.

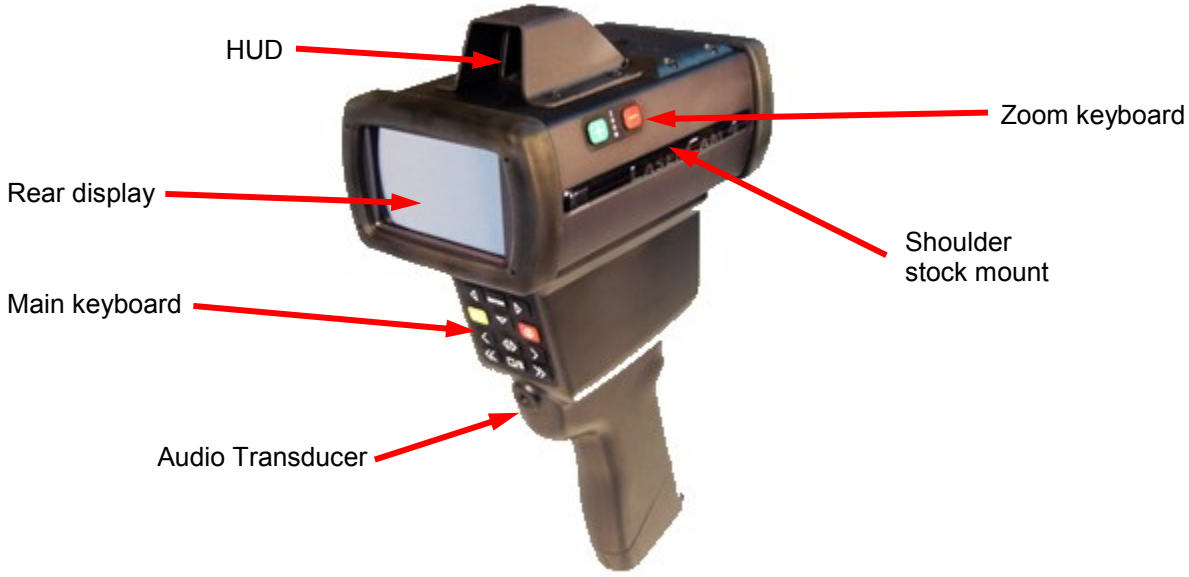


Figure 1-1 - Rear and Right Side View of the LaserCam 4

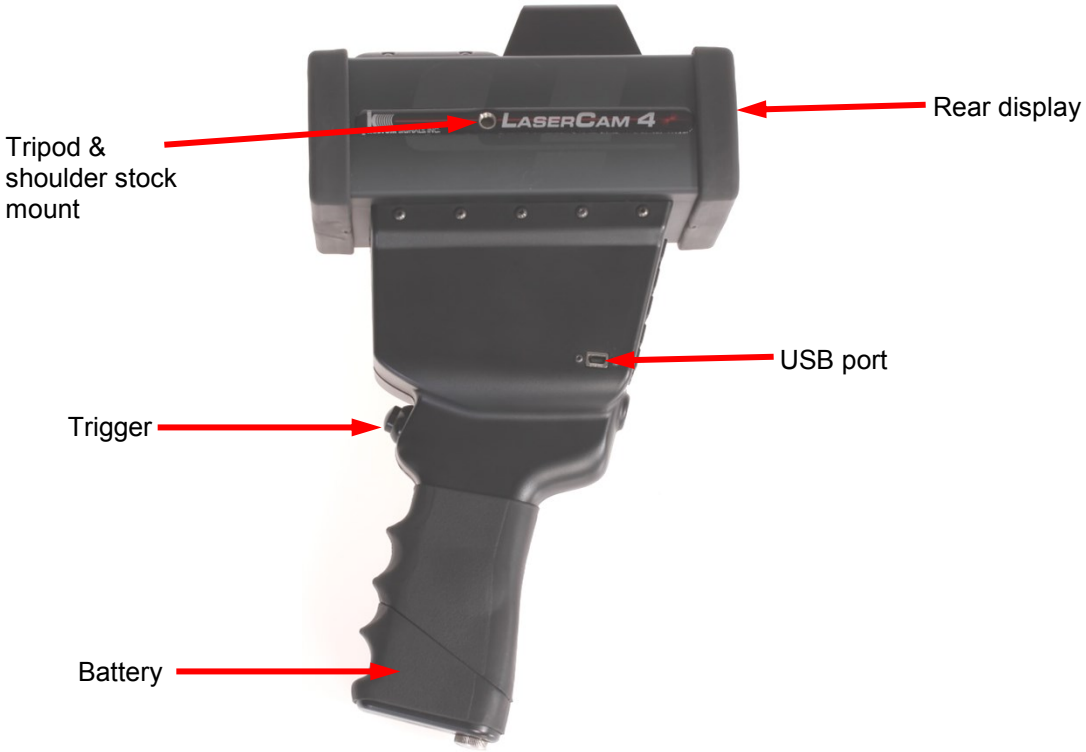


Figure 1-2 - Left Side View of the LaserCam 4

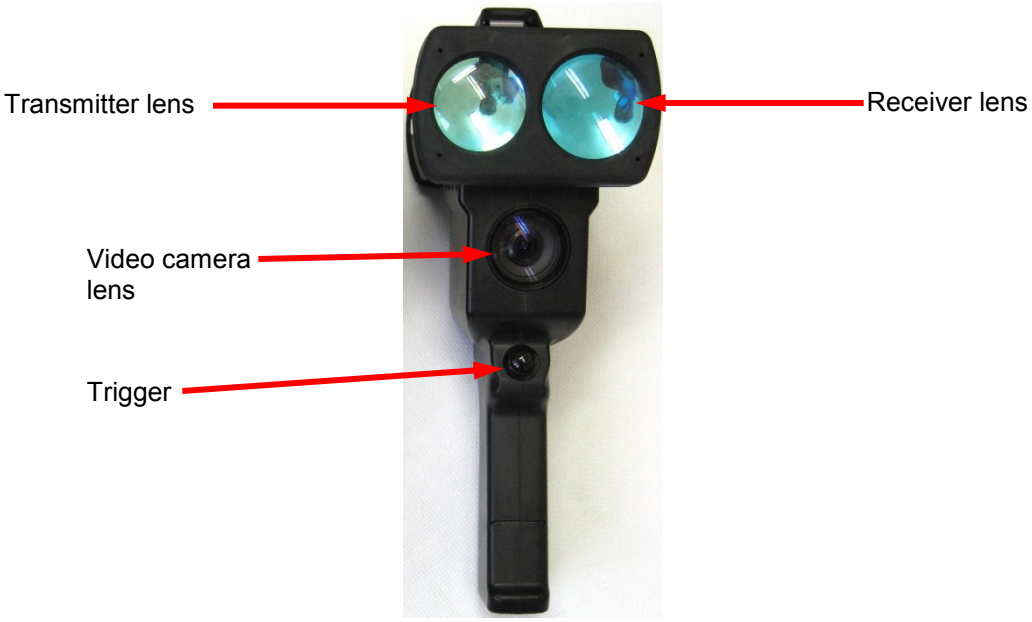


Figure 1-3 - Front View of LaserCam 4

Each of the called out items with be covered in the following pages.

1.3.1 Zoom Keypad

On the right side of the LaserCam 4 housing, as viewed from the rear, the user will find the zoom keypad near the top edge of the housing. This keypad has two (2) buttons. The green button with the plus (+) symbol is used to zoom the camera in, while the red button with the minus (–) is used to zoom the camera back out.

1.3.2 Head-Up Display (HUD)

The HUD is located on the top of the LaserCam 4 and displays the aiming reticle, as well as the speed and range of a target. The user may choose to turn the range to the target off.

1.3.3 Rear Display / User Interface

The rear display on the LaserCam 4 is the primary user interface for the unit. The display provides a great deal of information, as well as providing a display for viewing live video from the camera, playback of recorded video, and review of screen shots taken from the rear display. In addition to these functions, the display also has the full menu system and has the appropriate control buttons for the menu system. The menu systems and the control buttons within the menu system will be detailed in Chapter 3: Using the LaserCam 4 Menu System.

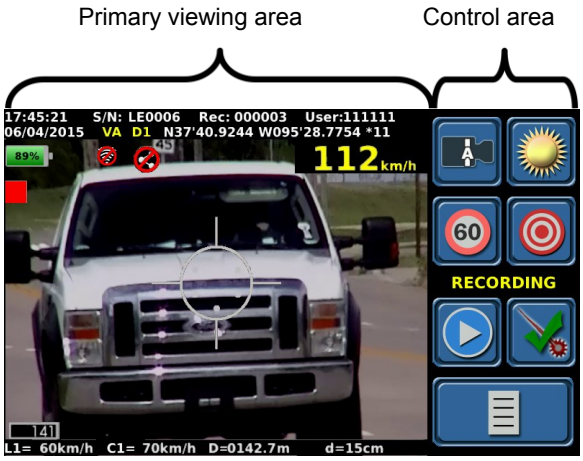
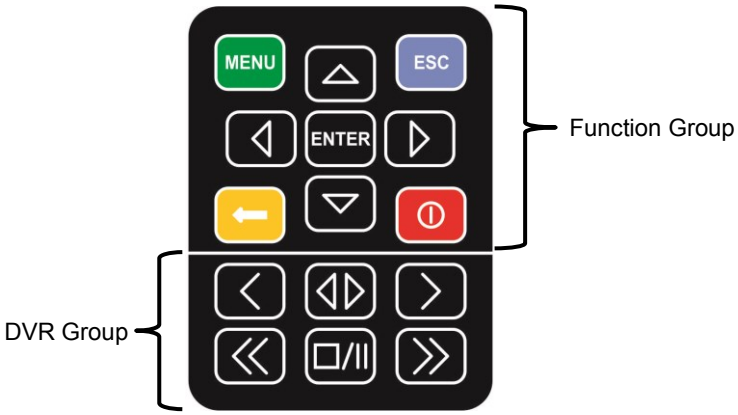


Figure 1-4 - Enforcement Screen on Rear Display

1.3.4 Main Keypad

The main keypad is configured in two button groups. The upper group is the function group, while the lower group is the DVR group. The purpose of these buttons will be defined in detail in Chapter 2: System Operation.



Function Group Buttons	DVR Group Buttons
MENU button	< button
ESC (Escape) / Self-Test button	◁▷ button
Directional buttons	> button
ENTER button	<< button
Power button	□/II button
← (Backspace) button	>> button

Figure 1-5 - Main Keypad

1.3.5 USB Port
On the left side of the LaserCam 4 is a mini-B USB Port. This port is used for connecting the device to an administrative PC. This USB connection is used for the following purposes:

- Setup and management of the device
- Transferring video/images from the LaserCam 4 to the administrative PC
- Installing software updates

1.3.6 Trigger
The trigger is located on the front of the handle and is used to activate the range/speed measurement functions and video recording.

1.3.7 Tripod Mount
Each LaserCam 4 can accommodate the tripod mount by using the ¼-20 socket, located on the left side of the device.

1.3.8 Shoulder Stock Mount
Each LaserCam 4 can accommodate a shoulder stock by using the ¼-20 sockets located on each side of the LaserCam 4 housing.

1.3.9 Transmitter/Receiver Lenses
Located on the front of the LaserCam 4 is a pair of lenses for the laser. The lenses are attached to the front of the LaserCam 4 aluminum housing. The lenses are different sizes. The smaller of the two (2) lenses is for the transmitter, while the larger of the two (2) lenses is for the receiver.

1.3.10 Camera Lens
The LaserCam 4 utilizes a Sony video camera to provide a visual record of any violations that are captured with the LaserCam 4.

1.3.11 Battery & Corded Power
The LaserCam 4 uses a Lithium-ion Polymer (LIP), rechargeable battery. The battery is rated at 3.8 VDC / 10.8 Ah / 40.0 Wh. The battery is installed in the handle of the LaserCam 4. The battery will only install in the handle one way and is held in place with a knurled screw.

The LaserCam 4 has an optional 2.8 m (9 ft.) 12 VDC corded handle insert with cigarette plug adapter and replaceable fuse.

Figure 1-6 - Rechargeable Battery & Corded Battery Handle

1.3.12 Battery Charger

Each LaserCam 4 includes a rechargeable battery charger. The charger utilizes an actual LaserCam 4 battery handle. The battery is inserted into the charger in the same way as it is installed in the LaserCam 4.

The battery charger is equipped with a power switch for turning the charger on or off. The charger is also equipped with an LED to provide the status of the battery charger.

Figure 1-7 - Battery Charger

When the LED is illuminated red, the battery is charging. When the LED is illuminated green, the battery is fully charged. When the LED is not illuminated, there is no battery in the charger, or the charger is turned off.

1.3.13 Bluetooth® Mobile Printer

The LaserCam 4 is available with an optional Bluetooth® printer. The printer allows the user to print citations at the enforcement site. A standardized report form is provided. From the snapshot gallery within the Records menu, the user can select the desired image(s) file and send it to the predefined report form and Bluetooth® printer. The printing function offers the following benefits:

- Standardized form
- Ability to insert the agency's logo on the form, via the LaserCam 4 Setup application
- The ability to print one (1) or two (2) snapshots on the printed report

Instructions for customizing the form can be found in the Setup application Manual. Only select Bluetooth printers are supported for use with LaserCam 4. For more information, please contact your Kustom Signals Sales representative for more information.

How to print is covered in Chapter 2 – System Operation.

Figure 1-8 – Brother® PocketJet 7 Thermal Printer

1.4 AutoTrak™

The AutoTrak™ feature automatically controls the LaserCam 4 optical zoom with approaching & receding target tracking. The user will pull the trigger to fire the laser. The camera zoom will change with the range to target, optimizing the target image in the evidence. The user selectable post recording action enables faster target to target measurement by returning the camera zoom to the desired initial view.

1.5 Power Saver Mode

This function allows the LaserCam 4 to automatically go to sleep when the user sets the device down, such as when they lay the unit in a vehicle seat. When the user picks the device up, the device automatically wakes up.

When the LaserCam 4 is powered up, the internal inclinometer measures the inclination of the device. When the LaserCam 4 is tilted away from the vertical axis to the side, if the tilt exceeds +/- 70° from vertical, sleep mode will be initiated by the internal logic. The position of the LaserCam 4 in relation to the vertical axis is measured every 0.5 seconds. Depending on how long the LaserCam 4 is laid down, as measured by internal timer circuits, the LaserCam 4 may assume one of the following modes:

- Active state – Normal operation
- Sleep_mode1 after 5 sec – Minor energy saving (LCD, Bluetooth®, GPRS, GPS are turned off, and CPU clock will slow down)
- Sleep_mode2 after 2 min – Major energy saving (everything from Sleep_mode 1 remain off, plus the camera and laser components are turned off)
- Shut down after 10 min – Complete LC4 power off

  Note: Each sleep time and the tilt angle that starts the timer is adjustable using ProLog or the Setup Application.

1.6 Login IDs and Passwords

The LaserCam 4 is designed so that each user is required to log into the device to be able to use it. The two types of login IDs that are used are:

- Controller / Administrator
- User

Both login IDs can operate the unit but only a Controller Login allows settings changes using ProLog or the Setup Application. This allows the agency to control configuration access to authorized personnel only.

The default configuration of the LaserCam 4 includes a set of default Login IDs and Passwords for each type of user. The default Login IDs and Passwords are provided in the following table.

Login Type	Login ID	Password
Administrator (ProLog and Setup Application)	111111	333333
User 1	001	001
User 2	002	002
User 3	003	003

The administrator for the agency will log in to the device and will need to set a new administrator Login ID and Password to secure the device and prevent unauthorized changes. In addition, the administrator will need to create an ID for each individual user for that device. This is accomplished using the ProLog software application that comes with the LaserCam 4. Refer to the ProLog Operator Manual for more information.

1.7 Wi-Fi

The LaserCam 4 has an IEEE 802.11 a/b/g interface that can be used to download video and configure the unit. Reference the documentation supplied with the various applications supplied by Kustom Signals for details on setup and use.

1.8 IR Illuminator (Optional)

The LaserCam 4 has an optional Infrared (IR) Illuminator that can assist in capturing vehicles at night. The vehicles will be seen in Black and White as the IR mode is a night time mode.

Figure 1-9 – LaserCam 4 with IR Illuminator

1.9 Long Range Yoke (Optional)

The LaserCam 4 has an optional yoke assembly which supports an optical telephoto lens to increase the range to identify a target registration plate or to enforce seat belts or mobile phone infractrions.

Figure 1-10 – Long Range Yoke with 2.2x Zoom Lens

Chapter 2 - System Operation

2.0 General Description

This chapter provides a detailed explanation of the operating characteristics of the LaserCam 4 speed detection system.

IMPORTANT ***The following guide to operating the LaserCam 4 lidar system is not intended to be a training program. Before operating this unit or any other speed measuring system, Kustom Signals, Inc. urges all users to have training in radar and lidar speed monitoring devices. Contact your District Manager or Kustom Signals, Inc. at 1-913-492-1400 (Sales), or 1-620-431-2700 (Service) for further details.***

The LaserCam 4 is a versatile instrument that measures both the speed and range of selected target vehicles while at the same time capturing the target vehicle with photos or video, providing a complete tracking history for speed enforcement.

The advanced technology of the LaserCam 4 provides pinpoint aiming capability, permitting the user to isolate a single vehicle out of a group. Rather than using microwave transmission employed by traditional traffic radar systems, the LaserCam 4 uses invisible infrared light pulses for measurement. The beam width of the LaserCam 4 is less than 1 foot (30 cm) wide at a target range of 1000 feet (300 meters), which provides the user with target specific speed measurement.

The technology used by the LaserCam 4 to measure distances and speeds is referred to as LIDAR, which stands for light detection and ranging. When the trigger is pulled, the LaserCam 4 sends out hundreds of invisible infrared laser light pulses per second. As each pulse is transmitted, a timer is started, and when the energy of a laser pulse is reflected from a target and received by the LaserCam 4, the timer is stopped. From the elapsed time taken for the laser pulse to strike and return from the target, the distance to the object is calculated with the known speed of light. If the target is moving with respect to the LaserCam 4, a sophisticated algorithm is used to derive the speed of the target from a successive number of range calculations. This speed determination is then displayed to the user.

The LaserCam 4 brings several new innovations to market including:

- AutoTrak™ automatic optical zoom with target tracking (patent pending)
- User selectable post recording action for faster target to target measurement (returns camera zoom to desired initial view)
- Power Saver Mode via Inclinometer (patent pending)
- Certification warning with optional lockout (patent pending)
- Microphone audio recording of target tracking with video modes

2.1 Control Descriptions

In Chapter 1 - Product Description, the locations of the operating controls and displays were introduced. This chapter will provide detailed descriptions of each control and display.

IMPORTANT ***Use of controls, adjustments or performance of procedures other than those specified is not recommended. Adherence to the instructions contained in this manual ensures the device works at peak performance.***

Figure 2-1 - Control Locations

2.1.1 Trigger

Depending on the current mode of operation, the trigger of the LaserCam 4 performs a couple of different functions. When operating in Automatic Mode the user will press and release the trigger to place the system in a mode where the laser is firing continuously. The user can move from vehicle-to-vehicle and when a target vehicle exceeds the capture speed, the DVR will start recording video. If in Video Automatic mode, recording stops when the target is lost and the *laser off target* timer expires. The user will press and release the trigger again to stop firing the laser.

When operating in Manual Mode, the LaserCam 4 will fire the laser and activate the DVR anytime a target vehicle exceeds the capture speed. When the trigger is released the laser will stop firing and the DVR will stop recording after the minimum record time is met. The default is 2 seconds and the maximum default is 120 seconds.

> *Note: The minimum and maximum record times are adjustable using ProLog or the Setup Application.*

If in the Video Only (VV) mode the trigger will record video when pulled or if in Photo Only (PP) mode releasing the trigger will create a photo snapshot.

2.1.2 Audio Transducer

The audible tone provides feedback to assist the user in aiming the LaserCam 4. The aiming tone is activated when the trigger is pulled and a staccato or chirping tone is heard when no

valid target is in range, such as aiming the unit at the sky. As the quality of range data from a target improves, the ”chirp rate” increases, indicating proper aiming of the LaserCam 4. When a range or speed is actually displayed, the chirping simultaneously changes to a solid tone.

2.1.3 Zoom Keypad

The zoom keypad is located on the right side of the LaserCam 4’s extruded aluminum housing, toward the rear of the unit, along the top edge of the housing. This keypad has two (2) buttons. The green button with the plus (+) symbol is used to zoom the camera in, while the red button with the minus (–) is used to zoom the camera back out.

2.1.4 Rear Display with Touchscreen

The LaserCam 4 utilizes a rear display with integrated touchscreen. This means that the user can control the device using the buttons on the display.

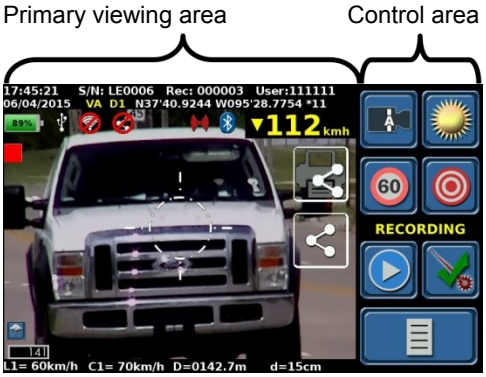


Figure 2-2 - Enforcement Screen on Rear Display

2.1.4.1 Enforcement Screen Viewing Area

Around the primary viewing area, the following information is displayed:

Item	Definition	Item	Definition	Item	Definition
17:45:21	*Time*	*S/N: LE0006*	*Device Serial Number*	*REC: 000003*	*Record number*
User:111111	*Operator ID*	*06/04/2015*	*Date*	*VA*	*Operating Mode (VA)*
D1	*Camera Mode (D1)*	*N37’40.9244*	*GPS Latitude*	*W095’28.7754*	*GPS Longitude*
**11*	*# of Detected GPS Satellites*	89%	*Battery Level*		*Wi-Fi Status Red”No”Symbol = not connected Green = connected*
	*Network Status Red”No”Circle = not connected*	and RECORDING	*Recording*	▼112 kmh	*Speed & Direction (Up arrow indicates receding target)*
	*# of Video Frames*	*L1=60km/h*	*Posted Speed Limit*	*C1=70km/h*	*Capture Speed*
D=0142.7m	*Range (Distance)*	*d=15cm*	*Diameter of laser beam at target*		*IR active*
	*Poor Weather Mode*		*USB connected*		*Bluetooth active*

Figure 2-3 - Enforcement Screen on Rear Display

Note: When units are in feet, the LaserCam 4 displays the diameter of the laser beam in inches (in).

