

Instituto Nacional de Metrología de Colombia – INM

Time and Frequency Laboratory
2021-05-26



El progreso
es de todos

Mincomercio



Liz Hernández Forero
Electronics Engineer
Linked since 2008



Nelson Bahamón Cortés
Physicist
Linked since 2014



Daniel Sotelo Moncada
Electronics Engineer
Linked since 2018



Fernanda Rodriguez Rodriguez
Electronics Engineer
Linked since 2019



Alexander Gutiérrez Guevara
Electronics Engineer
Linked since 2019

PROJECTS AND RESPONSIBILITIES

¡Porque Colombia se le mide!

NEW SERVICES AND PROJECTS:

- Premium Legal Time service.
- Speed measurement service (New Project - I+D+i).
- **INM Time Scale (New Project - I+D+i).**
- **T&F Mathematical Models Review (New Project - I+D+i).**
- Development of an Atomic Clock (Proposal).



Daniel Sotelo Moncada

- Speed Measurement service.
- Research activities.
- Documentary analysis of speed measurement technologies.
- Diagnostic visits to identify metrological traceability elements or parameters.



Fernanda Rodriguez

- Metrological assurance activities.
- Calibration activities.
- Premium Legal Time service.
- Support to the metrology fundamentals training course.
- Research activities.



