

Tiempo y Frecuencia

Dirección de Tiempo y Frecuencia



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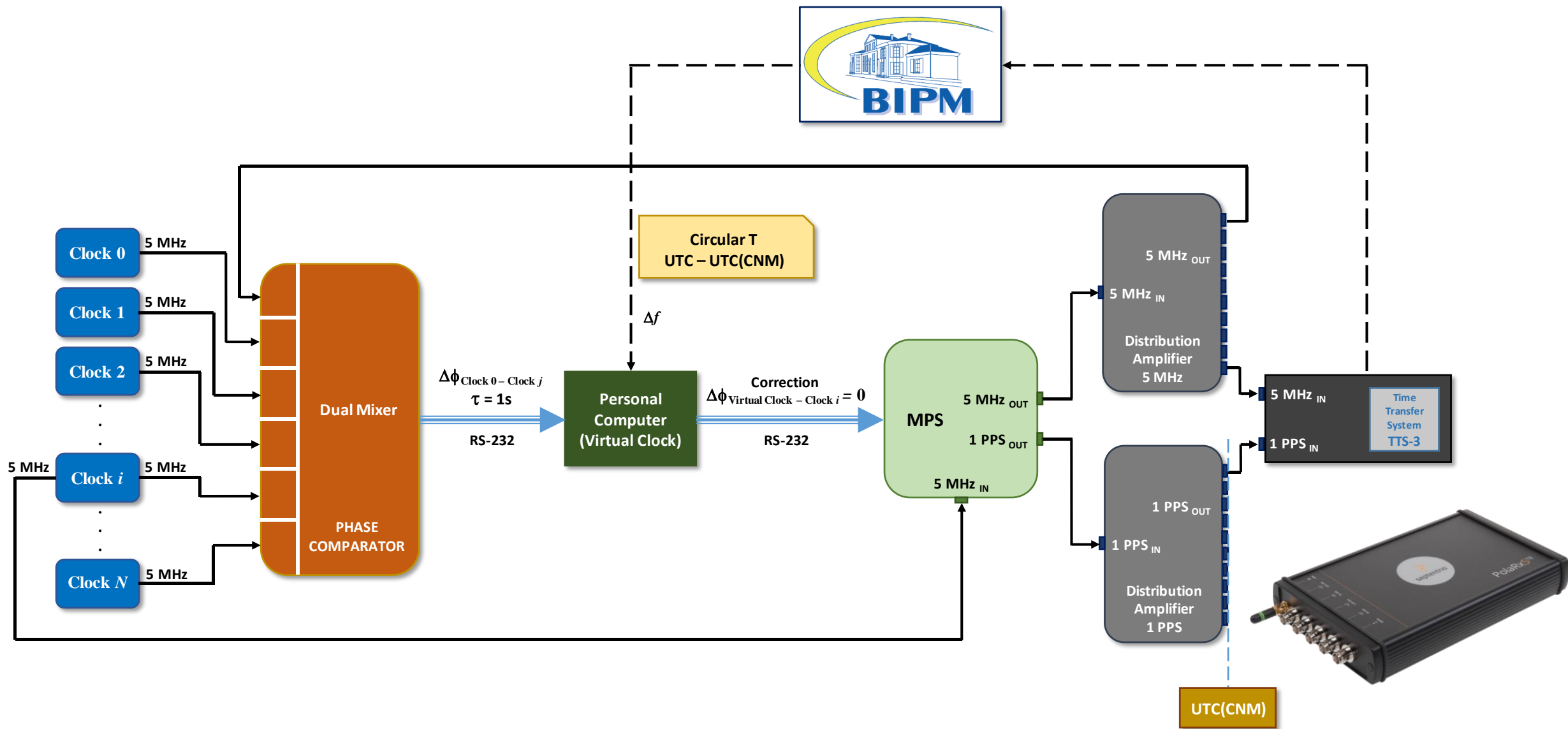