2.1.4.2 Display Options

The time has many options for display set by an administrator using the Setup Application. Options for separators are \ / ; : . , - _ . Below are a few examples:

- MM/DD/YYYY will give 06/04/2015
- MMM/DD/YYYY will give Jun/04/2015
- MM_DD_YYYY will give 06_04_2015
- DD.MM.YYYY will give 04.06.2015

2.1.4.3 Enforcement Screen Buttons

In the control area of the sample image of the enforcement screen, the following buttons are shown:

Icon	Basic Definition	Icon	Basic Definition
	Operating Mode		Instant Play
	Camera Mode		Laser Self-Test
	Speed Limit		Menu
	Capture Speed		

Figure 2-4 - Rear Display Icons

2.1.5 Main Keypad

The main keypad is configured in two button groups. The upper group is the function group, while the lower group is the DVR group.

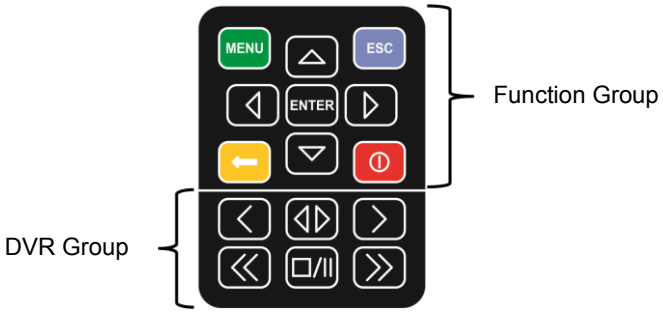


Figure 2-5 - Main Keypad

2.1.5.1 Function Group Buttons

MENU	• This button is used to enter the Menu setup mode and configure the unit's major functions.
ESC	• From the enforcement screen, a press of this button will initiate a system self-test. • In Menu mode, pressing this button exits the menu system and returns the LaserCam 4 back to its most recent operating mode.
▲ ▼ ◀ ▶	• Directional buttons – Used to navigate left, right, up and down in the various menus.
ENTER	• This button is used to confirm selections.
⏻	• Power button – To power the LaserCam 4 on, the user will press and release the power button. Once the unit is powered on and has completed the startup sequence, the user may press the power button to initiate a system shutdown.
←	• (backspace) button – Used to exit the menu system.

IMPORTANT ***DO NOT shut the LaserCam 4 down by removing the battery, unless specifically told to do so by Kustom Signals, Inc. Technical Support.***

2.1.5.2 DVR Group Buttons

	• When playback is paused this button is used to back up the video one frame for each press. • When the unit is idle this button will switch between speed limit and capture speeds L1/C1, L2/C2, or L3/C3.
	• This button is used to play the video at normal speed. First press of the button will play the video forward at normal speed. The second press of the button will play the video in reverse at normal speed.
	• When playback is paused this button is used to advance the video one frame for each press. • When the unit is idle switch between speed limit and capture speeds L1/C1, L2/C2, or L3/C3.
	• Once the video is playing in forward or reverse, regardless of playback speed, this button will decrease the speed of playback. The video may be played at 1/32X, 1/16X, 1/8X, 1/4X, 1/2X, 1X (normal speed), 2X, 4X, 8X, 16X or 32X speed. • When the unit is idle this button will switch between speed limit and capture speeds L1/C1, L2/C2, or L3/C3.
	• This button is used to stop or pause the video playback. • If in Photo Auto mode and idle this button will open the calibration window.
	• Once the video is playing in forward or reverse, regardless of playback speed, this button will increase the speed of playback. The video may be played at 1/32X, 1/16X, 1/8X, 1/4X, 1/2X, 1X (normal speed), 2X, 4X, 8X, 16X or 32X speed. • When the unit is idle this button will switch between speed limit and capture speeds L1/C1, L2/C2, or L3/C3.

2.1.6 Head-Up Display (HUD)

The HUD performs two (2) critical functions in the operation of the LaserCam 4. First, it provides the aiming reticle by which the instrument is aimed at the desired target. Secondly, the user can configure the LaserCam 4 to allow the HUD to display the captured speed and/or range of the target as the user continues to observe the target, creating a tracking history that is vital for admissible court evidence. The aiming reticle approximately replicates the laser beam spot size. As seen from the rear of the instrument, the aiming reticle is located in the center of the HUD reflecting glass, and defines the area where the laser pulses are transmitted. The reticle is illuminated whenever the LaserCam 4 is powered up. The intensity of the reticle is adjusted along with the intensity or brightness of the HUD using the HUD brightness menu in the menu system.

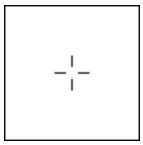


Figure 2-6 - Aiming Reticle

In addition to the reticle, the HUD may also display three (3) additional types of data, depending on which features are active. The types of data are vehicle speed, distance (range) to vehicle, and selected capture speed (1, 2, or 3).

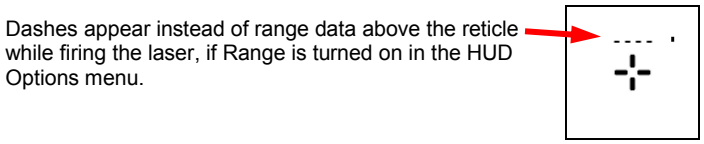


Figure 2-7 - HUD Display During a Trigger Event

2.1.6.1 Speed data

When the LaserCam 4 is operating in Speed and Range mode, the speed data will appear in the HUD and on the rear display once a vehicle has been targeted and the laser has been fired. Once this occurs, the speed of the target will appear below the reticle. If the LaserCam 4 is operating in Range only mode, the speed data will not appear in the HUD or on the rear display.

2.1.6.2 Range data

When Range is turned on in the HUD Options menu, range data will be displayed in the HUD and on the rear display when range measurements are taken. The HUD will display the reticle and dashes until a vehicle is targeted and the laser is fired. Once this occurs the range to the target will appear above the reticle.

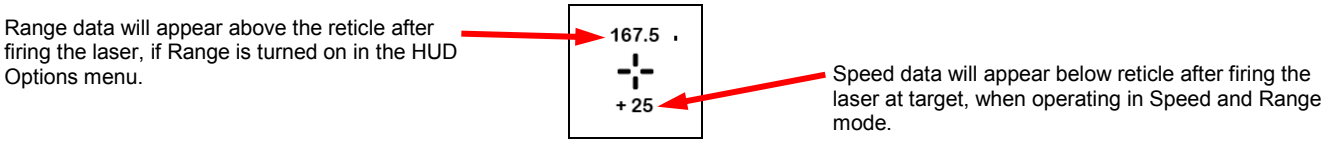


Figure 2-8 - HUD Display After a Trigger Event

After the trigger is released, the HUD remains on for 15 seconds at the set brightness, and then dims.

2.1.6.3 Speed Limit/Capture Speed

On the right side of the HUD display is a display depicting the Speed Limit/Capture Speed pair chosen. One bar indicates L1, C1 while 2 bars indicates L2, C2 is selected and three bars is for L3, C3.

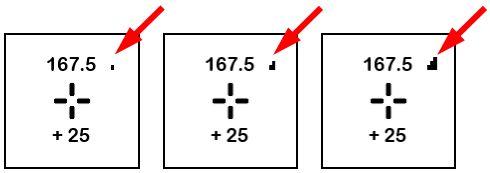


Figure 2-9 - HUD Display Showing Capture Speed Pairs

2.2 Power On or OFF

2.2.1 Power On Sequence

When the user turns the LaserCam 4 on, the system will run the internal test sequence. During this period, there will be a sequence of screens that appear on the display. The first screen that will be shown on the rear display is the Welcome Screen.

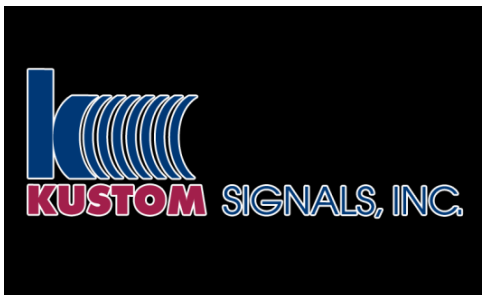


Figure 2-10 - Welcome Screen

The next screen to appear is the device name screen.

Figure 2-11 - Device Name Screen

A progress bar will appear showing the progress of the boot-up process and its various system tests. If there are many video and photo files the system may linger at this screen while checking the files.

Figure 2-12 – Progress Bar Screen

The GPS synchronization will appear next. Each agency has the ability to skip this feature by pressing the ”X” button in the lower right, or they can press the ESC button on the main keypad. If the user does not press the ”X” icon or the ESC button on the main keypad the GPS synchronization will proceed and will time out after 45 to 60 seconds.

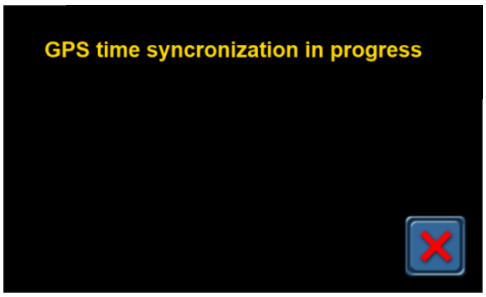


Figure 2-13 - GPS Time Synchronization Screen

The next screen to appear during the startup sequence is the Linux Operating System screen. This screen provides the version of Linux that is running on the device, as well as other key data. After the self-test sequence has completed successfully, the TESTING COMPLETE message will appear at the bottom of the screen.

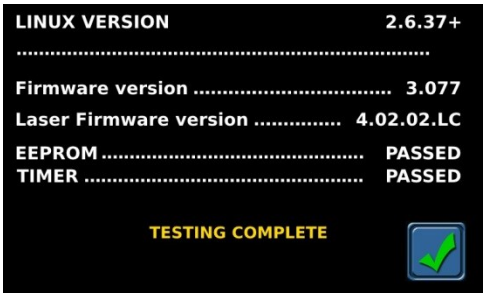


Figure 2-14 – Version Summary and Laser Test Results Screen

Once the LaserCam 4 has completed the startup sequence, the user will be presented with the Login screen.

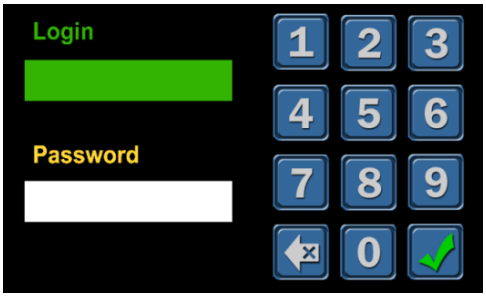


Figure 2-15 - Login Screen

The user will need to log into the LaserCam 4 to be able to use it. Both the Login and Password are numeric fields. The user will first enter their Login ID and then press the check button. If the user accidently enters an incorrect number, the user will press the button under the 7 button to back up one position. Next, the user will enter their password and press the check button again. If the user has entered a Login or Password that is invalid the below screen will appear:

Figure 2-16 - Incorrect Username or Password Error Message

In some regions the use of GPS is not allowed. In those areas the agency may use location codes instead. If this is the case, a location code entry screen will appear. The user will choose a preset location code or enter a new location code, then press OK to save the setting.

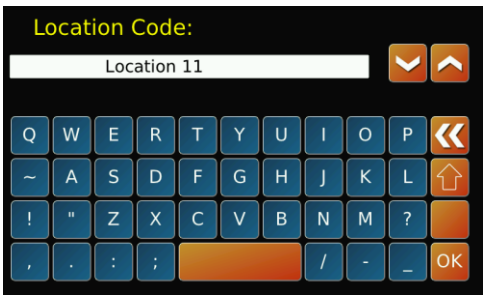


Figure 2-17 - Location Code Entry Menu

2.2.2 Voltage Level and Shutdown

The LaserCam 4 uses a Lithium-ion Polymer (LIP) battery. These batteries will require daily charging. Testing has shown that during typical use the battery charge will last eight (8) hours with constant use. Actual discharge time will depend on the specific manner in which the LaserCam 4 is used (i.e., Automatic vs. Manual).

The LaserCam 4 displays a battery icon on the rear display to provide the user with the approximate percentage of charge that is remaining in the battery. In the following image, two samples are shown. The top icon illustrates that there is 30% charge remaining, while the next icon down illustrates that there is 75% charge remaining. Like many of today's smart phones, the icon will constantly update to provide approximate real-time values. In addition, an icon is provided to show when the device is being powered with the 12V power adapter.

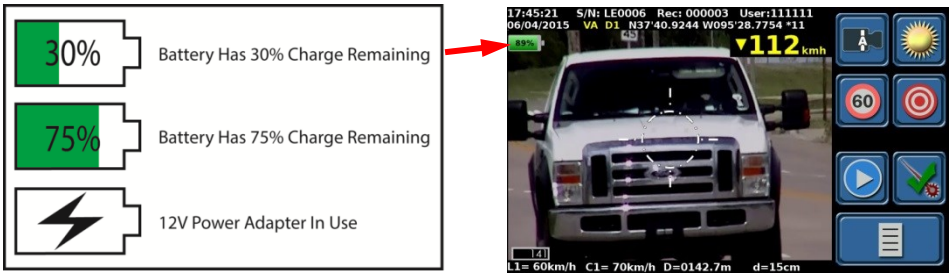


Figure 2-18 - Battery Indications

When the voltage level of the rechargeable battery has dropped to a level where the battery voltage is too low to allow proper operation (i.e., can no longer function), the system will overlay a message on the existing screen with a countdown timer that warns the user that the battery is low and the unit will be shut down. The message also includes a countdown timer to

indicate how quickly (in seconds) the shutdown will occur. A sample of this message is shown in the following figure.

Figure 2-19 - Low Battery Warning Message with Countdown Timer

2.3 Setting Posted and Capture Speeds

2.3.1 Overview

The capture speed setting (Cx, where x is 1, 2 or 3) is used by the recording modes to dictate when a recording is made. The Capture Speed must be set before beginning speed enforcement activities. The posted speed limit (Lx, where x is 1, 2 or 3) is only used for back office reference in the tracking history graph. It does not impact the function of the LaserCam 4 in any way other than to be overlaid onto the recorded video or snapshot so it becomes part of the evidence.

A configurable feature via an administrative utility is the ability to set up to three speed limits and three capture speeds. Using a setup application one, two, or three speeds can be enabled to be set by the user. This example has all three enabled.

2.3.2 Posted Speed

This setting represents the posted legal speed limit for the area where speed enforcement is taking place. The user will press the posted speed limit button from the enforcement screen to access the speed limit entry screen. Note that there are a maximum of three (3) possible limits that can be available depending upon a configuration an administrator will set by using the Setup application or ProLog.

Figure 2-20 - Select the Posted Speed Limit Button

2.3.2.1 Setting the Speed Limit(s)

Once the speed limit entry screen appears the user will use the numeric keypad to enter the posted legal speed limit(s). Once the correct speed limit has been entered, the user will press the green check button, located under the 9 button. This also moves the focus to the next speed, and after the third speed (or your configured maximum) pressing the green check mark will save the setting and return to the Enforcement screen. Pressing the HOME button at any time will exit with only the changes set by pressing the green check mark. Shown below are the three possible screens based upon your unit's configuration.

Figure 2-21 - Posted Speed Limit Entry Screen

2.3.3 Capture Speed

The second step is to enter the value for the capture speed (CS) setting(s). This is the speed that the target vehicle must exceed to initiate record mode in auto or manual operating modes. The user will press the capture speed button to access the capture speed entry screen. Note that there are a maximum of three (3) possible speeds that can be available depending upon a configuration an administrator will set by using the Setup application or ProLog.

Figure 2-22 - Select the Capture Speed Button

2.3.3.1 Setting the Capture Speed Limit(s)

Once the screen appears, the user will use the numeric keypad to enter in the desired capture speed(s). Once the capture speed has been entered, the user will press the green check button, located under the 9 button. This also moves the focus to the next speed, and after the third speed (or your configured maximum) pressing the green check mark will save the setting and return to the Enforcement screen. Pressing the HOME button at any time will exit with only the changes set by pressing the green check mark. Shown below are the three possible screens based upon your unit's configuration.

Figure 2-23 - Capture Speed Limit Entry Screen

2.3.4 Using the Speed Limit and Capture Speed Settings

Note: This capability only applies to units that are configured for 2 or 3 limit/capture pairs.

2.3.4.1 Switching Between Available Capture/Limit Pairs

Please note that the speed limit / capture limit cannot be changed while firing the laser. Once you have set the limit and capture settings to the values you desire, pressing the or or or or or buttons on the rubber keypad will switch the speed limit and capture speeds between the choices. In Video Auto or Photo Auto modes the enforcement screen will show L1 and C1, L2 and C2, or L3 and C3. Manual Modes only show L1 to L3.

2.3.4.2 Target Speed Color Change (Option)

The LaserCam 4 can show color change when a speed exceeds the capture speed setting; green for speeds under or equal to the capture speed, red when over the capture speed. This option can be set using the setup application.

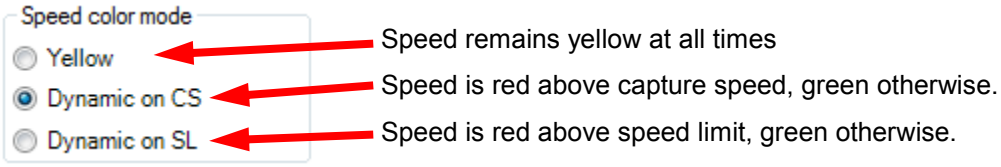


Figure 2-24 – Color Changing Target Speed

2.4 Selecting an Operational Mode

2.4.1 Control Location

From the enforcement screen, the user can see the current operating mode by looking at the top left button in the control area on the right side of the display.

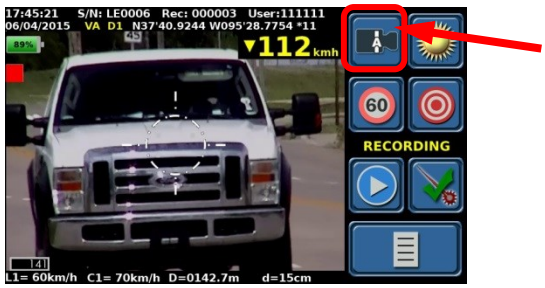


Figure 2-25 - Operational Mode Button on Enforcement Screen

2.4.2 Operational Mode Choices

If the user wants to change the operational mode, they need to press the Operational Mode button to access the operational mode menu. When this menu appears, the control area switches the bottom button to a HOME button. The primary viewing area changes from showing the video stream from the video camera to the operational mode menu. This portion of the screen has six (6) buttons. The top two buttons select between photo mode and video mode. The bottom four (4) buttons are used to select the record operating mode. The buttons are:

Automatic	Manual	Range	Video only or Photo only

The HOME button is used to exit back to the enforcement screen to begin using the current setting.

Note that a busy graphic may appear while the camera adjusts to the associated operational mode post record setting.

A white border on the button is used to indicate the currently selected mode.

The home button is used to confirm the user's selection.

Figure 2-26 - Operational Mode Selection Screen and the busy screen (right)

2.4.3 Operational Mode Behavior

In either Video or Photo mode the record triggers are essentially the same, the differences being in the Range and the two no-laser modes (Video only and Photo only).

2.4.3.1 Video Automatic Mode

When operating in Video Automatic mode (VA), the LaserCam 4 will automatically record "over speed" infractions. A speed of zero stops the record event. There is a delay called "Laser Off Target" (LOT) that continues to video record after the zero speed is reached. This LOT delay can be set to a minimum of 1 second up to a maximum of 5 seconds by an administrator using the Setup Application or ProLog.

Before pulling the trigger the operator should select the AutoTrak® setting and the After Record behavior. See Chapter 3 for how to access the menus.

After the above behavior is configured, the operator will press and release the trigger to place the laser in continuous fire mode. The operator will hear a periodic beep to indicate that the laser is firing. When the speed of the targeted vehicle exceeds the preset capture speed (C1, 2, or 3) the DVR will automatically start recording. Once the vehicle speed reaches zero (0) the recording will stop after the LOT delay.

The user can press and release the trigger to stop firing the laser. If a recording is active the recording will stop after the LOT delay. The operator will initiate a new cycle by pressing and releasing the trigger again. Information data like speed limit, capture speed, target speed, target range, etc. will be captured as part of the video record.

2.4.3.2 Photo Auto Mode

When operating in Photo Automatic mode (PA), the LaserCam 4 will automatically take up to two (2) snapshots of "over speed" infractions. The possible photo shots are peak and range, where range is the photo taken at the calibrated distance. When using Photo Automatic it is highly recommended a tripod be used. The primary design use is unattended speed capture but this mode is also capable of tracking vehicles. Note that AutoTrak® is not available in this mode so automatic zoom based upon distance (range) will not occur while tracking.

To configure the LaserCam 4 to operate in Automatic mode, the user will first need to set the capture speed (Cx) setting as discussed above. Then a "calibration" step is required to set the distance (range) shot. This is where the focus will be sharpest and is intended to provide a good image of the license. Find an object that can be used to set up the focus at the desired tag image capture distance. The camera will focus and set the zoom to this target and once the calibration (optimal focus) is complete, aiming the camera at the location where a vehicle will pass through the optimal range will result in clear images of the car tag.

To ”calibrate”, the operator will press the STOP/PAUSE button of the rubber keypad to place the LaserCam 4 into a ”calibration” mode. If you wish to change the setting, pulling the trigger will start the ”calibration” over again. Once calibration is complete, press the HOME button to return to the Enforcement screen to begin capturing speeds.