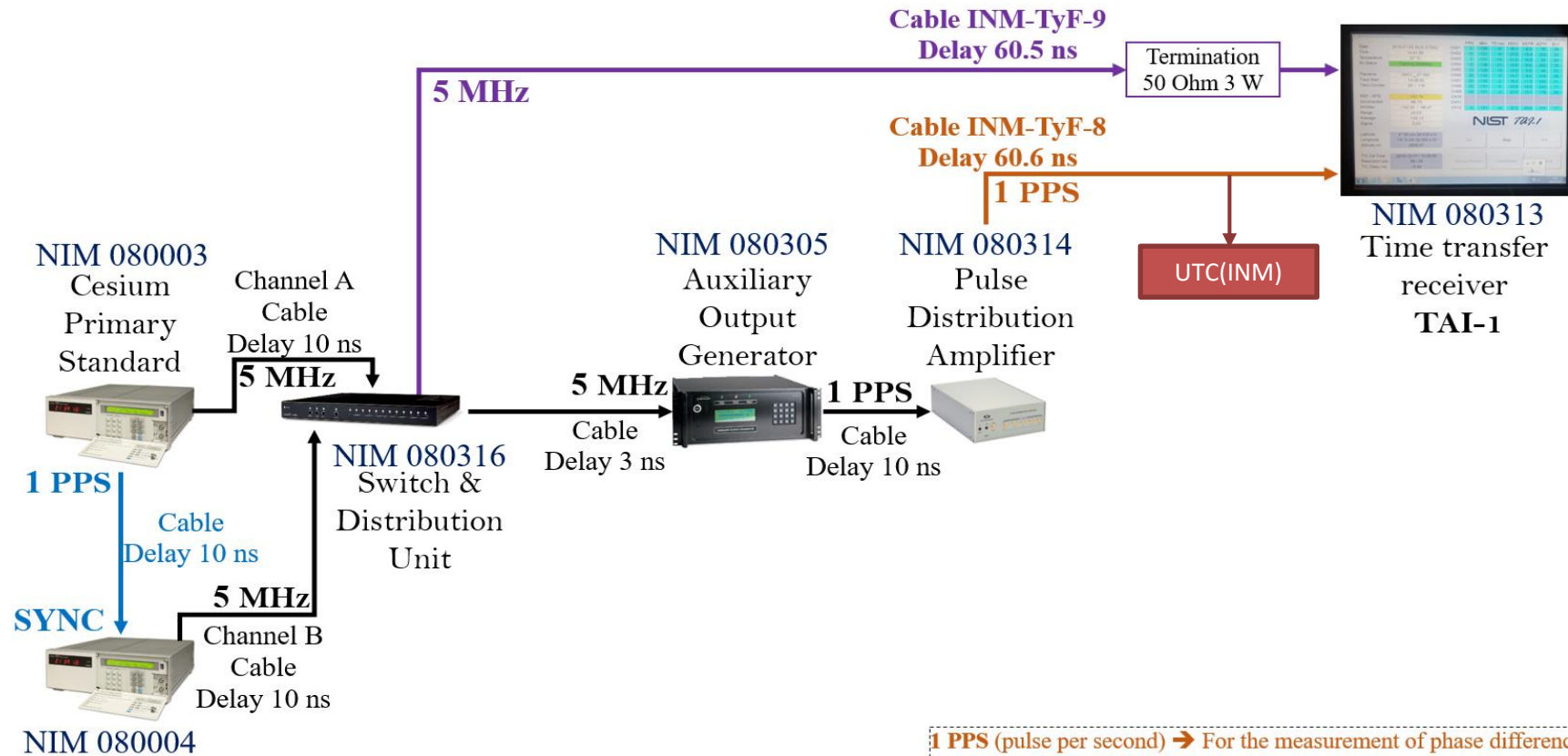
Alexander Gutiérrez Guevara

- Metrological assurance activities.
- Calibration activities.
- Support to the measurement uncertainty training course.
- Research activities.

Laboratory set-up



Diagram of Laboratory set-up



1 PPS (pulse per second) → For the measurement of phase difference.