Tiempo y Frecuencia

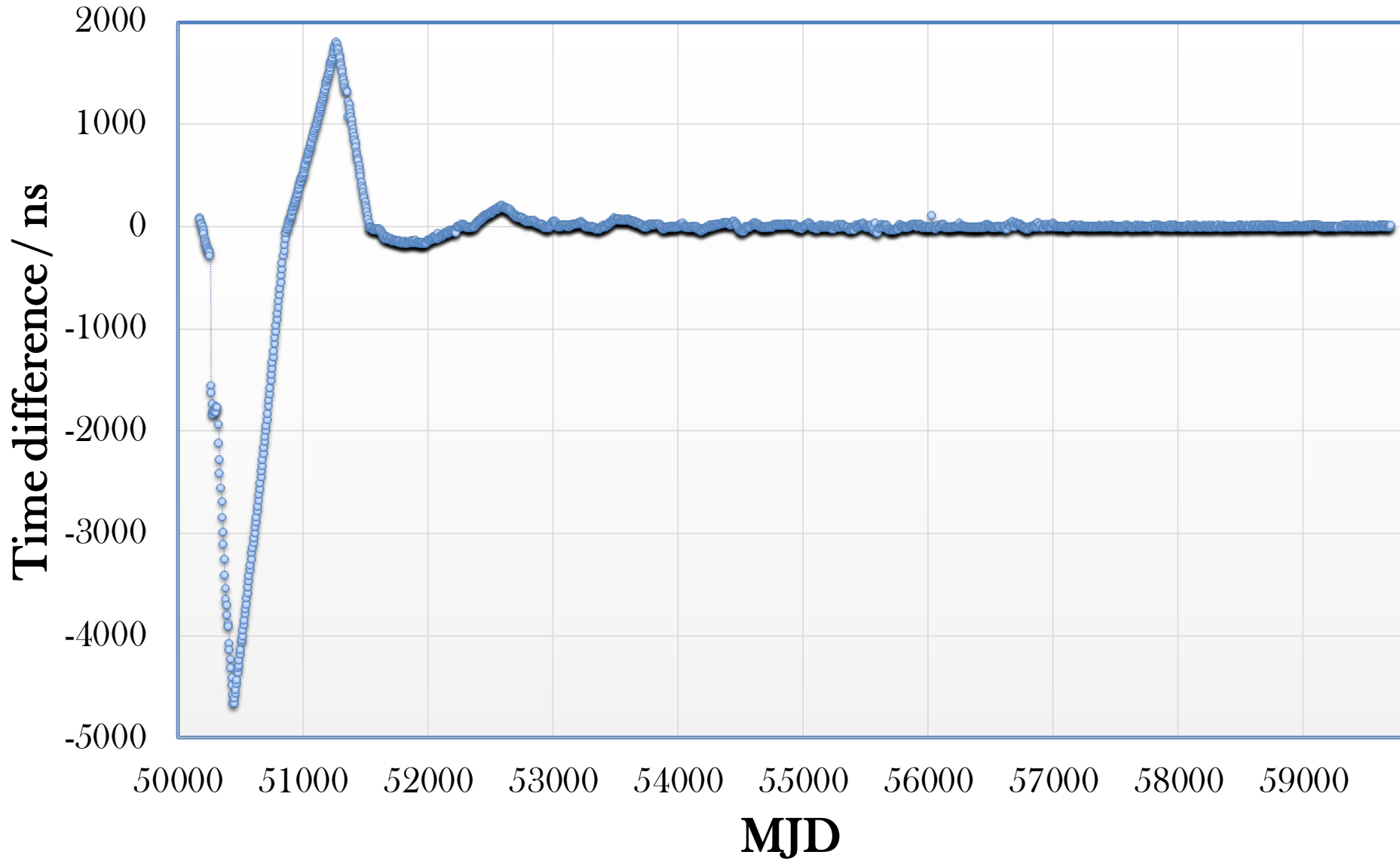