Figure 2-27 - Calibration Mode AF On

Figure 2-28 - Calibration Mode AF Off

To begin speed capture, the operator will press and release the trigger while in the Enforcement screen to place the laser in continuous fire mode. The operator will hear a periodic beep to indicate that the laser is firing. When the speed of the targeted vehicle exceeds the preset capture speed (C1, 2, or 3) the unit will automatically start a snapshot session. Once the vehicle speed reaches zero (0) the session will stop and start a new session.

The user can press and release the trigger to stop firing the laser. The operator will initiate a new cycle by pressing and releasing the trigger again. Information data like speed limit, capture speed, target speed, target range, etc. will be captured as part of the photo snapshot record.

2.4.3.3 Video Manual Mode

When Manual mode is selected, the user will press and hold the trigger to activate the laser and the system will start recording once the capture speed setting is exceeded. When the user releases the trigger the laser will stop firing and the system will stop recording after the minimum record time is met, assuming it was recording when the trigger is released. Information data like speed limit, capture speed, target speed, target range, etc. will be captured as part of the video or snapshot record.

Also in the Video manual mode, a special automatic print mode is enabled. When a target is present and video is being recorded, an ICON of a printer appears on the Enforcement screen that allows instant printing. See the ”Quick-print” discussion later in this chapter. See chapter 3 for details of the report print-out.

2.4.3.4 Photo Manual Mode

When Manual mode is selected, the user will press and hold the trigger to activate the laser and the system will take photo snapshots once the capture speed setting is exceeded. When the user releases the trigger the laser will stop firing and the system will stop taking snapshots. Information data like speed limit, capture speed, target speed, target range, etc. will be captured as part of the video or snapshot record.

In Photo Manual mode the system will take photos (snapshots) at every range selected (by an administrator using the Setup application) plus first, peak, and last if the capture speed is exceeded instead of a video. The ranges available are 50m, 75m, 100m, 125m, 150m, 175m, 200m, 225m, and 250m. Instant print is not active in Photo Manual mode.

2.4.3.5 FTP Transfer after Record/Photo

If manual FTP transfer is configured a network icon will appear allowing a download of the last record or snapshot session to be downloaded. If automatic FTP transfer is selected, the video or photo files will be automatically transferred. If the unit has been configured to delete the file after transfer any files successfully transferred will be removed from the LaserCam 4 device. Otherwise, the files remain on the LaserCam4 until space is needed. More details on FTP Transfer is covered later in this section.

2.4.3.6 Range Only Mode

When Range only mode is selected the LaserCam 4 will measure the range to the target. No speed data will be taken but the LaserCam 4 will record. The LaserCam 4 will start recording when the trigger is pulled and a range is read and will stop recording when the user releases the trigger.

2.4.3.7 Video or Photo Only Mode

When Video only mode is selected the LaserCam 4 will work like an ordinary digital video camera (DVC). In this mode the LaserCam 4 will only record video. No speed or range data will be stored. The LaserCam 4 will start recording when the user presses and holds the trigger. The LaserCam 4 will stop recording when the user releases the trigger.

When the Photo only mode is selected the LaserCam 4 will act like a snapshot camera. No speed or range data will be stored. Press and release the trigger to take the photo. Releasing the trigger takes the snapshot.

2.5 Selecting the Camera Mode

2.5.1 Control Location

The LaserCam 4 provides an adjustment control button for the camera mode from the enforcement screen. This button is located in the upper right corner of the display.

Figure 2-29 - Camera Mode Button Location

2.5.2 Camera Mode Choices

Once the camera button has been pressed, the camera mode selection menu will appear. The screen will have two rows of buttons. The top row of buttons will be used to adjust the camera mode for daytime operations, while the bottom row of buttons will be used to adjust the camera mode for nighttime operations.

Figure 2-30 - Camera Mode Menu

IMPORTANT ***Camera settings directly impact the quality of the recorded video or photos. Select the appropriate camera setting for the ambient light level of the license plate, or less than optimum video quality may result.***

Working from the left to right, the buttons on the top row are:

- Day Mode 1 (D1) – Used in full sun conditions.
- Day Mode 2 (D2) – Used in mostly sunny conditions.
- Day Mode 3 (D3) – Used in mostly cloudy conditions.
- Day Mode 4 (D4) – Used in full cloudy conditions.

Working from the left to right, the buttons on the bottom row are:

- Night Mode 1 (N1) – Used in cloudless conditions with a half to full-moon.
- Night Mode 2 (N2) – Used in partly cloudy conditions, or when the moon is half-moon to new-moon. *This will control an optional IR illuminator.*
- Night Mode 3 (N3) – This setting switches to an IR mode and allows controlling an optional IR illuminator. *Do not use this without an illuminator.*

Press the desired camera setting button, then the HOME button to exit the menu.

2.6 Proper Handling

The LaserCam 4 is a precision instrument and requires the user to follow basic handling techniques to get the most out of the instrument.

2.6.1 Hand Held Operation

For hand held operating, the user needs to understand how to hold the device properly. The most important item is to not cover the camera lens with their hand.

The user needs to understand that any shaking from their hands will transfer to the video image. As more optical zoom is used, the more effect shaking will have on the video captured. Because of this, hand held operation is only recommended when targeting vehicles in close proximity to the LaserCam 4.

2.6.2 Tripod and Shoulder Stock Operation

When shooting targets at greater distances, Kustom Signals highly recommends the LaserCam 4 be used with a tripod or shoulder stock. The use of a high-quality tripod will provide a stable platform for operating the LaserCam 4 for tracking long range targets. When mounted to a tripod, use the tripod handle as the primary lever for movement. The mounting of the LaserCam 4 is not designed to allow the LaserCam 4 handle to overcome the resistance of the tripod.

Figure 2-31 - LaserCam 4 Hand-held, Shoulder Stock, and Tripod Mounted

2.7 Recommendations for Roadside Setup

Two factors should be considered when setting up to make speed or distance measurements with the LaserCam 4. They are (1) the location of the instrument relative to the roadway upon which traffic is moving, and (2) the actual setup in or around the patrol car.

In selecting a location for monitoring traffic, be aware that the LaserCam 4 is subject to the cosine effect in the same manner as conventional microwave radar and other laser-based speed measuring systems. The cosine effect is a principle which states that the apparent measured speed of a target will be decreased from its actual speed depending upon the angle between the direction of observation and the true direction of travel.

The amount of error is defined by a trigonometric relationship known as the cosine. From a judicial standpoint, the measurement inaccuracy introduced by the cosine effect is always in favor of the motorist, since it has the effect of reducing the measured speed. The greater the angle between the LaserCam 4 and the direction of traffic, the greater the cosine error produced. For small angles, the cosine effect is relatively insignificant. For example, at angles of less than 8°, the cosine error is under 1%, and at angles of less than 14°, the error is under 3%. As a general guideline, if a location is selected where the distance to the target vehicle is at least ten times greater than the LaserCam 4's perpendicular distance from the roadway, this corresponds to an angle of 5.7° or less, and the amount of cosine error will not exceed 0.5%. For example, setting up 30 feet (9 meters) off the roadway and measuring targets at a range of 300 feet (90 meters) or greater, assures the cosine effect produces no more than 0.5% error in the speed measurement. Again, it is important to remember that any cosine error introduced always reduces the indicated speed reading, thus favoring the motorist.

Another factor in selecting a setup location is that a clear line of sight to the target vehicle during the entire measurement interval is critical. Intervening objects such as signposts, utility

poles, and tree branches prevent the instrument from gathering sufficient valid measurement data to display a speed-reading. It is also better to select a setup location where minimum movement of the LaserCam 4 is required in order to keep it aimed on the desired target.

Visibility conditions also affect the performance of the LaserCam 4. Although the laser emissions used by the device are not in the visible spectrum, they are close enough in wavelength that atmospheric or climatic conditions that impair vision also adversely affect the operation. This impact is mitigated to some degree due to the new “poor” weather-operating feature available on LaserCam 4. However, rain, smoke, fog, and airborne dust particles, if sufficiently dense, may prevent its operation. The instrument is not affected by ambient light conditions. The LaserCam 4 should meet or exceed speed detection performance expectations whether operating in bright daylight or in total darkness.

The LaserCam 4 is fully capable of providing reliable operation, even when firing through the vehicle glass. When firing through vehicle glass the user should expect a reduction in the effective range of the LaserCam 4 due to the refraction of the laser transmit and received pulses. The user will find that the inclement weather feature improves operation when firing the laser through vehicle glass.

The narrow beam width of the LaserCam 4 makes precise target identification possible; it may be difficult to aim at long ranges if operated handheld. For those situations, using a monopod, tripod, or shoulder stock to assist in stabilizing the instrument is helpful.

As with all things related to achieving good images with a camera, some experimentation by the operator is required to achieve the best images. The following discourse is a general guideline to aid in getting an operator started down the path of success.

Proper camera exposure settings start with choosing a setting based upon the amount of light on the vehicle tag, not the overall brightness. A sunny day with the tags in the shadow of the car will require a cloudy day setting to get a good image of the tag.

If your system has the optional IR Illuminator there are several ways to capture good quality images of reflective tags. Due to cameras having difficulty with focusing in low light conditions we recommend mounting the IR Illuminator and LaserCam 4 on the same tripod and using Custom/Custom, and turning off AutoTrak®, when using video modes. The IR Illuminator is turned on when in Custom/Custom or Photo Auto “calibration” to allow the camera a better chance to focus. Choose a road sign or some other object that gives the camera a good image to focus upon. Manual focus can help so is available as an up and down arrow button when auto focus is turned off.

2.8 Instant Playback

This button plays back the last video or views the last photo file.

2.8.1 Control Location

The LaserCam 4 provides a quick method of accessing the last recording session. The button is located in the left column of controls just above the menu button. The screen shown after this button is pressed is different between video and photos. The photo viewing screen is the same as the one used to view snapshots created from video so refer to the *Selecting and Deselecting Snapshots* discussion later in this chapter for details on the photo screen.

Figure 2-32 - Instant Playback Button Location

2.8.2 Video Playback Screen and Controls

If the last record is a video, pressing the instant playback button will enter the playback screen.

Figure 2-33 - Playback Screen

2.8.2.1 Pause

This button will pause the playback. When paused, a snapshot can be taken. See snapshot below for details.

2.8.2.2 Stop

This button stops the playback and returns to the Enforcement screen.

2.8.2.3 Play Reverse

This button will play the video backwards at real time speed.

2.8.2.4 Play Forward

This button will play the video forward at real time speed.

2.8.2.5 Frame Step Back

This button will step the video back one frame – requires the video to be paused.

2.8.2.6 Frame Step Forward
This button will the video forward one frame – requires the video to be paused.

2.8.2.7 Play Fast Rewind
This button plays the video backward at a faster rate with each button press, rotating through the steps of 1/32X, 1/16X, 1/8X, 1/4X, 1/2X, and back to 1X (normal speed).

2.8.2.8 Play Fast Forward
This button plays the video forward at a faster rate with each button press, rotating through the steps of 2X, 4X, 8X, 16X, 32X, and back to 1X (normal speed).

2.8.2.9 Snapshot with Zoom
While reviewing a video the user may create a snapshot (photo) from the video. This snapshot can be used in a citation printout. Note that a snapshot can be created ONLY from video.

To create a snapshot, the user must pause the video, use the step forward and/or backward buttons to find the exact frame they wish to print or save. The paused video files can be zoomed and panned to allow enlarging a portion of the original before saving as a snapshot. The user must keep in mind that zooming is a balance between enhancement and pixelization. The zoomed image can be saved and used in the creation of a citation (discussed below). There are 5 levels of zoom, x1, x1.5, x2, x4, and x8.

To create a zoomed image the user must press and hold in the center of the area to be enhanced. This enters the zoom and panning screen.

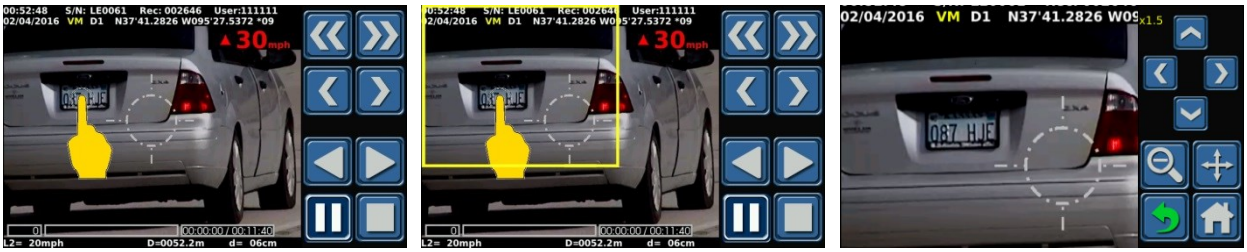


Figure 2-34 – Video Pause to Initial Zoom

Figure 2-35 – Example Zoom Images, x1 through x8

The user can navigate the snapshot zoom using the buttons on the zoom screen.

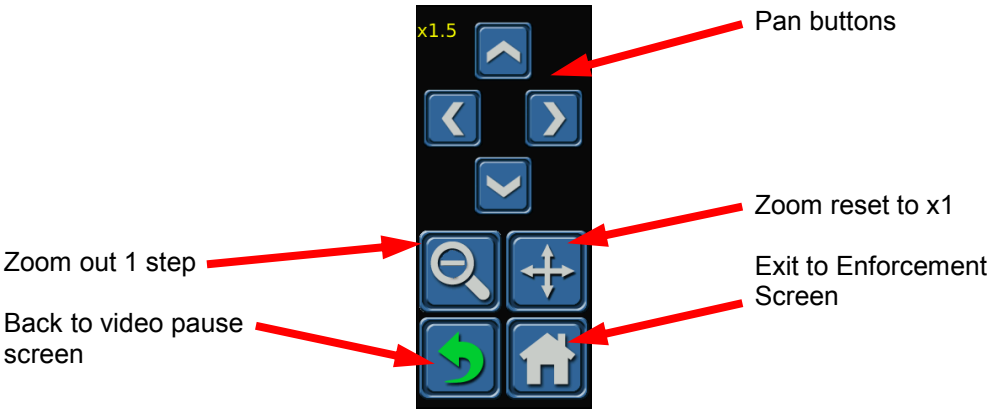


Figure 2-36 – Example Zoom Images, x1 through x8

Tapping twice on the video will create a snapshot from the image shown. A message will appear announcing that a snapshot has been taken. Note that the citation can have only two images so any more created past 2 cannot be included. Only the last two selected will be printed.

Figure 2-37 – Snapshot Saved (pause left, x2 zoom right)

2.9 Quick-print

This allows a quick method of printing the highest speed captured during a manual tracking session. This remains until a new recording is created. This feature requires the optional Bluetooth® printer or the LaserCam 4 configured to create a pdf citation.

2.9.1 Control Location

The quick print ICON appears over the live video on the enforcement screen. This ICON is not part of the recorded information and will not appear if Bluetooth is disabled (see Chapter 3).

Figure 2-38 - Quick-print ICON location

2.9.2 Citation Printing

Pressing the Quick-print button prints the last traffic event using the highest speed of the video session. See **Citation Creation and Printing Instructions** below for details of the printed form and all the requirements to use this feature.

2.10 Manually Accessing Media Files

To review video, photos, or snap shot files that are saved on the device or create new snapshots, the user will need to access the file system. From the Enforcement screen, the user will press the Menu button, and then press the Record Search button which will display the VIDEO PREVIEW menu screen.

2.10.1 Video/Photo Preview Screen

Located on the Main Menu screen at the lower left, this button is used to access the Video Preview menu which allows the user to select a specific video file, photo, or snapshot to review. The Video Preview first opens with a file grouping choice screen.

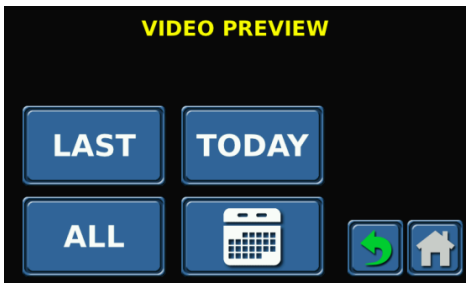
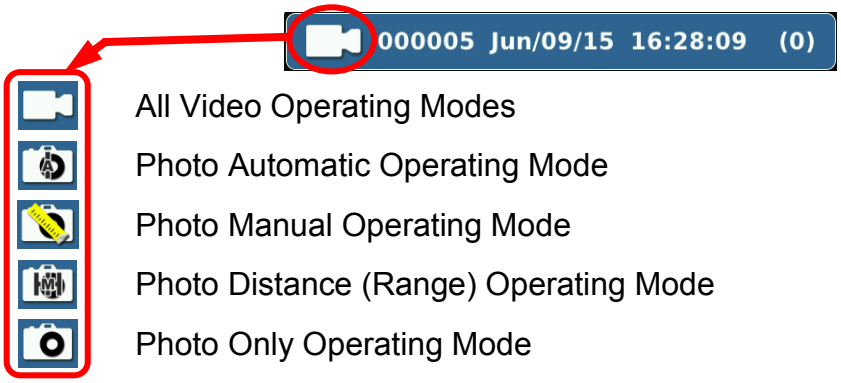


Figure 2-39 - Video Preview Menu Screen

2.10.1.1 ICON Legend

Pressing any of the above buttons will cause a selection menu to appear showing record sessions that can be either Video or Photo sessions. The ICONs to the left are different for video and photo and include the operating mode. The naming convention is discussed later in this subsection.



2.10.1.2 Last Button

Located at the upper left of the Video Preview screen this button opens the navigation screen with only the last recording shown. The scroll buttons are shown but have no effect. The bottom 4 buttons and the snapshot viewer are active.

Figure 2-40 - LAST Video File screen

2.10.1.3 All Button

Located at the lower left of the Video Preview screen this button opens the navigation screen with all recordings in memory shown. The list is sorted oldest (at the top) to newest (at the bottom). When opened the newest file is highlighted. The file is also identified with an x of y. In the below example there are 11 files and we have highlighted file number 11. Navigation is discussed later in this section.

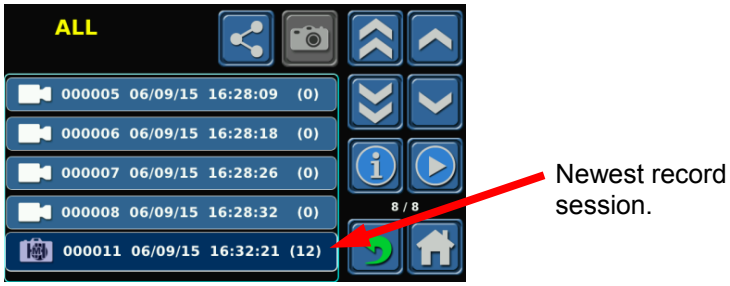


Figure 2-41 - ALL Video File screen

2.10.1.4 Today Button

Located at the lower left of the Video Preview screen this button opens the navigation screen with only recordings made on the current date shown. This uses the same sorting as the ALL button discussed above.

Figure 2-42 - TODAY Video File screen

2.10.1.5 Calendar Button

Located at the lower middle of the Video Preview screen this button opens a navigation screen with a calendar. Dates with video present are identified by the date being bold. Selecting a date will show a list of recordings made on the date selected. This uses the same sorting as the ALL button discussed above.

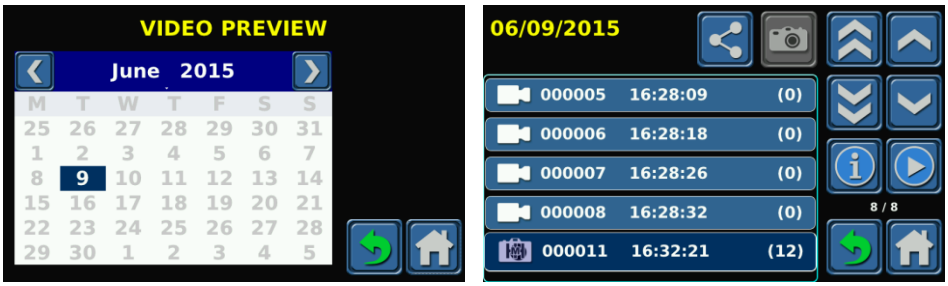


Figure 2-43 - Calendar Video Preview Screens

2.10.2 Video/Photo Naming Convention

The media file names follow a standard naming convention. Here is an explanation of how the files are named.

Figure 2-44 - ALL Video File screen

2.10.2.1 Video Naming Details

The top button in the image is named 000005 06/09/15 16:28:09 (0).

000005	The recording number.
06/09/15	The date when video file was created (this example is in DD/MM/YY).
16:28:09	The time when video file was created (HH:MM:SS).
(0)	A count showing the number of screen shots made from this recording.

2.10.2.2 Photo Naming Details

The bottom button in the image is named 000011 06/09/15 16:32:21 (12). This is referencing a folder that contains all the photos associated with the recording session.

000011	The recording number.
06/09/15	The date when video file was created (this example is in DD/MM/YY).
16:32:21	The time when video file was created (HH:MM:SS).
(12)	A count showing the number of photos made during this recording session.

2.10.3 File Navigation

There are several ways to navigate through the files. All the screens behave the same so only ALL will be discussed. Navigating Video files differs slightly from navigating Photo files so each will be discussed.

Once a Video file has been selected (which is indicated by a darker blue shading of the button) the user can take several actions: 1) get file information 2) play a video 3) view snapshots.

Once a Photo file has been selected (which is indicated by a darker blue shading of the button) the user can take several actions: 1) view a photo 2) view snapshots.

- Page Up  Press to move up one page at a time.
- Page Down  Press to move down one page at a time.
- Step Up  Press to move up one video at a time.
- Step Down  Press to move down one video at a time.
- Information  Press to view information associated with the selected video.
- Play  Press to play back the video.
- Snapshot  Press to view all snapshots associated with the selected video.
- Return  Press to return to the previous screen.
- Home  Press to exit the menu system and return to the Enforcement screen.