 5 MHz → For the TIMEBASE of the comparison systems.
 1 PPS – SYNC → To synchronize two clocks.

Infraestructura INM - TF



DEVELOPMENT OF NEW CALIBRATION SERVICE FOR VEHICLE SPEED MEASUREMENTS (CINEMOMETERS)

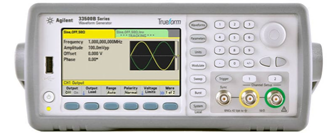
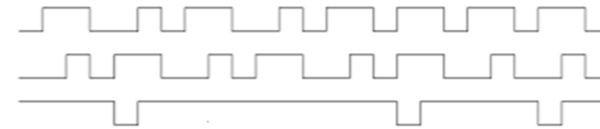
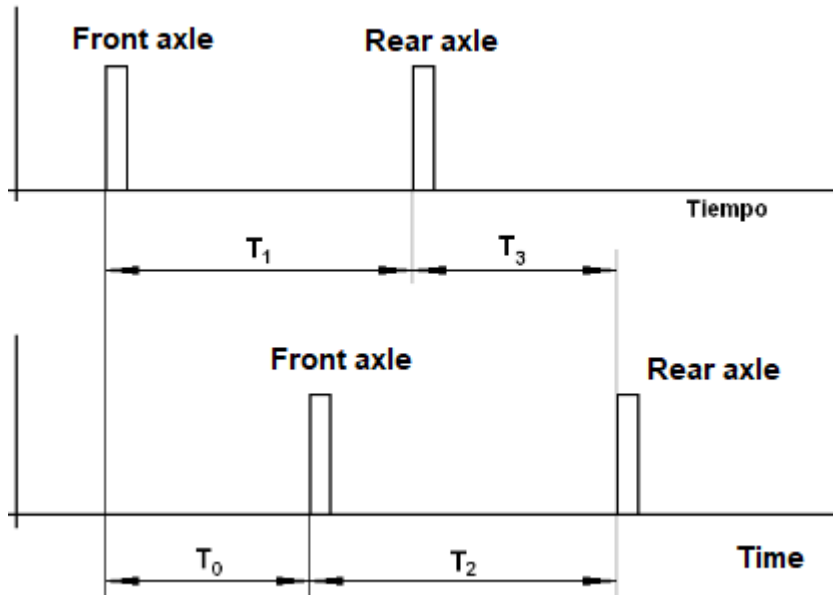
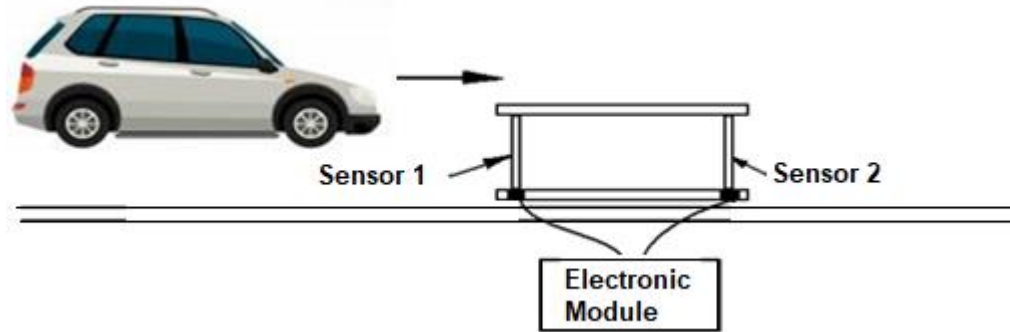
Objective