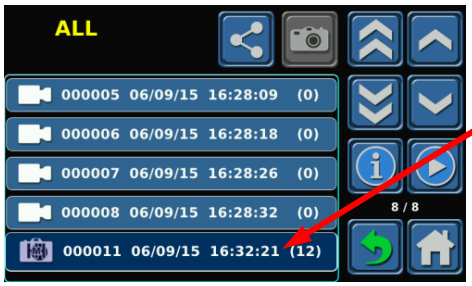


Figure 2-45 - Video File List

2.10.3.1 Video File Information

Once a video file has been selected, which is indicated by a darker blue shading of the file button, the user presses this button to see information about the file. This is not available for photo files. File information includes date the file was created, GPS coordinates or Location Code, number of frames, file size, Compression, video resolution, frame rate, bit rate, duration in seconds, and the User ID.

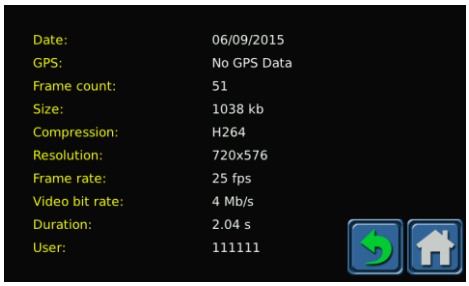


Figure 2-46 - Video File Information Screen

2.10.3.2 Video File Play Button

Once a file has been selected, which is indicated by a darker blue shading of the file button, press the play button in the control area of the screen to play the video. A new screen appears and the video begins to play. The playback screen and its operation are described previously in this chapter under **Instant Playback**.

2.11 Reviewing or Creating Screen Shots from Video Files

When the list of media files appears, there is a camera button in the upper portion of the screen. If a snapshot exists there will be a number greater than zero in parentheses next to the file name. The camera (snapshot) ICON will be greyed out if the number is zero. Press the camera button to access the available snap shot files.

If no snapshots exist, refer to the **Video Playback Screen and Controls** section under **Instant Playback** to create snapshots.

Figure 2-47 - Accessing snapshot images

2.11.1 Selecting and Deselecting Snapshots for Citations

The last snapshot will be shown identified by an X of Y identifier. Use the scrolling and page buttons to move between multiple snapshots.

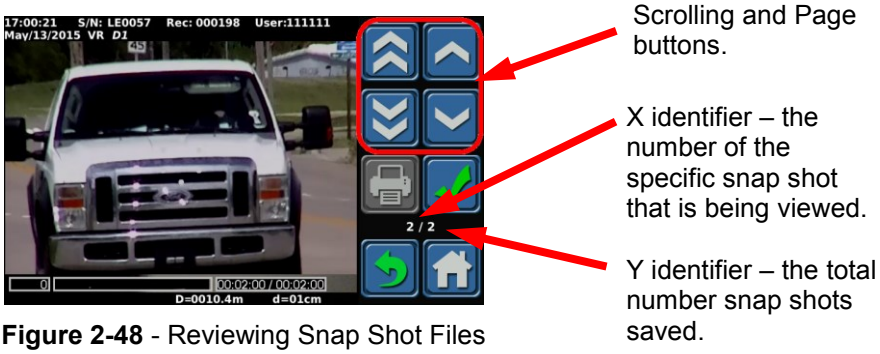


Figure 2-48 - Reviewing Snap Shot Files

Once the user identifies the desired snap shot, pressing the green check mark button will select the image and activate the printer button. The user can select 2 snapshots to present on the print out. Only the last two images selected will be printed. When the user selects a snapshot file, a red frame will appear around the image, indicating that the snapshot is selected. The printer icon will become visible if Bluetooth is enabled (see Section 3).

If the user decides they do not want to print the snap shot, pressing the X button will deselect the image for printing. Note that the printer button greys out when no snapshots are selected.

Figure 2-49 - Snap Shot Highlighted in Red

2.12 Reviewing and Selecting Photos for Citations

In the list of media files, photos are indicated by two different ICONs, one for Photo Auto mode and one for Photo Manual mode. While the zoom feature is available no new snapshots can be created because snapshot only functions with video as stated above in the **Instant Playback** section.

- Photo Auto 
- Photo Manual 

2.12.1 Accessing Files

Photos are accessed similar to video but there are some differences. First difference is the snapshot ICON is greyed out as these are already images. Second difference is the snapshot capability is not available.

Figure 2-50 – Photo Media Selection

Figure 2-51 – Photo Information Screen

2.13 Citation Creation and Printing Instructions

After snapshots are created and selected as described in the sections above, a citation can be created or printed depending upon the configuration choices made during initial configuration.

2.13.1 Printout Configuration

There are three Controller (Administrator) configurable items of the printout.

- Logo
- User Name
- PDF Citation, Paper Citation, or Both

The Logo is a bitmap that an administrator can import into the LaserCam 4 using the Setup Application. Instructions can be found in the Setup application manual.

The User Name is the name entered into the LaserCam 4 that is associated with the User Logon number. This information can be set using ProLog or the Setup application.

The citation can be in two document forms, a PDF document or a paper copy. Selecting both creates both types. The paper citation requires a Kustom Signals defined Bluetooth® printer. The PDF citation can be downloaded via FTP which is discussed later in this manual. Using the Setup Application an administrator can configure the output type.

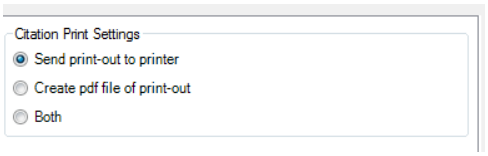


Figure 2-52 – Citation Print Choices in Setup Application

2.13.2 Pairing a LaserCam 4 to a Printer

A qualified printer's MAC address needs to be configured in the LaserCam 4 and one successful print-out finished before the LaserCam 4 will pair with another printer when the first one is not present. A Controller (Administrator) will need to set the MAC address using ProLog or the Setup Application. The printer's unique MAC address can be found by pressing and holding the Bluetooth button on the HP® Officejet 100 Mobile Printer for 5 seconds with the printer powered on and paper in the printer. Enter the MAC address in the Printer tab in the MAC address text box of the Setup Application.

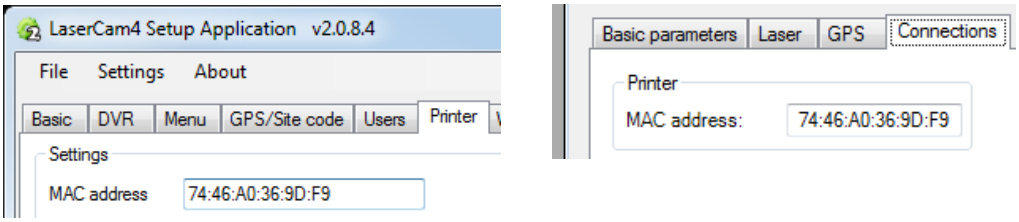


Figure 2-53 – Printer MAC Address Entry: Setup App. (left) ProLog (right)

If the printer that is paired with the LaserCam 4 is not present but a different qualified printer is wirelessly active, after a timeout, a screen will appear allowing the user to choose the alternate. Note that the LaserCam 4 only displays qualified printers.

Figure 2-54 – Printer timer (left) and Printer MAC Address Choice Screen (right)

If no qualified printer wireless connection is active, after a timeout a message will appear announcing that the connection has failed.

Figure 2-55 – Printer timer (left) and failure message (right)

2.13.3 Citation Printing

To create a citation, the user should ensure the following conditions are met:

- If configured for Bluetooth® printing:
  - Ensure the battery is charged in the printer.
  - Turn the printer on by pressing the power button.
  - Turn the Bluetooth® function on by pressing the Bluetooth® button on the printer.
  - Insert paper in the printer.
- Select the snapshots to be printed. Refer to *Reviewing and Selecting Snapshots* above for more detail.
- Press the print button to print the citation. A sample image is shown in the following figure. This can be in the form of paper and /or PDF.

Figure 2-56 – PDF and Paper Citation plus FTP Available Screen

KUSTOM SIGNALS, INC.
Your Trusted Partner in Law Enforcement

Device type	:	**LaserCam4**
Device SN	:	**LE0057**
Recording No	:	**000005**
Operator ID	:	**000001**
Speed limit	:	**060 km/h**
Latitude	:	**N37'40.9244**
Longitude	:	**W095'28.7764**

Print date	**Test Controller**
Apr/10/2018	**Signature**_____

Figure 2-57 - **Sample Citation**

2.14 Long Range Yoke Operation

2.14.1 Overview

The LaserCam 4 Long Range bundle includes a tripod mounted yoke with fluid video head, 2.2x optical telephoto camera lens, 82 mm polarizing UV filter, tripod with carry bag and hard carry case. This is available as a complete solution with Lasercam 4 or as a separate upgrade option (NOTE - some LaserCam 4 hardware modifications may be needed depending on age of LaserCam 4.)

Figure 2-58 - LaserCam 4 with Long Range Yoke Bundle

2.14.2 Mount Tripod to Yoke

Remove the tripod from its carry bag and the yoke from the carry case. Without extending the tripod legs, mount the yoke to the tripod's threaded post. You may find it easier to hold the yoke in place and rotate the tripod clockwise to secure.

With the yoke mounted, extend the tripod legs to the desired height. You may choose to extend the tripod center post for a narrower footprint as shown below in Figure 2-59, below.

Figure 2-59 – Tripod base, yoke & tripod post, assembled yoke on tripod

2.14.3 Mount LaserCam 4 to Yoke

Place the LaserCam 4 in the yoke cradle. The yoke has two knobs, one for the ¼-20" sockets on each side of the LaserCam 4. The knobs have two locking tabs. With the tabs open, secure the LaserCam 4 with the knobs to the socket on each side of the LaserCam 4. Close the tabs when the knobs are secure as shown below in Figure 2-60.

***NOTE**: Older LaserCam 4 units were shipped with one socket on the left side of the housing. A factory upgrade is available to add a 2nd socket to the right side to support the Long Range yoke and new shoulder stock. All new LaserCam 4 ship with two sockets.*

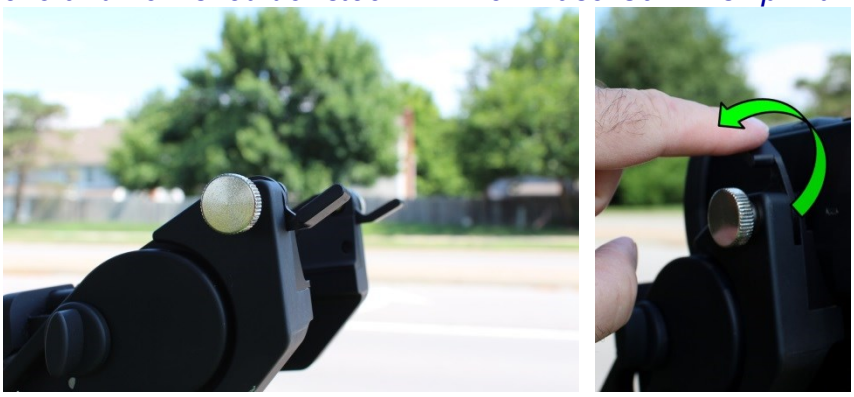


Figure 2-60 – LaserCam 4 Yoke Locking Tabs

2.14.4 Mount Optical Zoom Lens

Take the Zoom lens out of its packaging. Remove the dust cap and insert the lens into the receiver. Secure the lens by moving the lever counter clockwise. Twist the knob to secure the lens. The Operator may choose to utilize the polarizing filter depending on lighting conditions.

Figure 2-61 – Zoom Lens Mount, Lens Lock, Polarizing UV Filter

2.14.5 LaserCam 4 and Optical Zoom Lens Alignment

Once the optical zoom lens and yoke setup are complete, the operator must align the LaserCam 4 camera to the 2.2x Optical Zoom lens. Log in to the LaserCam 4 and manually zoom the camera lens to the desired enforcement range – 400 meters (1,200 feet) for example. Select an object or road sign near the roadway. A posted speed limit sign is ideal. Place the HUD aiming reticle on the target and lock the yoke vertical gimbal into place. Use the X-Y adjustment knobs to align the LaserCam 4 HUD & camera to the zoom lens. The left knob is the horizontal adjustment while the right knob adjusts the vertical axis.

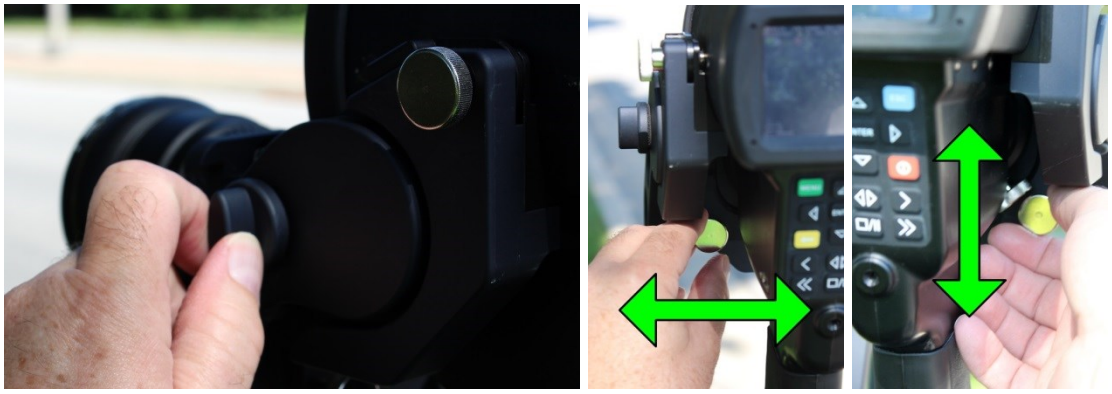


Figure 2-62 – Yoke Vertical Gimbal Lock, X & Y Alligment Knobs

2.14.6 LaserCam 4 Long Range Operation

Once you have the LaserCam 4 Optical Zoom lens aligned, set your desired mode of operation. It is recommended that you continue using AutoTrak with the Long Range yoke accessory for optimum results.

Figure 2-63 – Longe Range Target Tracking 400+ meters

2.14.7 LaserCam 4 Long Range Evidence Adjustments (optional)

If the video/photo results are not clear at the desired range of operation, there are several adjustments that you can make to improve evidence quality and optimize results.

Polarized UV Filter

Each Long Range Yoke bundle includes an 82 mm polarizing UV filter. Customers who wish to use the Long Range ability to enforce seat belts or distracted driving may find that lighting conditions make it difficult to see into target vehicles. Use of the polarized UV filter can improve the view of target vehicle occupants. Screw the filter clockwise onto the Optical Zoom lens and rotate to the desired optimization. Record and review evidence, rotating the polarized UV filter until the desired level of quality is achieved.

LaserCam 4 Custom Focus Setup

The operator may choose to turn off AutoTrak and focus the camera at a static target range. To do this, manually zoom the LaserCam 4 to the desired level. In the LaserCam 4 System menu, select AutoTrak and turn off. Select the “Custom/Custom” Zoom & Focus button (if this button is already selected, chose another button and then select “Custom/Custom”.) This will take you to the Custom Setup Zoom and Focus user interface and begin firing the laser.

Target an object at the desired enforcement range and the LaserCam 4 will automatically focus the camera on the target. If desired, the operator may turn off the Auto Focus function and manually adjust the focus to the desired level. The LaserCam 4 will provide audible feedback when range data is received. Pull the LaserCam 4 trigger to save the desired focus level and return to the enforcement screen.

Figure 2-64 – AutoTrak OFF, Auto Focus Interface, Manual Focus Interface

2.15 FTP Transfer Instructions

2.15.1 Overview

This is an **optional** feature that may be used to transfer files via FTP to be used for user defined purposes. This transfer includes pdf citation and the event log files. This is not how files are ingested into the ProLog software.

2.15.2 Activating the FTP Feature

This optional feature requires an access point and a running FTP server on the target computer or server before files can transfer. This FTP Server must be on the local network with an IP address as the LaserCam 4 purposely cannot navigate the internet. It also requires the LaserCam 4 to have the correct SSID, network password, FTP server address, and FTP Password set using the Setup Application. The user name should be the serial number of the LaserCam 4, i.e., LE0071.

The LaserCam 4 must be set to use the Wi-Fi connectivity. See the ”Wi-Fi Connectivity” menu description in Section 3 to set the behavior.

A Controller (Administrator) can configure the LaserCam 4 to leave or delete the files upon download using the Setup Application. If the setting is to leave the file, the files remain in the LaserCam 4 but are marked for destruction when space is needed. All or some of the available files are cleared upon power-up, depending upon the erase setting. If delete is chosen, ANY download method will erase the files as they are transferred.

2.15.3 Automatic Wi-Fi

This optional feature, when enabled, will automatically transfer new files when contact is made with the FTP server. Files are marked as sent as each transfer is completed so are not sent the next time connectivity is established.

2.15.4 Using Manual Wi-Fi

This optional feature when enabled allows the user to transfer files of their choosing by accessing the Record menu and browsing. In this example the ALL menu will be used to

transfer files. Unless the erase after transfer option is active the files can be transferred multiple times. If the files exist on the target server drive they are overwritten.

2.15.4.1 Quick FTP Transfer ICON

When the unit is set via the Wi-Fi menu (see Section 3) to Manual FTP transfer a share ICON appears that allows immediate transfer of the last record session. When pressed this feature will transfer the file(s) associated with last record session. The exception to this is Video Automatic which transfers files automatically, overriding the Manual FTP setting.

Figure 2-65 – Quick FTP Transfer ICON

2.15.4.2 Selecting a File or Files

When the record ALL menu is entered the below left screen is visible. Note the share button that is visible. When no transfer is possible this button is not visible. When the share button is pressed a check mark button appears and the bottom file is highlighted and a check mark added to the left.

Figure 2-66 - Left = Initial view, right share ICON pressed.

If the check mark is pressed again all files are selected. Pressing an individual file will select or de-select that file. Pressing the X (cancel) button will deselect all files.

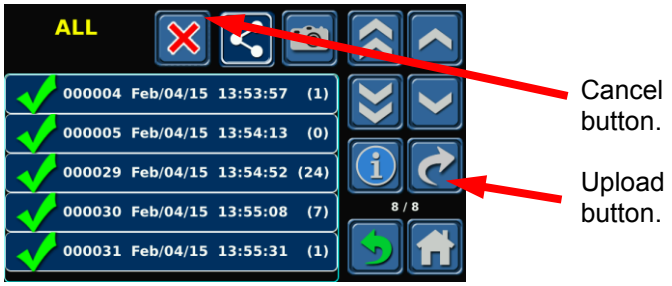


Figure 2-67 - All files selected for transfer.

2.15.4.3 Transfer Selected Files

The below images show the various screens that will appear during transfer including failure. To start the transfer the upload button is pressed.

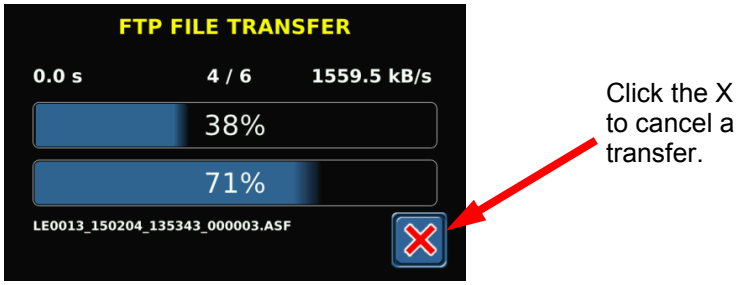


Figure 2-68 - FTP Transfer active.

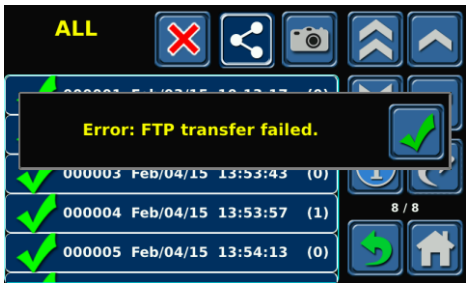


Figure 2-69- FTP Transfer fail.

2.15.4.4 Cancel a Transfer

If the X button is pressed during a transfer the LaserCam 4 will stop the transfer. Once stopped the above failure message appears.

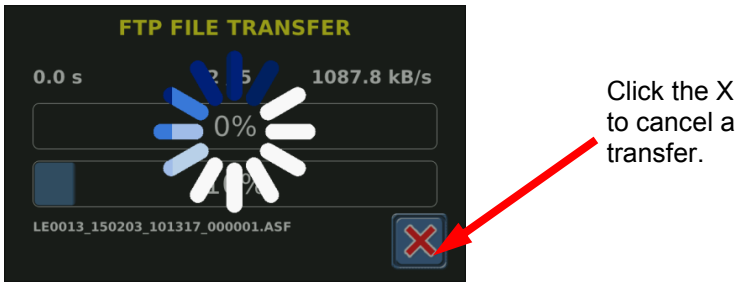


Figure 2-70 - FTP Transfer Cancel.

Chapter 3 - Using the LaserCam 4 Menu System

3.0 General Description

This chapter provides a detailed description of the menu system of the LaserCam 4. This chapter will focus on the menus that are available after pressing the Menu button on the Enforcement Screen.

3.1 Menu Hierarchy

The following image depicts the menu hierarchy. Use the image to understand how to navigate the menu system. Several of the screens have already been covered in Chapter 2: System Operation.

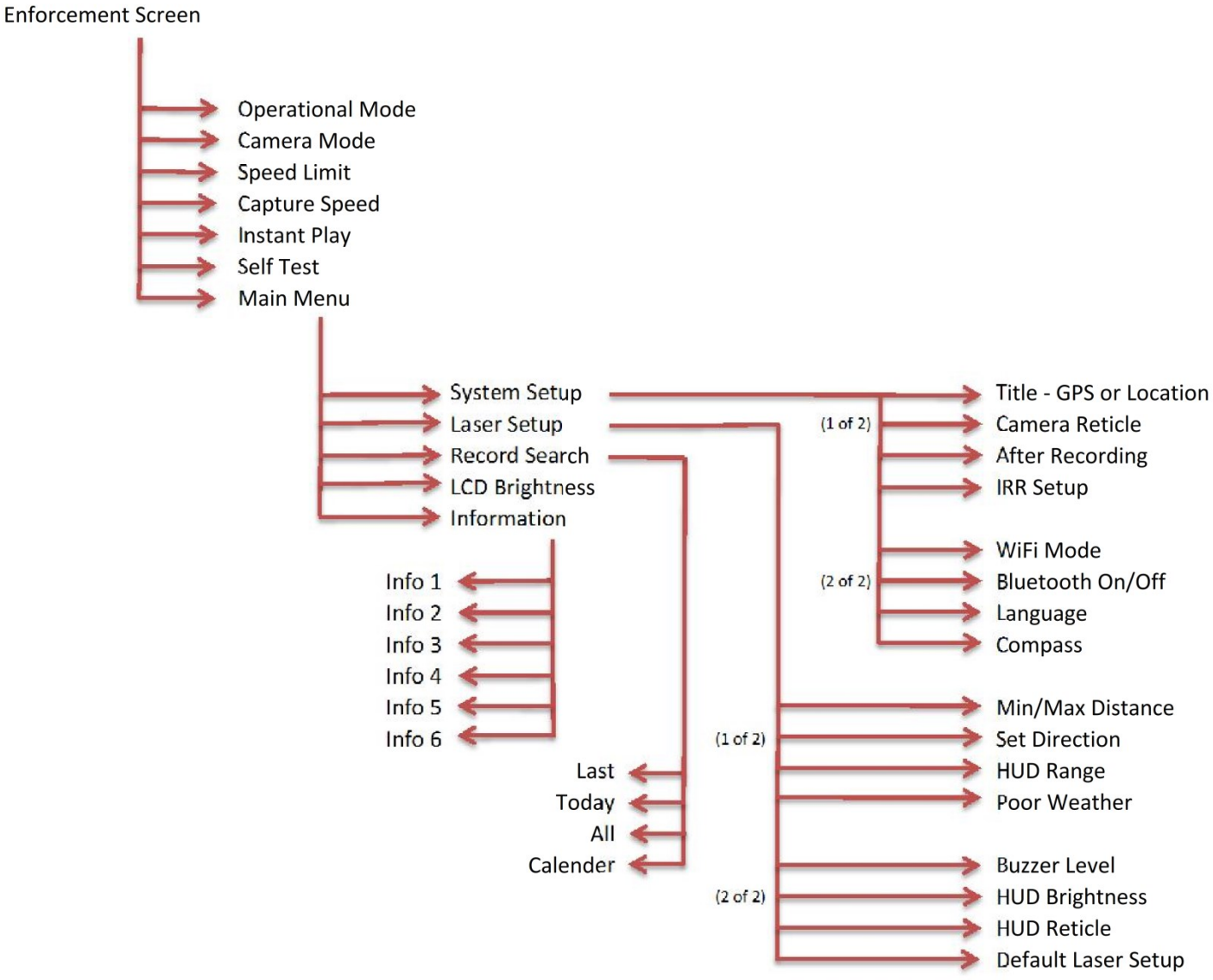


Figure 3-1 - Menu Hierarchy

3.2 Accessing the Menu System

3.2.1 Touchpad method

From the Enforcement Screen the user will press the menu button in the lower right corner of the display to access the LaserCam 4 menu system.

Figure 3-2 - Menu Button on Enforcement Screen

3.2.2 Main Keypad Method

Another method that can be used to access the menu system is to press the MENU button on the main keypad.

Figure 3-3 - MENU Button on Main Keypad

3.3 Main Menu

3.3.1 Overview

The LaserCam 4 Main Menu is comprised of one (1) screen. When the user presses the menu button, the Main Menu screen will appear. This section will provide an overview and subsequent sections will cover the sub-menus opened by each. The Main Menu has six (6) buttons. It is accessed by pressing the Menu button on the Enforcement screen or the Menu button on the Main keypad.

Figure 3-4 - Main Menu

3.3.2 System Setup Button

Located at the upper left, this button is used to access the SYSTEM SETUP menu, where the user may access the GPS feature, choose a camera reticle, set camera behavior after each record session, set the optional IR Illuminator behavior, set the Wi-Fi behavior, or activate Bluetooth. If you have logged on as a controller or service user you can also access the language and compass menus. Each of these sub-menu items will be discussed later in this chapter.

3.3.3 Record Search Button

Located at the lower left, this button is used to access the Record search function, where the user may search through the files (video and photo) that have been saved to memory. See section 2 for details.

3.3.4 Laser Setup Button

Located at the upper center, this button is used to access the LASER SETUP menu, where the user may set the operating range, set operating direction, set the HUD range on or off, set Poor Weather mode to on or off, adjust the buzzer level, adjust the HUD brightness, select the HUD reticle that will be used, or restore the settings to the values that were set when the LaserCam 4 left the factory.

3.3.5 LCD brightness Button

Located at the lower center, this button will allow the user to access a screen where the user can adjust the brightness of the rear LCD display.

3.3.6 Information Button

Located at the upper right, this button will access a series of screens that provide details about the LaserCam4, such as serial numbers, various settings, and firmware versions.

3.3.7 Home Button

Located at the lower right, this button will exit the menu and return to the Enforcement screen.

3.4 System Setup Menu

3.4.1 Overview

Located on the Main Menu screen at the upper left, the System Setup Menu button accesses the System Setup Menu which consists of two (2) screens of six (6) buttons. These menu screens are used by the user to configure basic system functions. Note that the language and compass are not accessible to those with user log-on access.

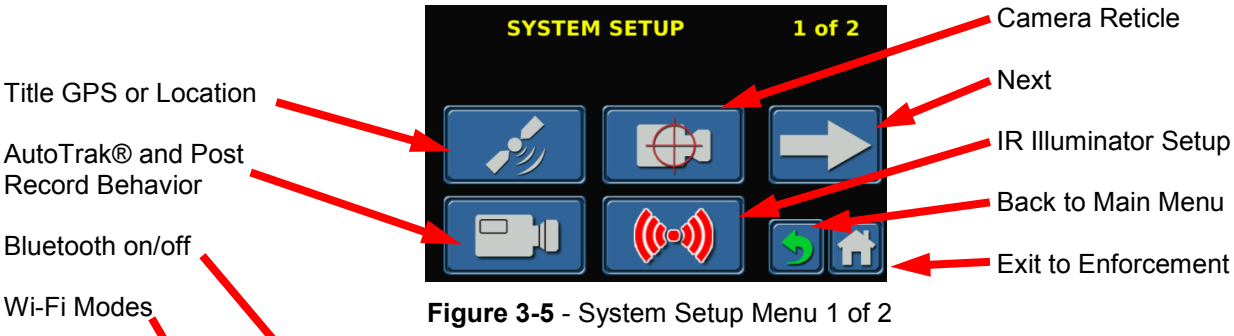


Figure 3-5 - System Setup Menu 1 of 2

Figure 3-6 - System Setup Menu 2 of 2 (Left Controller, Right User)

3.4.2 Title GPS or Title Location Selection Button

Located at the upper left of menu 1 of 2, this button opens a screen that allows selecting three (3) display options for the text overlay on the Enforcement screen. The choices are: GPS, OFF, or Location code. Note that GPS data is not received when OFF is chosen so no automatic update of the clock or no GPS location in the log.

Figure 3-7 - GPS or Location Selection Menu and Display Location

3.4.3 Camera Reticle Button

Located at the upper center, this button is used to access the camera reticle selection menu. The user may select from nine (9) different reticles that will be overlaid onto the video. The user will press the up or down arrow to make a selection. The chosen reticle will appear on the screen. Once the desired reticle is set, press the back arrow button to return to the System Setup menu.

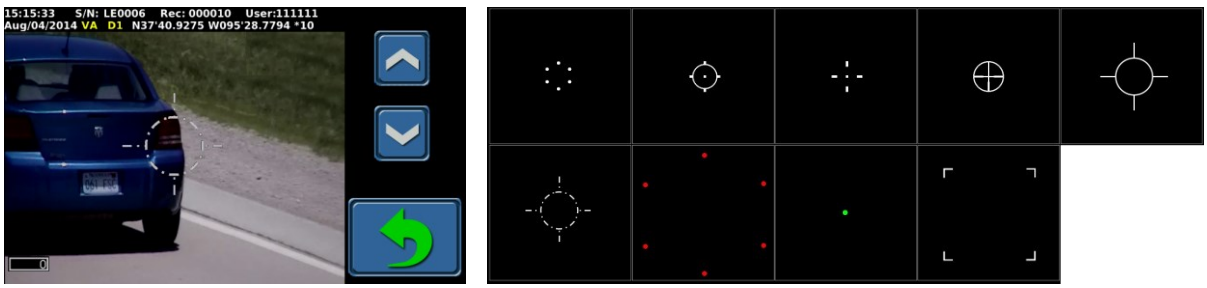


Figure 3-8 - Camera Reticle Menu and Choices (right)

3.4.4 After Recording Zoom & Focus Button

The After Recording Zoom & Focus menu is the menu that will appear when the user presses the Camera Setup button on the System Setup menu. This menu is used to determine how the zoom and focus functions of the camera will work. This screen has five (5) round buttons across the center of the screen. Each button has two labels below it. The top button is the setting for zoom, and the bottom button is the setting for focus. Working from left to right, the buttons are:

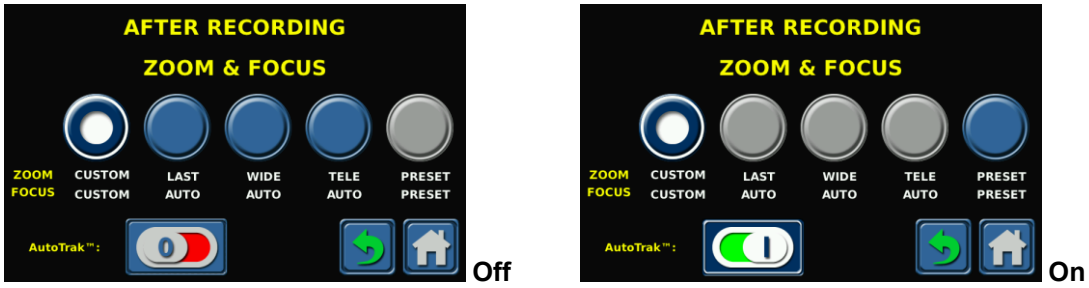


Figure 3-9 - Camera Setup Menu

Note: *Buttons that appear gray are unavailable due to the current AutoTrak™ setting.*

3.4.4.1 Custom / Custom Button

Located at the far left this button opens a live viewing screen, temporarily disables AutoTrak, sets auto focus to on, and fires the laser in range mode. To use, press the button, then aim the LaserCam 4 at a sign or other stationary target at the distance where the optimum focus and zoom is desired. Manual focus is available by toggling the AUTO FOCUS off then using the up/down arrows to focus. In bright light conditions this is usually not necessary. Pull the trigger to save the setting and return to the *After Recording Zoom & Focus* screen. When AutoTrak is active this is the return or home position of the camera after each record session.

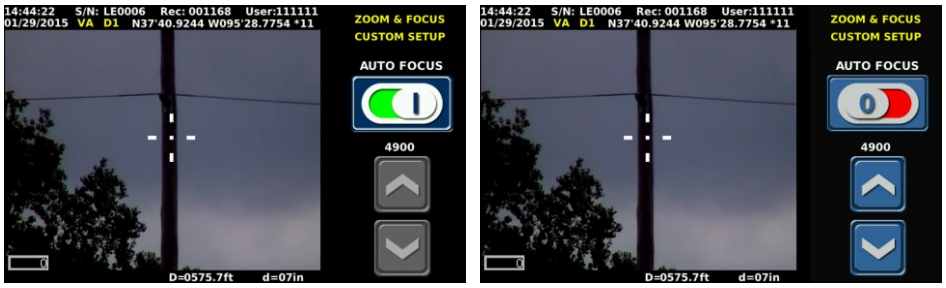


Figure 3-10 - Custom / Custom Setting Screen

3.4.4.2 Last / Auto Button

Camera will use the most recently used zoom setting and focus will be set to autofocus. This will be applied at the end of each recording session.

3.4.4.3 Wide / Auto Button

Camera will have zoom set to wide angle and focus will be set to autofocus mode. This will be applied at the end of each recording session.

3.4.4.4 Tele / Auto Button

Camera will have zoom set to telephoto and focus will be set to autofocus. This will be applied at the end of each recording session.

3.4.4.5 Preset / Preset Button
Camera will have both the zoom and focus set to a preset setting that is not adjustable. This will be applied at the end of each recording session.

3.4.4.6 AutoTrak™ On/Off Slider
At the bottom of the screen is a slider switch used to turn the AutoTrak™ function on and off. Press on the slider to toggle between ON and OFF. When AutoTrak™ is turned on, the center three buttons (Last / Auto, Wide / Auto, and Tele / Auto) will be greyed out, meaning those functions cannot be used. The AutoTrak™ function is a smart zoom function. When the AutoTrak™ is turned on and the user targets a vehicle, the LaserCam 4 will determine the range to the target and will adjust the zoom and focus appropriately.

3.4.4.7 Return Button
Located at the lower right, this button navigates back to the System Setup menu screen.

3.4.4.8 Home Button
Located at the lower right, this button will exit the menu and return to the Enforcement screen.

3.4.5 IR Setup Button (Option)
Located on the System Setup 1 of 2 menu screen at the lower middle, this button is used to determine how long the system will wait for the wireless IR Illuminator to respond before stopping the search and moving on to the camera IR mode. It also sets the control mode of the IR Illuminator once contact has been made. If Bluetooth (on sheet 2 of 2) is off then this ICON is greyed out.

3.4.5.1 IRR Mode Slider Choices
A slider allows 3 choices, DYNAMIC, OFF, or ON. The image to the right shows the screen that is present until contact with the remote IR Illuminator is established or this timeout is completed. The image to the right is triggered by switching to Dynamic or ON with no IR Illuminator.

Figure 3-11 - IRR Setup Menu – IR Mode failing to connect (Right Image)

3.4.5.2 Pair to the IR Illuminator
If an IR module if powered and not in flood override mode, a list of Bluetooth devices will appear. Select the one you wish to control and click the OK check mark button to pair the devices.

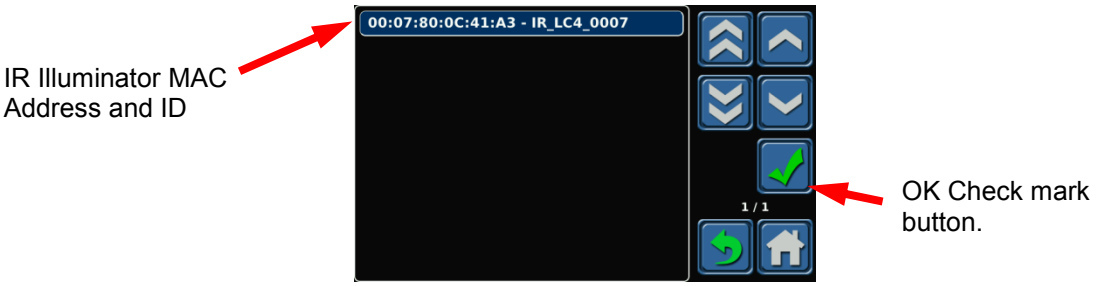


Figure 3-12 - IRR Pairing Menu

3.4.6 Wi-Fi Connectivity

Located on the System Setup 2 of 2 menu screen at the upper left, this button is used to control what the Wi-Fi connection action. There are four (4) choices:

- Auto FTP – When a network is present that matches the settings within the LaserCam4 new files will be automatically transferred via FTP.
- User FTP – Files are selected via the record menu (the same as playback) and the user manually triggers an FTP transfer.
- KSI Apps – This setting allows the unit to connect to one of several LaserCam 4 support application via Wi-Fi. Refer to the various application manuals for details.
- Wi-Fi OFF – This turns off the Wi-Fi to reduce power consumption.

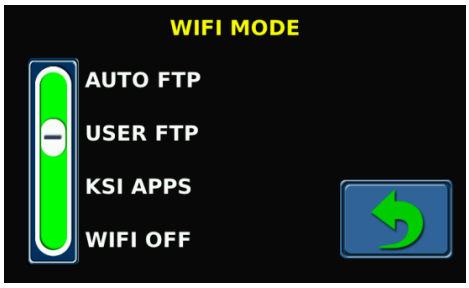


Figure 3-13 - Wi-Fi Use Choices Menu

3.4.7 Bluetooth On/Off

Located on the System Setup 2 of 2 menu screen at the upper center, this button is used to turn Bluetooth on or off. Bluetooth is used for IR Illuminator control and printing.

Figure 3-14 - Left = Bluetooth on, Right = Bluetooth off

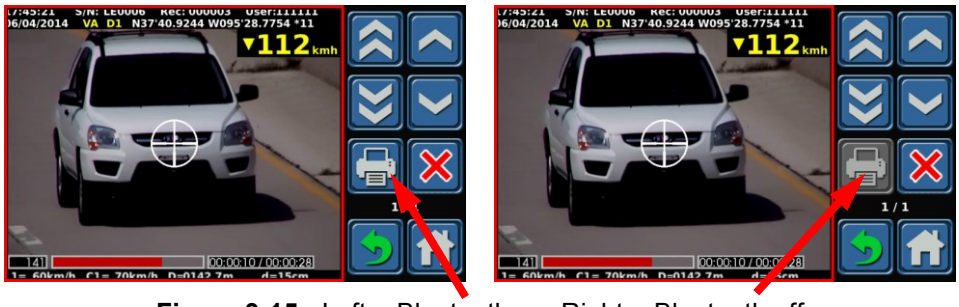


Figure 3-15 - Left = Bluetooth on, Right = Bluetooth off

3.4.8 Language

This is accessible only by a controller level log-on. Located on the System Setup 2 of 2 menu screen at the lower left, this button is used to access the language selection menu. Additional languages may be added as needed. Use the navigation buttons to select the language.

Figure 3-16 - Sample Language Setup Menu

3.4.8.1 Navigation

- Page Up  Press to move up one page at a time.
- Page Down  Press to move down one page at a time.
- Step Up  Press to move up one video at a time.
- Step Down  Press to move down one video at a time.
- Check Mark  Press to select the language and exit to the Enforcement screen.
- Return  Press to return to the previous screen.
- Home  Press to exit the menu system and return to the Enforcement screen.

Note: The language selection is not applied unless the check mark is pressed and this menu is exited. If either the Return or Home buttons are pressed before the Check mark is pressed to confirm the selection, no language change is applied.

3.4.9 Compass Menu

This is accessible only by a controller level log-on. Located on the System Setup 2 of 2 menu screen at the lower center, this button is used to access the compass and inclinometer. The inclinometer appears on the left side of the screen, while the compass appears on the right side of the screen.

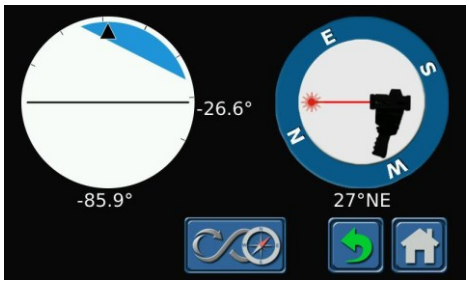


Figure 3-17 - Compass Menu

Located at the bottom of the menu, in the center, the user will find the compass calibration button. The compass calibration procedure will need to be performed when the user first uses the device in a geographic location. The procedure should be performed again if the user changes their geographic location. Changes in surroundings, such as buildings, towers and bridges can result in subtle changes in magnetic noise, resulting in changes in how the compass reads.

To calibrate the compass, the user will press the calibration button and move the device in a figure 8 pattern for seven (7) or eight (8) rotations.

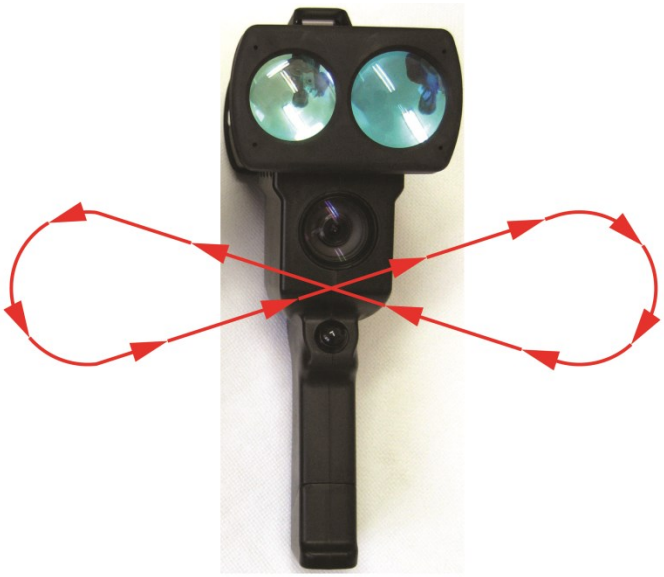


Figure 3-18 - Compass Calibration – Figure 8 Pattern

To the right of the calibration button, the user will find a green back arrow button, which is used to go one level up. Adjacent to the back button is a home button. Pressing this button will return the system to the main menu.

3.5 Laser Setup Menu

3.5.1 Overview

Located on the Main Menu screen at the upper middle, this button is used to access the Laser Setup menu which allows the user to set up the basic laser functions. The Laser Setup menu consists of two (2) screens. When the user presses the laser setup button, the Laser Setup 1 of 2 screen will always appear first.

3.5.2 Laser Setup 1 of 2

The Laser Setup 1 of 2 screen has seven (7) buttons.