Provide and disseminate metrological traceability to laboratories for the calibration of vehicle speed measurement instruments (cinemometers), using the frequency standards of the Time and Frequency Laboratory of the National Institute of Metrology of Colombia.

Project description

Calibration of speed measurement instruments will be performed by measuring time intervals between consecutive electrical pulses emitted by the Instrument Under Calibration, using standards from the Time and Frequency laboratory.

Measurement prototype



TIMELINE

2018
Self-learning about
technologies in Colombia,
International reference
documents



2019
ICONTEC (Instituto
Colombiano de Normas
Técnicas)
Cinemometers Standards

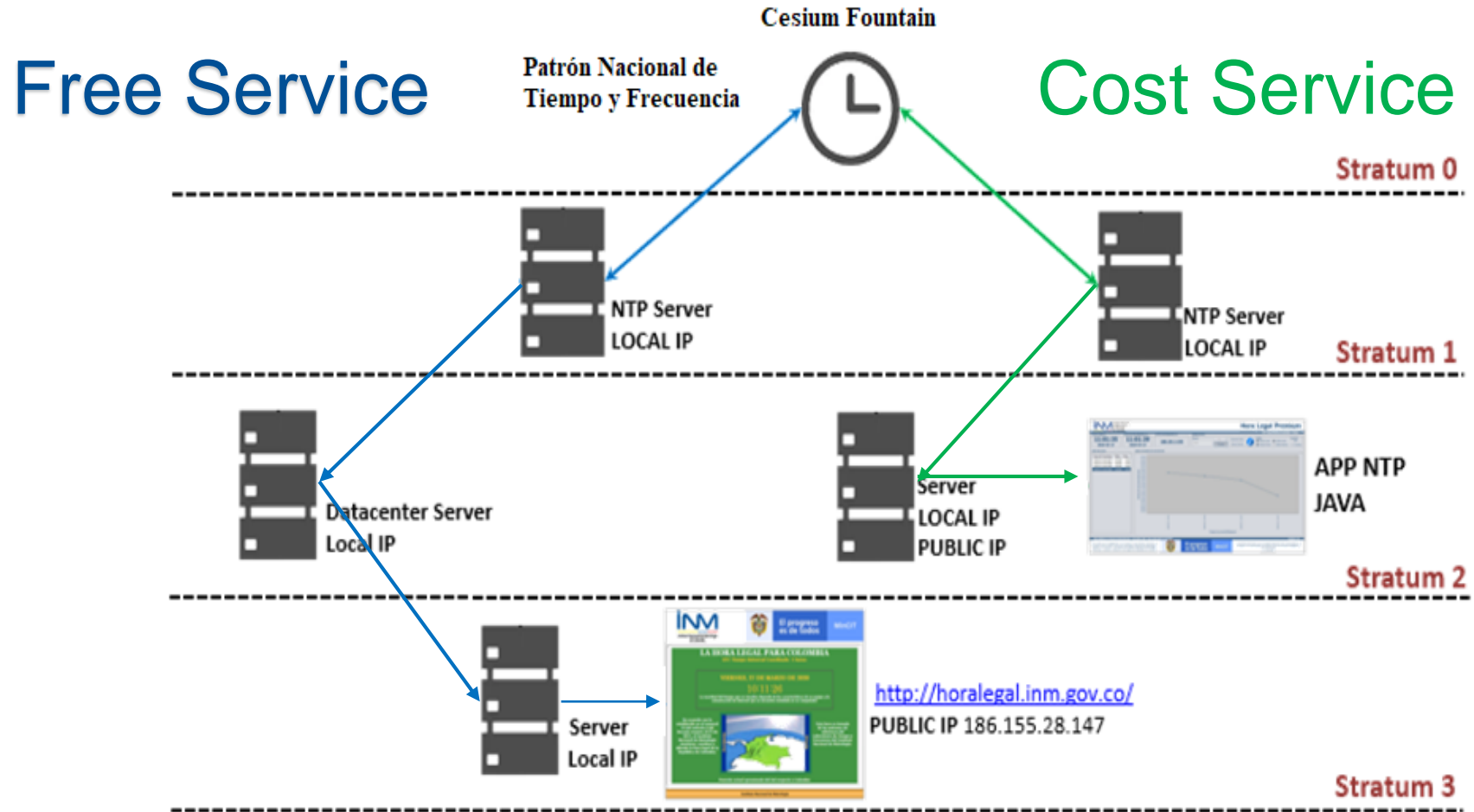


2020
Diagnostic meetings
(police, accredited laboratories,
manufacturers)
pilot test.



MEASUREMENT OF — SYNCHRONIZATION OFFSET — WITH THE LEGAL TIME

Configuration:



Service Features:

Monthly
measurement
report

Daily report

Exclusive IP
to
synchronize

Measurement
application

Measurement application:

Hora Legal Premium
— □ ×



**Instituto Nacional
de Metrología
de Colombia**



Hora Legal Premium

UTC Tiempo Universal Coordinado -5 horas Versión Beta-1.2.2

Relojes:

La hora legal es:
22:24:45
2020-09-23

La hora de este dispositivo es:
22:24:45
2020-09-23

Tabla informativa

Num	Originate Timestamp	Receive Timestamp	Transmit Timestamp	Destination Timestamp	Offset (ms)	Delay (ms)
566	2020-09-23 22:18:26:596	2020-09-23 22:18:26:784	2020-09-23 22:18:26:784	2020-09-23 22:18:26:596	188.000	0.000
567	2020-09-23 22:19:26:606	2020-09-23 22:19:26:793	2020-09-23 22:19:26:794	2020-09-23 22:19:26:606	187.500	-1.000
568	2020-09-23 22:20:26:610	2020-09-23 22:20:26:798	2020-09-23 22:20:26:799	2020-09-23 22:20:26:611	188.000	0.000
569	2020-09-23 22:21:26:615	2020-09-23 22:21:26:804	2020-09-23 22:21:26:805	2020-09-23 22:21:26:617	188.500	1.000
570	2020-09-23 22:22:26:623	2020-09-23 22:22:26:812	2020-09-23 22:22:26:812	2020-09-23 22:22:26:623	189.000	0.000
571	2020-09-23 22:23:26:630	2020-09-23 22:23:26:818	2020-09-23 22:23:26:818	2020-09-23 22:23:26:631	187.500	1.000
572	2020-09-23 22:24:26:637	2020-09-23 22:24:26:825	2020-09-23 22:24:26:825	2020-09-23 22:24:26:638	187.500	1.000

Menú principal

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Tipo de conexión

IP pública

VPN

Gráfica

Líneas

Puntos

Detener
Exportar datos

Ayuda
Nueva sesión

Gráfica de desfase de sincronización



Tiempo (aaaa-mm-dd hh:mm:ss)

Estos datos emplean el punto (.) en línea como separador decimal, de acuerdo con la 10ª Resolución de la 22ª CGPM de 2003 y la Resolución DG-210-2015 del 12 de agosto de 2015 del INM.



**El progreso
es de todos**

Mincomercio

Desarrollado por el Grupo de Automatización
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Bogotá D.C. Colombia

THANK YOU !

¡Gracias!

Fuente de:
NBC