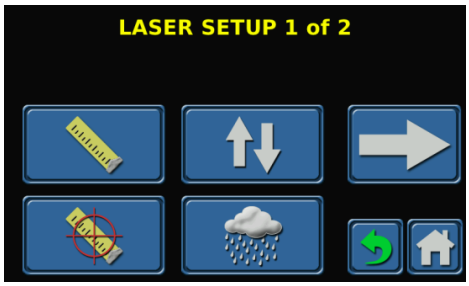


Figure 3-19 - Laser Setup 1 of 2

3.5.2.1 Set Min/Max Range Button

Located at the upper left this button opens a screen the user can use to set the operating range of the LaserCam 4 when taking speed/range measurements. This feature is very useful when performing speed enforcement in a construction or school zone.

The user will set the minimum and maximum distances. In most applications, the default settings are 10 feet (3 meters) for the range minimum and 8,000 feet (2,438 meters) for the range maximum. When this menu is first opened, the current settings will be displayed in the two fields and the MINIMUM entry box is highlighted.

Figure 3-20 - Set Range Menu

There are three methods for setting the range values for the minimum and maximum setting. They are:

- Press the button in the lower left corner with white case with the red “+” to reset the range settings to factory defaults.
- Via the numeric keypad.
- Shooting the range to a specific target.

To enter the range settings using the numeric keypad, make sure the desired field is highlighted (indicated by the colored box around the field) and then use the numeric key pad to enter the range into the field, then click on the green check button to save it.

To set the minimum and maximum range values by shooting to a target, the user will make sure the desired field is selected then press the button with the image of the LaserCam 4 in the lower left corner to turn the laser on. Next the user will identify a stationary target, such as a parked vehicle or road sign, at the specific distance that they wish to use as the entry or exit point for enforcement. The user will then aim the laser at the target until a solid tone is heard from the device, indicating that it has successfully acquired the target. The user will pull the trigger to save and return to the Min/Max range setting screen. The range should be present in the highlighted entry box. Press the green check button to save the setting. Repeat these steps for the second range setting.

3.5.2.2 HUD Range Button

Located at the lower left this button opens a screen with a slider switch that turns the range to target display on or off in the HUD. The user can press on the button to toggle between ON and OFF.

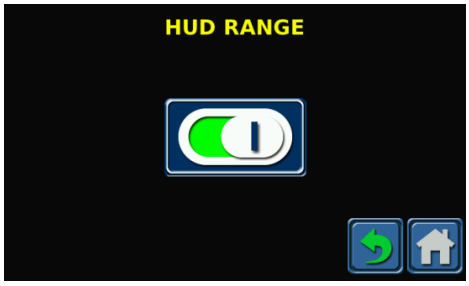


Figure 3-21 - HUD Range Menu (shown ON)

3.5.2.3 Set Direction Button

Located at the upper middle, this button opens the set direction menu where the user can set the device to measure speed/range on target vehicles that are moving in a specific direction (i.e., approaching or receding, or in both directions). The currently selected setting will have a white border and bright white direction indicators to indicate that button is selected. The buttons that are not selected will not have the white border and will have muted white direction indicators. Once the desired selection is made, the user will press the green back arrow to return to the LASER SETUP menu.

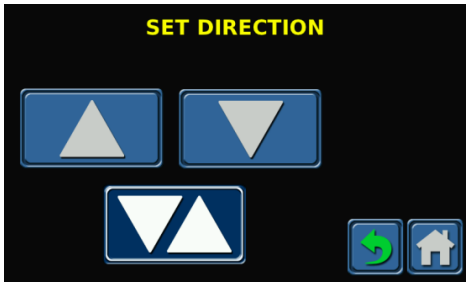


Figure 3-22 - SET DIRECTION Menu

3.5.2.4 Poor Weather Button

The user will press the Poor Weather button to access the control menu for the poor weather function. When this function is turned on it enables the LaserCam 4 to work more efficiently in adverse weather conditions for ranges greater than 200 feet (60 meters).

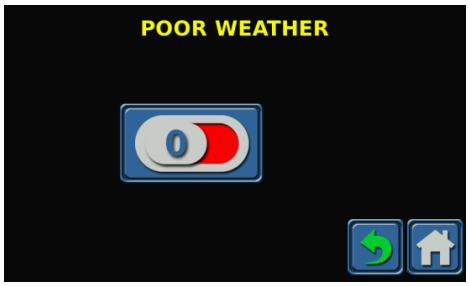


Figure 3-23 - Poor Weather Menu (shown turned Off)

3.5.2.5 Next Screen Button
Located at the upper right, this button navigates to the System Setup 2 of 2 screen.

3.5.2.6 Home Button
Located at the lower right, this button will exit the menu and return to the Enforcement screen.

3.5.3 Laser Setup 2 of 2
The Laser Setup 2 of 2 menu screen has seven (7) buttons. This is accessed from the Laser Setup 1 of 2 menu screen.

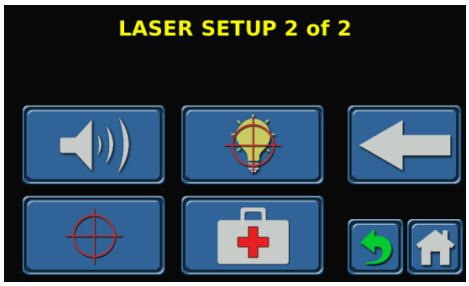


Figure 3-24 - Laser Setup Menus

3.5.3.1 Set Buzzer Level Button
Located at the upper left, this button opens the Buzzer Level menu to allow the user to adjust the volume of system tones. Once the menu opens, the user will use the left or right arrow buttons on the screen to increase (right arrow) or decrease (left arrow) the volume of system tones. As the volume is increased the bars on the page will turn from white to green. In the following figure, the image on the left shows the volume is set to level two (2), while the image on the right shows that the volume is muted. Mute is indicated by the fact that all the bars are white, and the appearance of the speaker icon on the left side of the screen that has the red X through it. When the desired volume is achieved, the user will press the back arrow to exit the menu and save the setting.

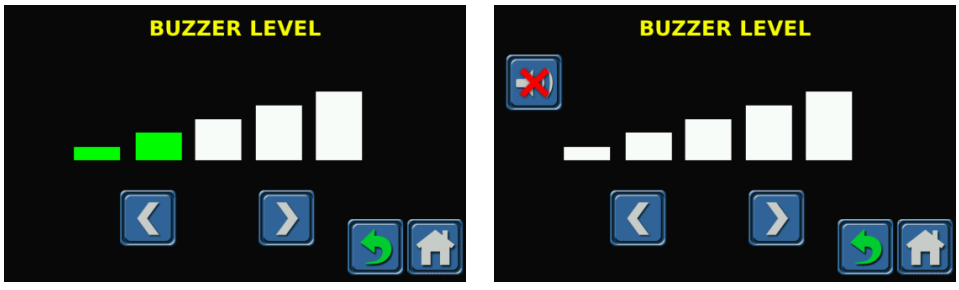


Figure 3-25 - Buzzer (Volume) Level Adjustment Menu

3.5.3.2 Set HUD Reticle Button

Located at the lower left, this button opens the HUD reticle menu to allow the user to select the reticle style that will be used on the HUD. There are four (4) reticles to choose from. The user will press the button with the image of the reticle type they desire. The user will press the back arrow button to save their selection and exit the menu.

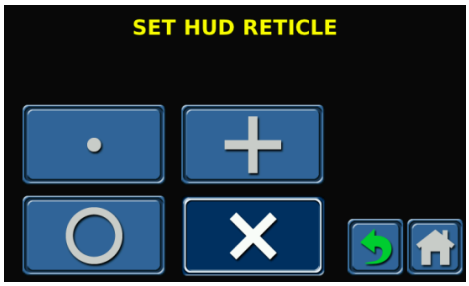


Figure 3-26 - Set HUD Reticle Menu

3.5.3.3 Set HUD Brightness Button

Located at the upper middle, this button opens the HUD brightness menu to allow the user to adjust the brightness of the HUD to adjust for ambient light conditions. This menu operates in a similar manner to the buzzer level menu. The left and right arrow buttons are used to increase or decrease the brightness. When the desired brightness is achieved, the user will press the back arrow to exit the menu.

Figure 3-27 - HUD Brightness Adjustment Menu

3.5.3.4 Restore Factory Defaults Button

Located at the lower middle, this button opens the Default Laser Setup menu screen. This is used to return all the settings accessed under the Laser Setup menus to their original factory configuration. Once the user has accessed the menu, there are two (2) buttons that they may select. If the user presses the button with the X, they will exit back out of the menu. If the user presses button with the green check, it will initiate the restoring of factory defaults. When this action is taken, the screen will switch to a progress bar to allow the user to see that the process is working.

Figure 3-28 - Restore Factory Defaults Menu

The default settings are as follows:

- Min/Max Range = 10 feet (3 meters) / 8,000 feet (2,438 meters)
- HUD Range = Display is ON
- Set Direction = Both
- Poor Weather = OFF
- Buzzer Level = 3
- HUD Reticle Shape = X
- HUD Brightness Level = 3

3.5.3.5 Previous Screen Button

Located at the lower right, this button navigates to the System Setup 1 of 2 menu screen.

3.5.3.6 Home Button

Located at the lower right, this button will exit the menu and return to the Enforcement screen.

3.6 LCD Brightness Menu

Located on the Main Menu screen at the lower middle, this button is used to access the Brightness screen. This screen allows the user to adjust the brightness of the rear display to compensate for varying ambient light conditions. When ambient light is high, the brightness of the rear display should be set to its highest level. Under night time conditions, the LCD brightness can be turned down.

Figure 3-29 - LCD Brightness Screen

Use the left and right arrow buttons to adjust the brightness. Once the brightness is set to the desired level, press the back arrow button on the screen to exit this menu.

3.7 Information Screens

Located on the Main Menu screen at the upper right, this button is used to access the information screens. When accessed the first of six (6) information screens is visible. The information screens provide information about the device itself. The user cannot change any information on these screens from the device. Along the right edge of the screens are the navigation controls. The grey left/right arrow buttons are used to move forward and back through the information screens. The green back arrow button is used to exit the info screens and return to the system setup menu.

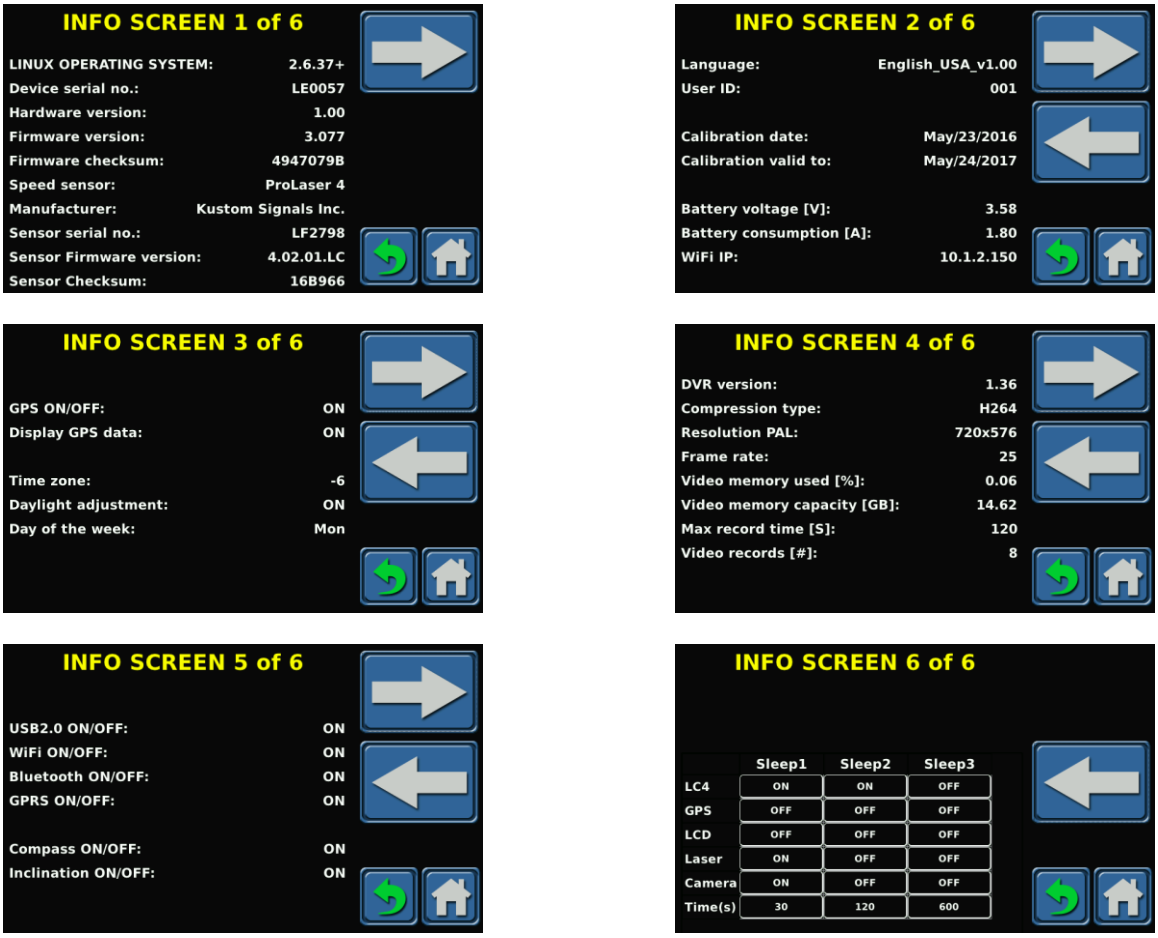


Figure 3-30 - Information Screens

Chapter 4 - Periodic Maintenance

4.0 General Description

This chapter provides information for the proper care and maintenance of the LaserCam 4.

4.1 Cleaning

The LaserCam 4 is designed and constructed so that only a minimal amount of normal maintenance is required. Maintenance consists of periodic cleaning of the external optical surfaces. This should be done only when necessary, as evidenced by degradation in performance of the unit or by visible contamination on the optics surfaces.

> ***IMPORTANT*** ***The external optical surfaces are coated glass. Extreme care must be taken when cleaning these surfaces to prevent scratching, which will lead to performance degradation.***

Surfaces that may be cleaned include the laser output aperture, the HUD combiner glass, and the HUD lens. Gently brush loose debris from the optical surface to be cleaned. Then, using a clean, lint-free cloth or lens cleaning tissue dampened with low-residue isopropyl alcohol, gently wipe the optical surface with a circular motion. A cotton swab may facilitate cleaning of the HUD lens and the lower surface of the HUD combiner glass. Repeat the cleaning procedure if necessary.

> ***Note:*** *During the lifetime of the instrument, scratches, pits, and stains may occur on the optical surfaces, which cannot be removed by cleaning. Excess rubbing should* ***NOT*** *be used to attempt to clean these marks; further damage may result. The LaserCam 4 will operate satisfactorily with a limited amount of cosmetic optical defects.*

Despite its rugged construction, the LaserCam 4 is still a precision electronic instrument. Common-sense handling and storage procedures will help prolong the useful life of the product.

- Whenever the instrument is not in use, it should be stored so that its lens area and HUD are protected, preferably in the LaserCam 4 carrying case.
- When momentarily laying the instrument down, care should be taken to keep the optical surfaces from contacting other objects such as seat upholstery, belt buckles, and so on, which could scratch the lenses.
- The instrument should never intentionally be pointed directly at the sun or any other source of intense light. Doing so may cause degradation of the sensitive receiver, resulting in loss of performance.
- Contact Kustom Signals, Inc. for periodic calibration requirements.

4.2 Accuracy Tests

To maintain the accuracy of the LaserCam 4, the agency should perform periodic accuracy tests. The user should always follow the requirements set forth by their agency's operating procedures to determine the frequency that the accuracy tests be performed. Kustom Signals, Inc. provides the following guidelines for accuracy confirmation for their lidar products:

1. Power-on/Manual Self-Test
2. HUD/Sight Alignment Test
3. Range Accuracy Test
4. Periodic laboratory certification as mandated by department policy, and by local or state case law.

Note: *During the HUD Alignment Test and Range Accuracy Test, the LaserCam 4 will record video of the test.*

4.2.1 Internal Self-Test Sequence Details

The power-on or user initiated self-test consists of memory tests, an accuracy test between two independent timing circuits to verify range and speed determination circuits are operating properly, and a rear display and HUD test.

4.2.2 HUD/Sight Alignment Test Details

Kustom Signals, Inc. recommends the user test the LIDAR's HUD aiming reticle for horizontal and vertical alignment with the laser beam. This test ensures the proper target is acquired for speed enforcement. To perform the test select an isolated target that is approximately 100 or more feet (30 or more meters) away. A good example is a utility pole with only sky behind it. Pull the trigger and slowly sweep the lidar aiming reticle horizontally across the target, confirming an audible chirp sounds when the target is within the reticle. Rotate the lidar 90 degrees and repeat for vertical alignment.

4.2.3 Range Accuracy Test Details

Kustom Signals, Inc. recommends a daily range accuracy test. One example is that the user takes one or more range readings to a known, fixed distance(s). The measured range displayed on the Kustom Signals, Inc. lidar should agree with the known distance within +/- 6 inches (+/- 0.15 m).

IMPORTANT ***All distance measurements are made relative to the front of the LaserCam 4, which is the reference plane.***

Kustom Signals, Inc. recommends the alignment and range accuracy tests be performed daily. Combined with the internal automatic self-test, the HUD alignment and the range test are an excellent means of determining the overall accuracy of the lidar unit. These tests are within the specified tolerance as set by the manufacturer and the International Association of Chiefs of Police (IACP).

4.2.4 Laboratory Certification Details

Kustom Signals, Inc. makes no recommendation or requirement for frequency of calibration for its products. No calibration expiration date for the product is listed on the certificate provided by Kustom Signals, Inc. Calibration intervals normally are fixed by:
1) State law, 2) Judicial precedent or requirement, or 3) Department policy, in that order. By that we mean if your state has no law regarding frequency of calibration, then frequency is determined by what your local judge requires or what the head of your department or agency specifies. The IACP Administrative Guide for Enforcement Technologies recommends each enforcement device be tested for measurement accuracy within a period of three (3) years.

Chapter 5 - Basic Troubleshooting

5.0 General Description

This chapter provides instruction for troubleshooting basic system faults. For symptoms not covered in this chapter, please contact Kustom Signals, Inc. Technical Support by calling 1-800-835-0156 or 1-620-431-2700.

5.1 Basic System Knowledge

The person attempting to troubleshoot faults on the LaserCam 4 should have a very good understanding of the operation of the LaserCam 4.

5.2 Trouble Symptoms

The troubleshooting in this manual will be broken down into symptoms:

- LaserCam 4 will not power on when using battery power.
- LaserCam 4 will not power on when using the external power cord.
- LaserCam 4 indicates that the initial start-up testing has failed and the unit will not power on.
- LaserCam 4 does not communicate over USB.
- The unit does not range or speed at the specific target it is pointed at with the Head-Up Display (HUD).

5.2.1 LaserCam 4 Will Not Power On When Using Batteries

If a condition exists where the LaserCam 4 system will not power on when using battery power, use the following table to diagnose the problem:

LaserCam 4 Will Not Power On When Using Batteries			
Step	**Action**	**Yes**	**No**
1	Press the power button just once. Did the LaserCam 4 turn on?	Return the LaserCam 4 to service.	Go to step 2.
2	Remove the battery pack from the LaserCam 4 unit and try a different, fully charged, battery or place the battery in its charger and charge the battery until it is fully charged. When the charge cycle is complete, reinstall the battery pack into the LaserCam 4. Press and hold the power button for at least one second. Did the LaserCam 4 turn on?	Return the LaserCam 4 to service.	Go to step 3.
3	Contact a Kustom Signals, Inc. Technical Support representative by calling 1-800-835-0156 or 1-620-431-2700.		

Figure 5-1 - LaserCam 4 Will Not Power On When Using Batteries

5.2.2 LaserCam 4 Will Not Power On When Using the External Power Cord

If a condition exists where the LaserCam 4 system will not power on when using external power mode, use the following table to diagnose the problem:

LaserCam 4 Will Not Power On When Using External Power Mode			
Step	**Action**	**Yes**	**No**
1	Press the power button just once. Did the LaserCam 4 turn on?	Return the LaserCam 4 to service.	Go to step 2.
2	Check the fuse in the external power cord to make sure that it is not blown. Is the fuse blown?	Replace the fuse with one of the correct size/rating. If the fuse blows again, seek help from a technician.	Go to Step 3.
3	Check the fuse for the 12VDC power port in the vehicle to make sure that it is not blown. Is the fuse blown?	Replace the fuse with one of the correct size/rating. If the fuse blows again, seek help from a technician.	Go to step 4.
4	Contact a Kustom Signals, Inc. Technical Support representative by calling 1-800-835-0156 or 1-620-431-2700.		

Figure 5-2 - LaserCam 4 Will Not Power On When Using External Power Cord

5.2.3 LaserCam 4 Indicates That the Initial Start-Up Testing Has Failed

If the LaserCam 4 system fails its internal system tests that are conducted during start-up, the LaserCam 4 will report the failure on the LCD screen and not proceed with boot-up. The LaserCam 4 will need to be returned for repair. Please contact Kustom Signals, Inc. Technical Support by calling 1-800-835-0156 or 1-620-431-2700.

5.2.4 LaserCam 4 Does Not Communicate Over USB

If the LaserCam 4 system will not communicate with the PC or Laptop, use the following table to diagnose the problem:

LaserCam 4 Does Not Communication Over USB			
Step	**Action**	**Yes**	**No**
1	With the LaserCam 4 powered off connect the USB cable and proceed through logon. The words **USB connected** should appear on a black screen.	Continue with download or configuration.	Go to step 2.
2	Try a different USB cable. This is a standard A to mini-B cable but it must be no longer than 1 meter (3.28 feet) long.	Continue with download or configuration.	Go to step 3.
3	Reinstall the USB driver that was supplied with the LaserCam 4 on the PC. Check for proper operation. Does the LaserCam 4 communicate over USB?	Continue with download or configuration.	Go to step 4.
4	Contact a Kustom Signals, Inc. Technical Support representative by calling 1-800-835-0156 or 1-620-431-2700.		

Figure 5-3 - LaserCam 4 Will Not Communicate Over USB

5.2.5 LaserCam 4 Does Not Range or Speed at the Specific Target

If the LaserCam 4 will not range or speed at the specific target that it is pointed at with the HUD, use the following table to diagnose the problem:

LaserCam 4 Does Not Range or Speed at the Specific Target it is Pointed At with the HUD			
Step	**Action**	**Yes**	**No**
1	Perform the HUD/Sight Alignment Test described in Chapter 4: Periodic Maintenance. Was the HUD/Sight Alignment Test successful?	Return the LaserCam 4 to service.	Go to step 2.
2	The LaserCam 4 requires service. Contact a Kustom Signals, Inc. Technical Support representative by calling 1-800-835-0156 or 1-620-431-2700.		

Figure 5-4 - LaserCam 4 Does Not Range or Speed at the Specific Target

Chapter 6 - Regulatory Compliance

6.0 Specifications

6.0.1 Operational Specifications

Parameter	Specification
Optimum Focal Distance	From 10 m to 500 m (33 to 1,640 ft.) Identify European registration plates at 200+ m (650 ft.) – typical Identify US registration plates at 175+ m (575 ft.) – typical
Lens Operating Range	0 to infinity
Speed Accuracy	±1 km/h (±1 mph)
Speed Range	16 to 320 km/h (10 to 200 mph) optional 0 minimum speed
Range Accuracy:	± 0.15 m (± 6 inches)
Display Resolution	Speed: 1 km/h or 1 mph Distance: 0.1 meter or 0.1 foot
Minimum Measurement Distance	3 m. (10 ft.)
Maximum Measurement Distance	Up to 2.4 km (up to 8,000 ft.) Stationary, reflective target
Acquisition Time (typ.)	0.3 second for 60 mph (97 km\h) target
Laser Pulse Rate	200 Hz (200 pulses/second)
Units of Measure	Speed: kilometers per hour or miles per hour Range: meters, feet and UK
Laser Output Power	108 µWatts
Eye Safety Certification	FDA/CDRH Class 1 Eye Safe (CFR 21) IEC 60825-1
Laser Wavelength	904 nm +/- 10 nm
Beam Width	1 mradians horizontal x 2.6 mradians vertical

Figure 6-1 - Performance Specifications

6.0.2 Physical Specifications

Parameter	Specification
Body	Aluminum housing with rubber bumpers, high-impact polycarbonate handle
Weight	1.70 kg (3 lb. 12.1 oz.) with battery 1.46 kg (3lb. 3.4 oz.) without battery
Size	17.3 cm x 10.7 cm x 31.2 cm (6.8 in. x 4.2 in. x 12.3 in.)
Temperature Range	Operating: -30° C to +60° C Charging: 0° C to +50° C Storage: -30° C to +70° C
Hard carry case	40.9 cm x 32.5 cm x 17.5 cm (16.1 in. x 12.8 in. x 6.9 in.)

Figure 6-2 - Physical Specifications

6.0.3 Hardware Specifications

Parameter	Specification		
Data Storage (defaults)	16 GB Video, internal, expandable to 64 GB 8 GB meta-data, internal (up to 480,000,000 events)		
Video Quality	4 MB/second (PAL = 25 fps)		
Expandable Video Memory	Standard 16GB Options: 32 GB or 64GB		
Maximum Record Size	No file size limit. Time limited to 16 minutes (configurable)		
Maximum Video Record Data	16 GB Card	32 GB Card	64 GB Card
Video file (hours)	8.1	16.9	33.8
No. of 5 second video files	5,900	12,200	24,350
Still Image Size	720 x 576 (0.4 MP to 15.8 MP with 36X optical zoom)		

AutoTrak™ (patent pending)	Automatic optical zoom with approaching & receding target tracking User selectable post recording action for faster target to target measurement (returns camera zoom to desired initial view)
Touch Screen Display	8.1 cm (3.3”) 480 x 800, color touch screen
Use with gloves	Yes
Camera Sensor	576 x 762 video resolution
Camera Lens	36X zoom f=3,4mm to 122,4mm auto focus, auto iris Progressive scan, Image stabilizer
GPS Receiver	Channels: 48, Telit module GE864-GPS
Real Time Clock	Li backup battery: 2-5 PPM 5 years, without primary battery inserted

Figure 6-3 - Hardware Specifications

6.0.4 Power Specifications

Parameter	Specification	
Operating Voltage	3.2 – 4.3 VDC	
Battery Pack	3.7 VDC, Lithium-ion Polymer rechargeable battery pack, short circuit and overcharge protected	
Battery Life	10+ hours (typical) with battery level indicator on display	
Corded power	16.5 to 9 VDC input (continuous)	
Nominal Power Consumption	Battery	Corded Handle
Firing Speed Mode	1.54A @ 4V	490mA @ 13.7 V
Firing Range Mode	1.59A @ 4V	590mA @ 13.7 V
Recording, not firing	1.49A @ 4V	515mA @ 13.7 V
Idle, not firing	1.45A @ 4V	483mA @ 13.7 V
Sleep mode 1	1.1A @ 4V	460mA @ 13.7 V
Sleep mode 2	190mA @ 4V	169mA @ 13.7 V
Off (Sleep3)	24mA @ 4V	14mA @ 13.7 V
Battery Charger	100 to 240 VAC 50/60Hz, 2 Amp	

Figure 6-4 - Power Specifications

6.0.5 Software

Parameter	Specification
Operational Modes	Video: Automatic, manual, range with video, video record only Photo: Automatic, manual, range with photo*, photo* only *capture on trigger release Poor weather setting available for all measurement modes, on screen icon
Language	30+ language settings including English, Arabic, Bosnian, Chinese, Croatian, Czech, German, Estonian, Hungarian, Italian, Macedonian, Polish, Portuguese (Brazil), Portuguese, Romanian, Russian, Serbian (Cyrillic), Serbian (Latin), Slovak, Slovenian, and Spanish. New languages easily added.
On image data	Date, time, serial number, GPS or site code, record #, user ID, operating mode, camera mode, posted speed, capture speed, target speed and range with units, and laser diameter at the target. Several fields optional.
System setup	Menu selectable on device or PC Setup utility
Data logging	Proprietary (ProLog) or DLLs with XML support
Encryption	AES 256 on file transfer
Video Evidence Management	ProLog Lite (included) ProLog Standard with multiple device support, expanded reports ProLog Standard Client – use with additional PC(s) that will access a common ProLog SQL database

Figure 6-5 - Software

6.1 Certification Information

Manufacture and operation of the LaserCam 4 is subject to the regulations of two governmental agencies, the Center for Devices and Radiological Health (or CDRH), and the Federal Communications Commission. The following sections describe the requirements of these two agencies, and the manner in which the LaserCam 4 complies with their regulations.

6.2 Eye Safety

LaserCam 4 conforms to Class 1 laser standards as specified by the U.S. Department of Health and Human Services, Food and Drug Administration's Center for Devices and Radiological Health (CDRH) as stated in subchapter J, Part 1040 Performance Standards for Light emitting Products. The CDRH rates lasers for law enforcement speed measurement as Class 1 devices. Class 1 is the lowest classification of a laser product in terms of relative potential risk. A definition of Class 1 devices is provided by the Laser Institute of America:

Class 1 – A Class 1 laser is considered safe based upon current medical knowledge. This class includes all lasers or laser systems which cannot emit levels of optical radiation above the exposure limits for the eye, under any exposure conditions inherent in the design of the laser product. There may be a more hazardous laser embedded in the enclosure of the Class 1 product, but no harmful laser radiation can escape the enclosure.

While the LaserCam 4 is certified as a Class 1 laser device and is inherently eye safe, certain reasonable precautions should be taken in its operation. As in the case of a movie projector, a person should not stare directly into the beam for extended periods of time. Since the beam is so narrow, normal random eye movements will generally prevent this from occurring. A person should also not stare directly into the beam within 50 feet (15 meters) of the instrument using binoculars, telescope, or other optical gain devices for any extended period of time.

Prescription eyeglasses, bifocals, and so on are not considered optical gain devices, because they serve only to correct the focus of the eye to normal human vision. In all respects of normal operation, excluding intentional abuse, the LaserCam 4 is completely safe for human exposure.

Persons interested in receiving further information regarding laser safety regulations are encouraged to contact one of the following organizations for assistance:

Laser Institute of America
12424 Research Parkway
Suite 130
Orlando, FL 32826

US Department of Health and Human Sciences
Center for Devices and Radiological Health
Food and Drug Administration
Rockville, MD 20852

American Conference of Governmental Industrial Hygienists
P.O. Box 1937
Cincinnati, OH 45201

6.3 Domestic US Requirements

The LaserCam 4 passes all minimum requirements for Speed-Measuring Device Performance Specifications: LIDAR Module as required by the International Association of Chiefs of Police (IACP) and National Highway Traffic Safety Administration (NHTSA). The LaserCam 4 has been tested and listed on the IACP LIDAR Conforming Product List (CPL).

6.4 Global Regulatory Requirements

The LaserCam 4 (including all standard options) conforms to health and safety requirements for devices sold in global markets, including, but not limited to EU, UK, NZ and Australia. International requirements include IEC 60825-1 Safety of laser products – Part 1: Equipment classification and requirements. LaserCam 4 must comply with Class 1M requirements as defined by the IEC.

The LaserCam 4 adheres to EMC (Electro Magnetic Compatibility) Directive 89/336/EEC to meet CE requirements. Additional certifications are listed in the following table:

Certification	Equivalent	Certification Type	Notes
FCC Part 15 Sub Part B Class A	CISPR11 or EN55011	Emissions	Test @ 3m
FCC Part 15 Sub Part B Class A	CISPR11 or EN55011	Emissions	Test @ 10m
EN 61000-4-6	N/A	Immunity to high frequency electromagnetic fields	150 kHz - 80 MHz, up to 10 V
EN 61000-4-3	N/A	Immunity to high frequency electromagnetic fields	80 MHz - 2 GHz, up to 10 V/m @ 3m
EN 61000-4-2	N/A	Immunity to electrostatic discharge (ESD)	+/- 8 kV air discharge +/- 6 kV contact discharge
EN 61000-4-4	N/A	Immunity to electrical fast transient disturbance/burst	Level 3
EN 61000-4-5	N/A	Immunity to surge voltages	All
EN 61000-4-11	N/A	Immunity to voltage drop, short term interruptions, and voltage fluctuation	All with 230V
EN 61000-4-8	N/A	Immunity to magnetic fields with energy frequencies	All levels

Figure 6-6 - Certification Listing

WARNING! ***THIS IS A CLASS A PRODUCT. IN A DOMESTIC ENVIRONMENT THIS PRODUCT MAY CAUSE RADIO INTERFERENCE.***

6.5 FCC Information

Since the LaserCam 4 is not designed to transmit RF (radio frequency) radiation, an FCC station license is not required for operation of the device. However, the LaserCam 4 does employ internal high frequency digital circuitry to perform its functions, and therefore is classified as a Class A digital device in accordance with Part 15 of FCC Rules and Regulations. The LaserCam 4 has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

WARNING! ***THIS IS A CLASS A PRODUCT. IN A DOMESTIC ENVIRONMENT THIS PRODUCT MAY CAUSE RADIO INTERFERENCE.***

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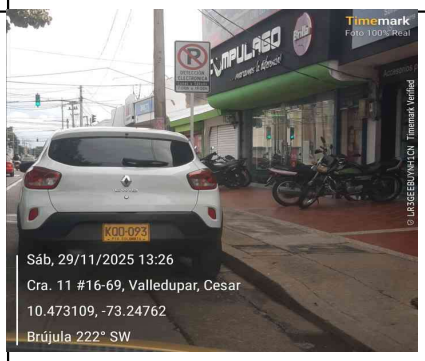
ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
41		10,4744736,-73,2484394
44		10,4736238,-73,2478491
46		10,4729308,-73,2473949
90		10,473141,-73,2477534

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
92		10,4741069,-73,2483969
95		10,4750368,-73,2490324
96		10,4752973,-73,248992
98		10,4757439,-73,2495782

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
99		10,4759867,-73,2497522
102		10,4767464,-73,2502378
103		10,4771566,-73,2502638
105		10,4776302,-73,2508123

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
106		10,4780342,-73,2508701
107		10,4780836,-73,2511526
109		10,4786102,-73,2512485
110		10,47853,-73,25146

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
116		10,48485,-73,25548
117		10,4839247,-73,2538885
119		10,4825281,-73,2526335
120		10,48118,-73,25162

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
123		10,4803007,-73,2509645
126		10,4792968,-73,2503801
128		10,4793826,-73,2503041
131		10,479082,-73,2500989

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
132		10,4786783,-73,2499532
134		10,478465,-73,2496051
139		10,4777436,-73,2492114
142		10,4771093,-73,2485472

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
143		10,4770554,-73,2486452
150		10,4760571,-73,2478721
151		10,4761253,-73,2477625
152		10,4758149,-73,2476336

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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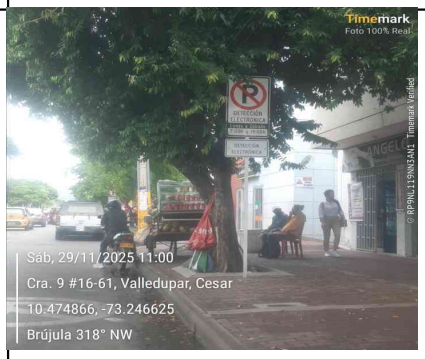
157		10,4753204,-73,2471371
158		10,4752574,-73,2472212
161		10,4746893,-73,2466871

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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162		10,4746387,-73,2467566
163		10,4743146,-73,2464866
164		10,4743362,-73,246393
166		10,4740385,-73,2461511

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167		10,4739738,-73,2462034
168		10,4737155,-73,2458991
169		10,473672,-73,2459917
173		10,4732935,-73,245289

ID	Foto	Coordenadas
174		10,4731865,-73,2452084
175		10,4729607,-73,2452989
176		10,4728818,-73,245405
178		10,472529,-73,2449805

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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180		10,472237,-73,2449033
181		10,4722867,-73,2447684
182		10,4718569,-73,2444508

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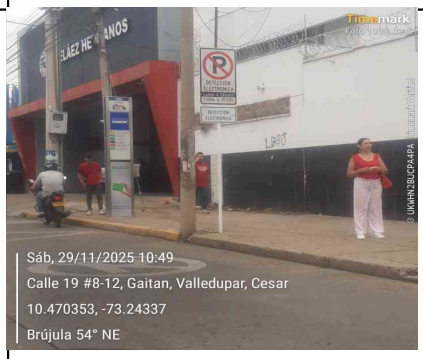
190		10,4709869,-73,243527
192		10,4702287,-73,2434417

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209		10,46579,-73,25244
211		10,4662,-73,25267
212		10,46656,-73,25262
215		10,46713,-73,25221

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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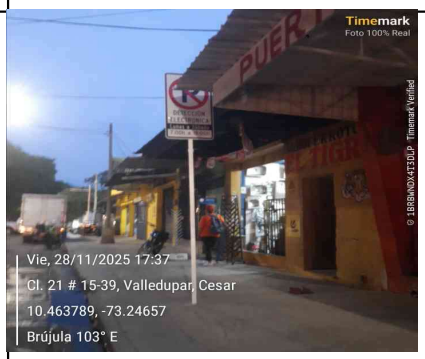
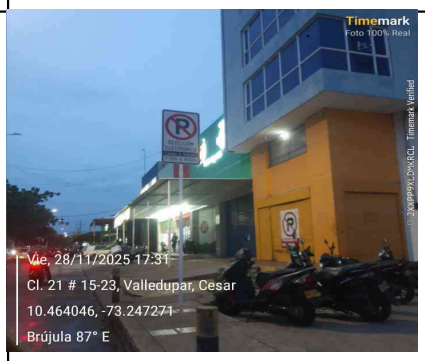
256		10,4639061,-73,2465861
257		10,4638178,-73,2476073
259		10,4641133,-73,2474792

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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264		10,467713,-73,2459017
319		10,4765033,-73,2493413
320		10,4763164,-73,2493437

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324		10,4761414,-73,2498899
326		10,4756997,-73,2505417
328		10,4754906,-73,2505673

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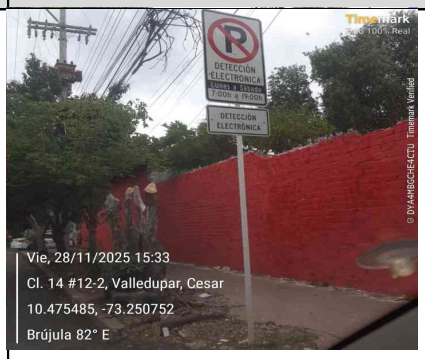
329		10,4753423,-73,2507862
331		10,47476,-73,25185
332		10,47483,-73,25178
333		10,47479,-73,25226

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335		10,4742081,-73,2527854
342		10,4734,-73,25378
343		10,47344,-73,25395
367		10,4737829,-73,2510307

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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368		10,4742185,-73,2503928
370		10,47469,-73,2497
375		10,4751012,-73,2491199
397		10,4747248,-73,2478704

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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398		10,4746662,-73,2478241
401		10,474461,-73,2483379
402		10,4743515,-73,2483004
404		10,4739069,-73,248934

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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405		10,4740203,-73,2489903
407		10,4737,-73,24951
408		10,4735677,-73,2494024
413		10,4725974,-73,2503909

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
416		10,4718247,-73,2504942
418		10,471539,-73,2505539
421		10,4721885,-73,2499406
426		10,4723998,-73,2496641

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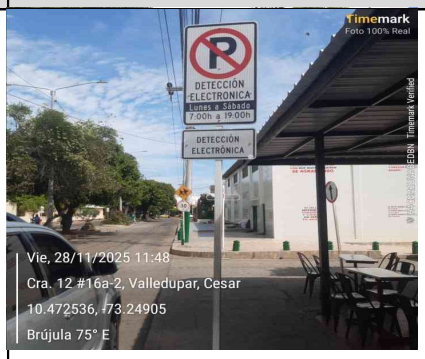
429		10,4726396,-73,2488696
432		10,4728928,-73,2488558
435		10,473782,-73,247478
438		10,4736509,-73,2476027

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501		10,4701879,-73,2500521
505		10,470646,-73,2493334
506		10,4712254,-73,2484433

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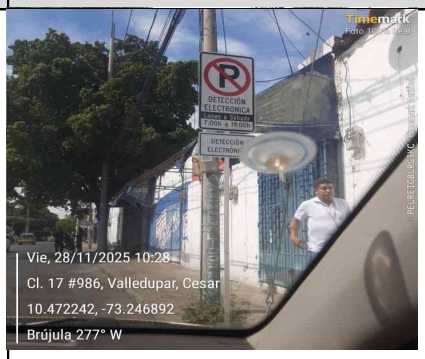
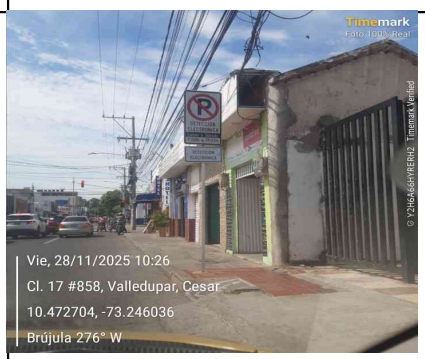
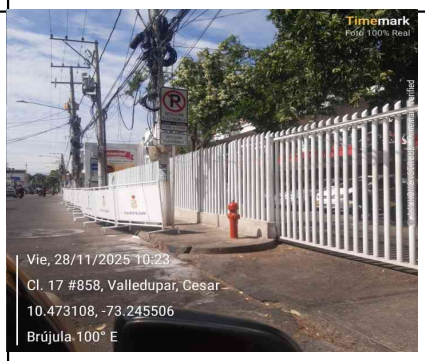
511		10,4720936,-73,2470811
513		10,4724376,-73,2465621
514		10,4727191,-73,2461325
516		10,4730481,-73,245628

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518		10,4733333,-73,2449686
519		10,4734426,-73,2450529
520		10,4737443,-73,2446356

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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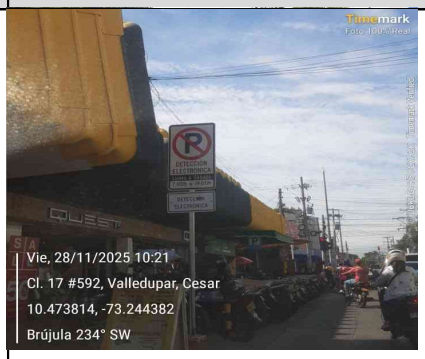
521		10,4736452,-73,2444886
524		10,4742015,-73,2438288
530		10,4746783,-73,2431543
533		10,4747985,-73,2429889

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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535		10,4751541,-73,2423129
536		10,4752236,-73,2424584
537		10,4754398,-73,2421024
539		10,4758181,-73,241342

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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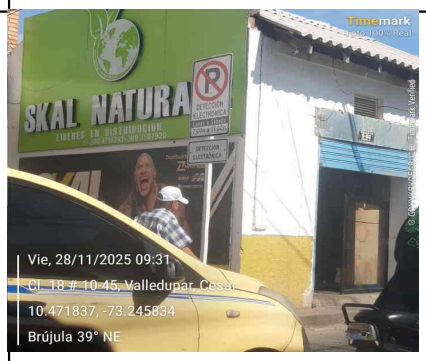
556		10,4724141,-73,2448494
562		10,47184,-73,24583

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563		10,4717072,-73,2457913
564		10,4715235,-73,2462692
567		10,4704165,-73,2479424
569		10,4698755,-73,2483322

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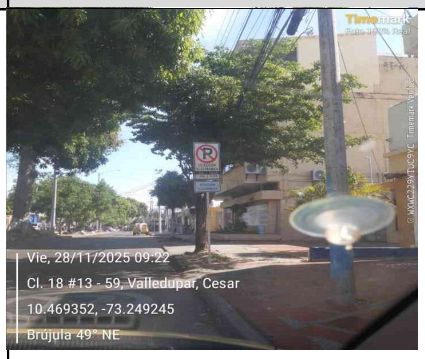
572		10,4692841,-73,2491642
576		10,4678524,-73,2494461
577		10,4684558,-73,2489051
685		10,4725748,-73,2443361

ID	Foto	Coordenadas
688		10,4731568,-73,24477
691		10,4739983,-73,2453382
695		10,4749473,-73,2459576
732		10,4717617,-73,2500113

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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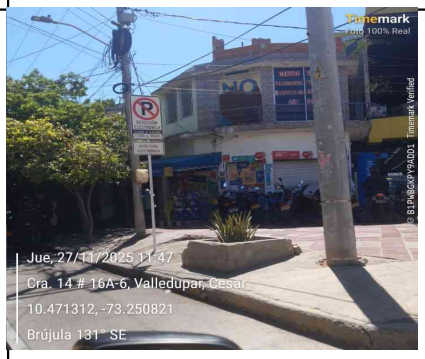
797		10,470558,-73,250244
803		10,4713001,-73,2507342

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

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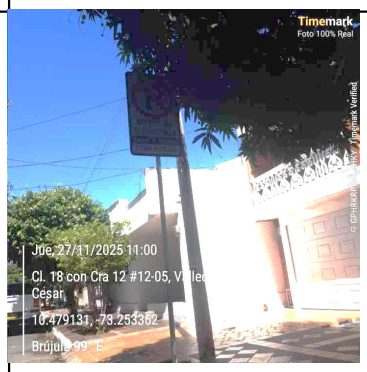
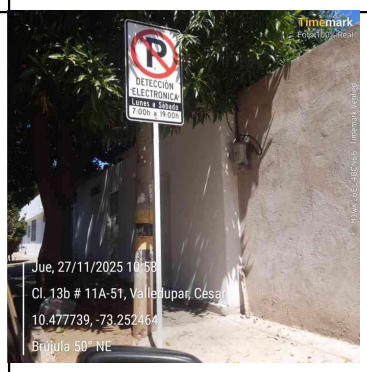
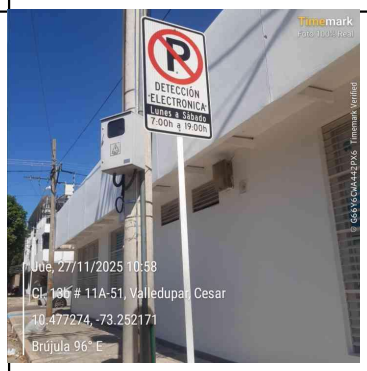
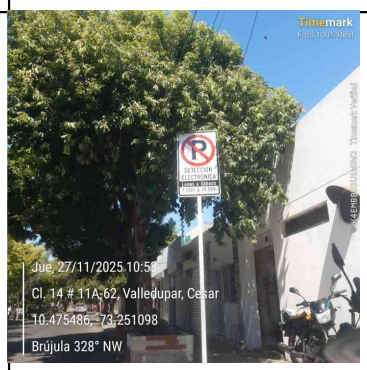
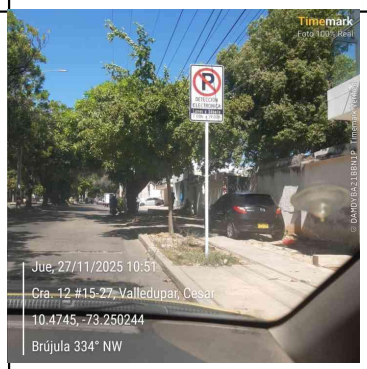
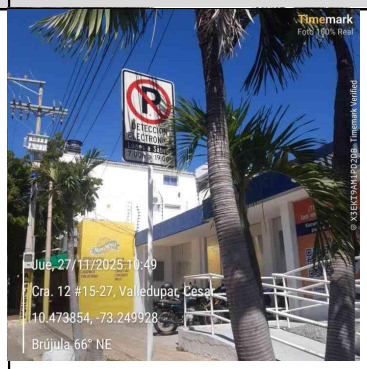
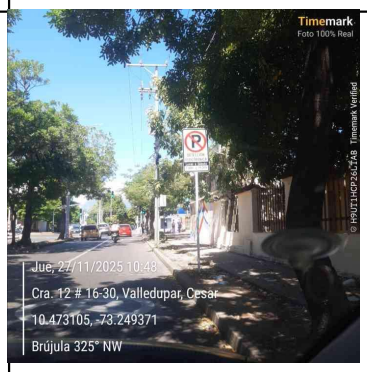
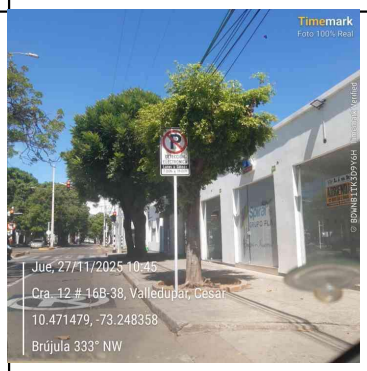
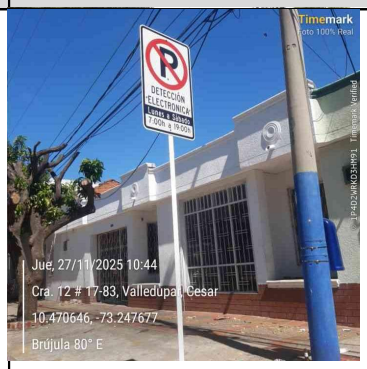
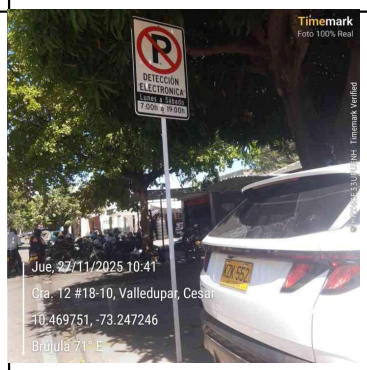
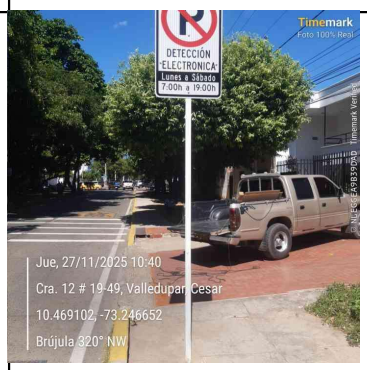
839		10,47913,-73,25336
844		10,47774,-73,25246
845		10,47727,-73,25217

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

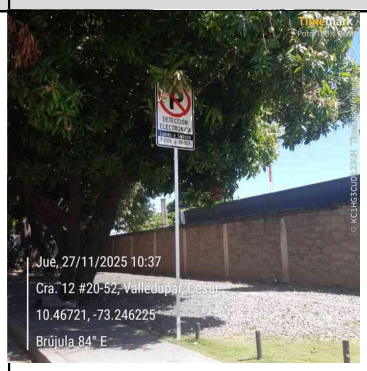
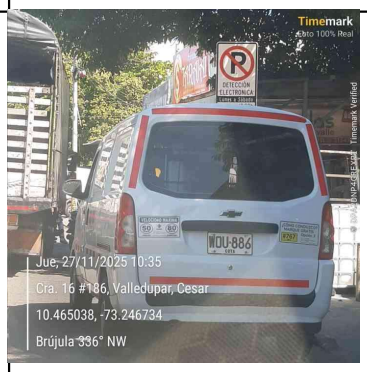
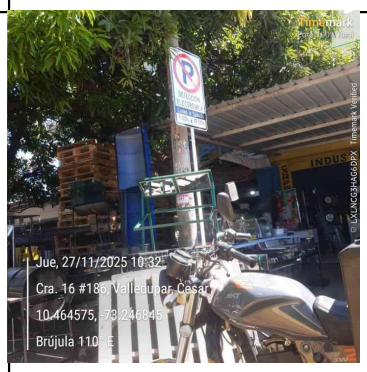
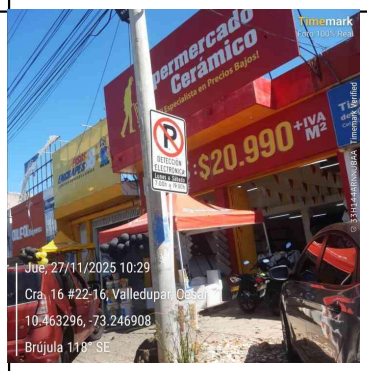
ID	Foto	Coordenadas
846		10,47719,-73,25212
848		10,47613,-73,25135
850		10,4754346,-73,2511617
852		10,4745,-73,25024

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

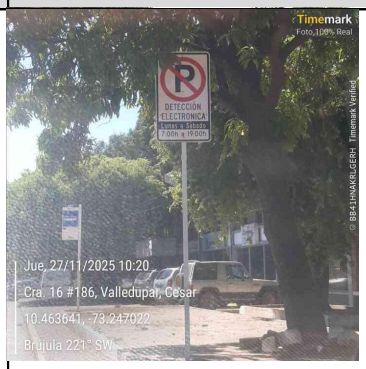
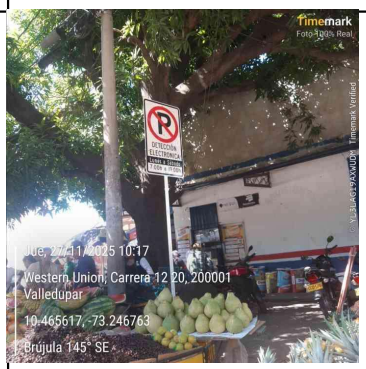
ID	Foto	Coordenadas
854		10,4738711,-73,2498603
855		10,4730863,-73,2493271
857		10,4719843,-73,2485956
858		10,4715117,-73,2482313

ID	Foto	Coordenadas
859		10,47065,-73,24768
862		10,469837,-73,2471333
864		10,4691,-73,24665
868		10,4676279,-73,2460097

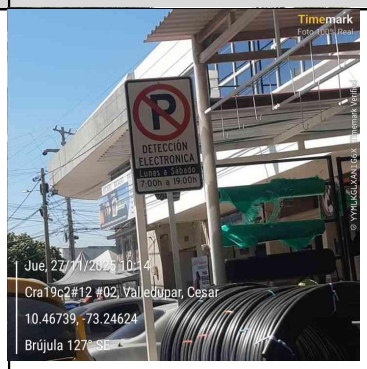
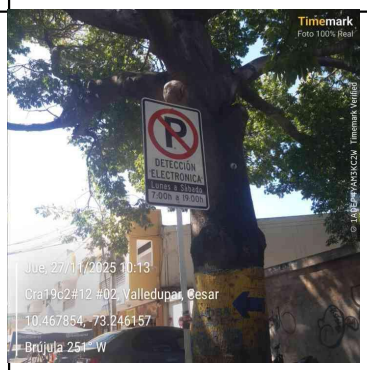
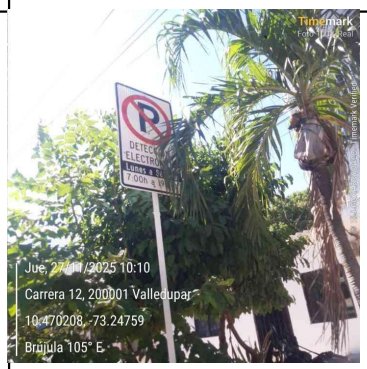
ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
869		10,4671098,-73,24611
874		10,4650374,-73,2466415
875		10,4644315,-73,2467689
877		10,4631655,-73,2468108

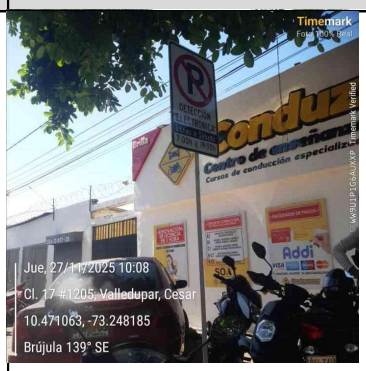
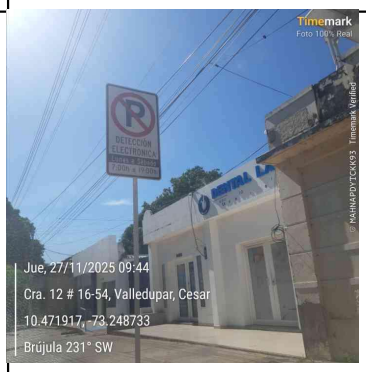
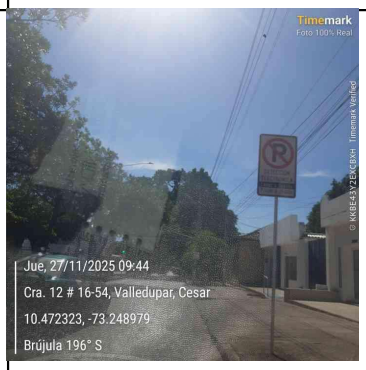
ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
892		10,4636506,-73,2471246
895		10,4645678,-73,2470227
896		10,4649,-73,24689
898		10,46562,-73,24676

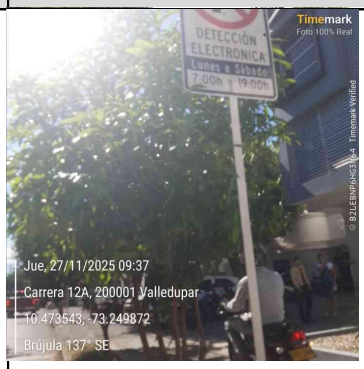
ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
902		10,4673649,-73,2462615
904		10,4677419,-73,2462136
907		10,46944,-73,24711
910		10,4702192,-73,2476477

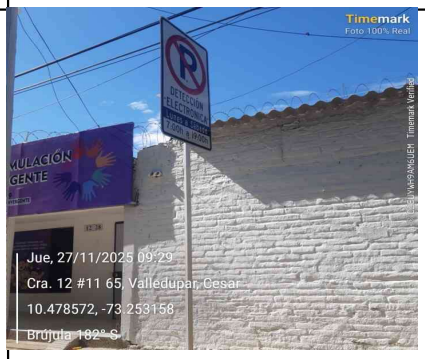
ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
912		10,47106,-73,24819
913		10,4718844,-73,2487716
914		10,4721894,-73,2489666
917		10,4724717,-73,2489437

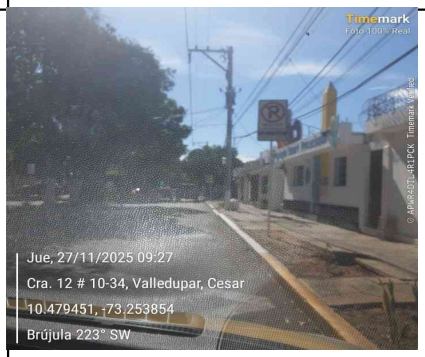
ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
921		10,47354,-73,24987
927		10,4751564,-73,2509662
929		10,47579,-73,25143
934		10,4770776,-73,2522656

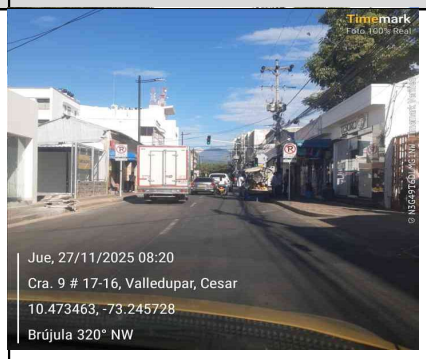
ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
935		10,4772641,-73,2523974
936		10,4774436,-73,2525302
937		10,47774,-73,25267
939		10,4784329,-73,2532271

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
942		10,47932,-73,25378
943		10,47945,-73,25385
961		10,4767526,-73,2500006
1014		10,4742502,-73,2484692

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
1076		10,4732661,-73,2457005
1077		10,4733347,-73,2456378
1083		10,4710029,-73,2437998
10001		10,46622, -73,2463351

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10002		10,4655909, -73,2464799
10003		10,4716316, -73,248601
10004		10,4740269, -73,2501808
10005		10,4629136744634, -73,2535426719433

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10006		10,4626898656634, -73,2535464651588
10007		10,4625816913527, -73,2535768108892
10008		10,462523874035, -73,2535066363858
10009		10,4613581999875, -73,2541647594281

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

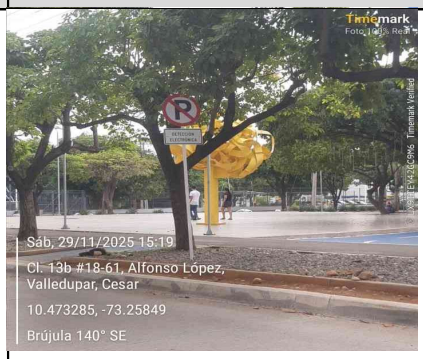
ID	Foto	Coordenadas
10010		10,4610018765963, -73,2542310154474
10011		10,4609403288134, -73,2541646341609
10012		10,4666406714254, -73,2522844325842
10013		10,4718238009441, -73,2506807748312

ID	Foto	Coordenadas
10014		10,4706654936059, -73,2452422884892
10015		10,4730993622175, -73,2468747678436
10016		10,4738442807091, -73,2473286298076
10017		10,4744621142062, -73,2477276704588

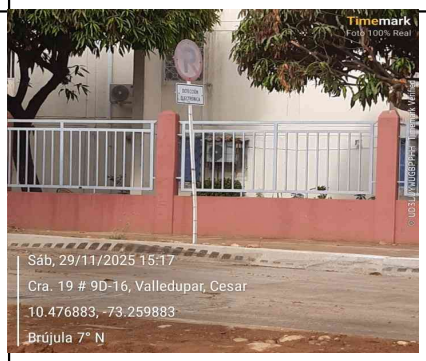
ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10018		10,4753985694963, -73,2483686021397
10019		10,4762954486399, -73,2490911967644
10020		10,4771743910005, -73,249682586799
10021		10,4771362402831, -73,2497125847133

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10022		10.4732926, -73.2586348
10023		10.4739487, -73.2589027
10024		10.4746399, -73.2591709
10025		10.4751409, -73.2593707

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10026		10.4758781, -73.259342
10027		10.4769288, -73.2597767
10028		10.4771468, -73.2598697
10029		10.4768778, -73.2600158

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10030		10,479763241866275, -73,25167384319866
10031		10,479446455685226, -73,2520948838222
10032		10.473322, -73.2534122
10033		10.4734708, -73.2533256

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10034		10.4731399, -73.2532715
10035		10.4732045, -73.2531481
10036		10.4726153, -73.2527444
10037		10.4725626, -73.2528731

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10038		10.4722306, -73.2526592
10039		10.4720075, -73.2523166
10040		10.4708705, -73.2515217
10041		10.477469042056578, -73.24782831422965

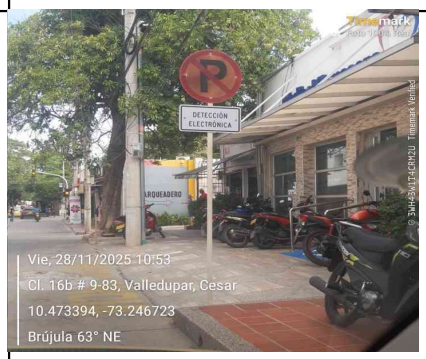
ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10042		10.47648619337917, -73.24909524835819
10043		10.476961765706774, -73.2486381658368
10044		10.476493653342109, -73.24907059245494
10045		10.474265939501226, -73.25239854055368

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10046		10.47446902804338, -73.2520096202893
10047		10.473632935386128, -73.25337486462941
10048		10.473865989190546, -73.24365777372789
10049		10.4734596, -73.2436471

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10050		10.4741188, -73.2457734
10051		10.47351, -73.2465765
10052		10.4733834, -73.2467106
10053		10.4732024, -73.2469086

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10054		10.47278, -73.24729
10055		10.4726579, -73.2475594
10056		10.4724943, -73.2474824
10057		10.472382, -73.2479823

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10058		10.4725772, -73.2476929
10059		10.4723298, -73.2477215
10060		10.4721543, -73.2479577
10061		10.4714749, -73.248961

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10062		10.4715472, -73.2492525
10063		10.4711628, -73.2498248
10064		10.4710212, -73.2500726
10065		10.4707401, -73.2501131

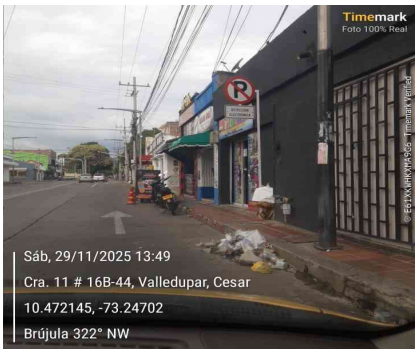
ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10066		10.4707336, -73.2504711
10067		10.4705569, -73.2507124
10068		10.4701924, -73.2509382
10069		10.473376566558311, -73.24802791068458

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
10070		10.471965748638153, -73.24990140145488
10071		10.4766932, -73.2455681
1072		10.4758324, -73.2460535
1073		10.4755939, -73.2450778

ANEXO 02. PRUEBAS SEÑALIZACIÓN EN TÉRMINOS DE LA RESOLUCIÓN NO 20243040045005 DEL 2024

ID	Foto	Coordenadas
1074		10.476220087642258, -73.25147270545514
48		10.4722204, -73.2469865
88		10.4725309, -73.2473305
1075		10,479666238305846, -73,25063110807749

ALCALDÍA DE VALLEDUPAR SECRETARÍA DE TRÁNSITO Y TRANSPORTE	**ESTADÍSTICAS GENERALES CONTROL REALIZADO MECANISMO DE CONTROL EN VÍA APOYADO EN DISPOSITIVO ELECTRÓNICO** *VALLEDUPAR, CESAR*
Objeto	Reporte estadísticas generales del control realizado mediante el mecanismo de **control en vía apoyado en dispositivo Electrónico** en la jurisdicción de la Secretaría de Tránsito y Transporte de Valledupar acorde a los lineamientos establecidos en el numeral 4.3.3 de la Circular 20254000000867 de 24-12-2025
Fecha elaboración:	Junio de 2026