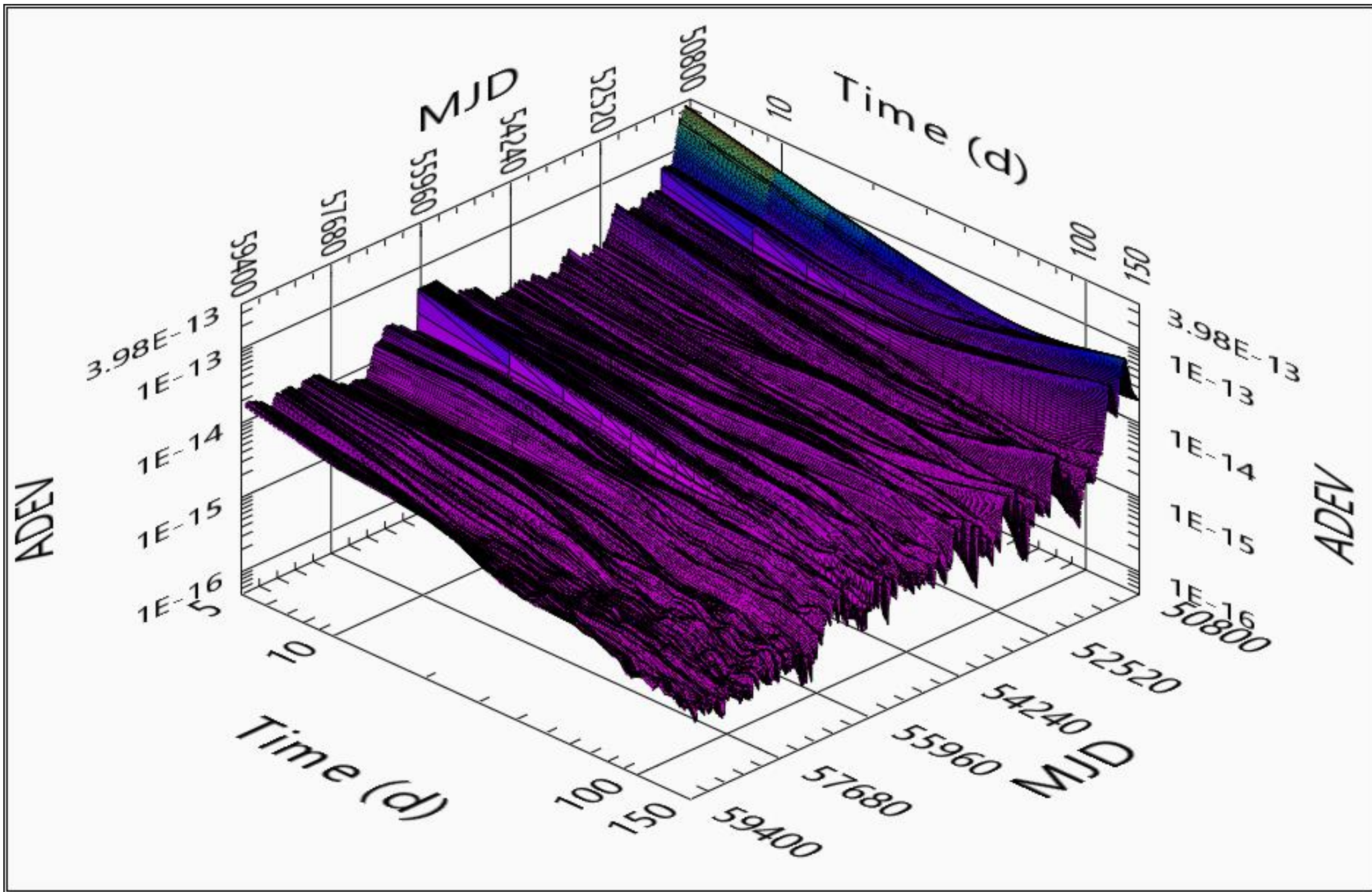
Laboratories



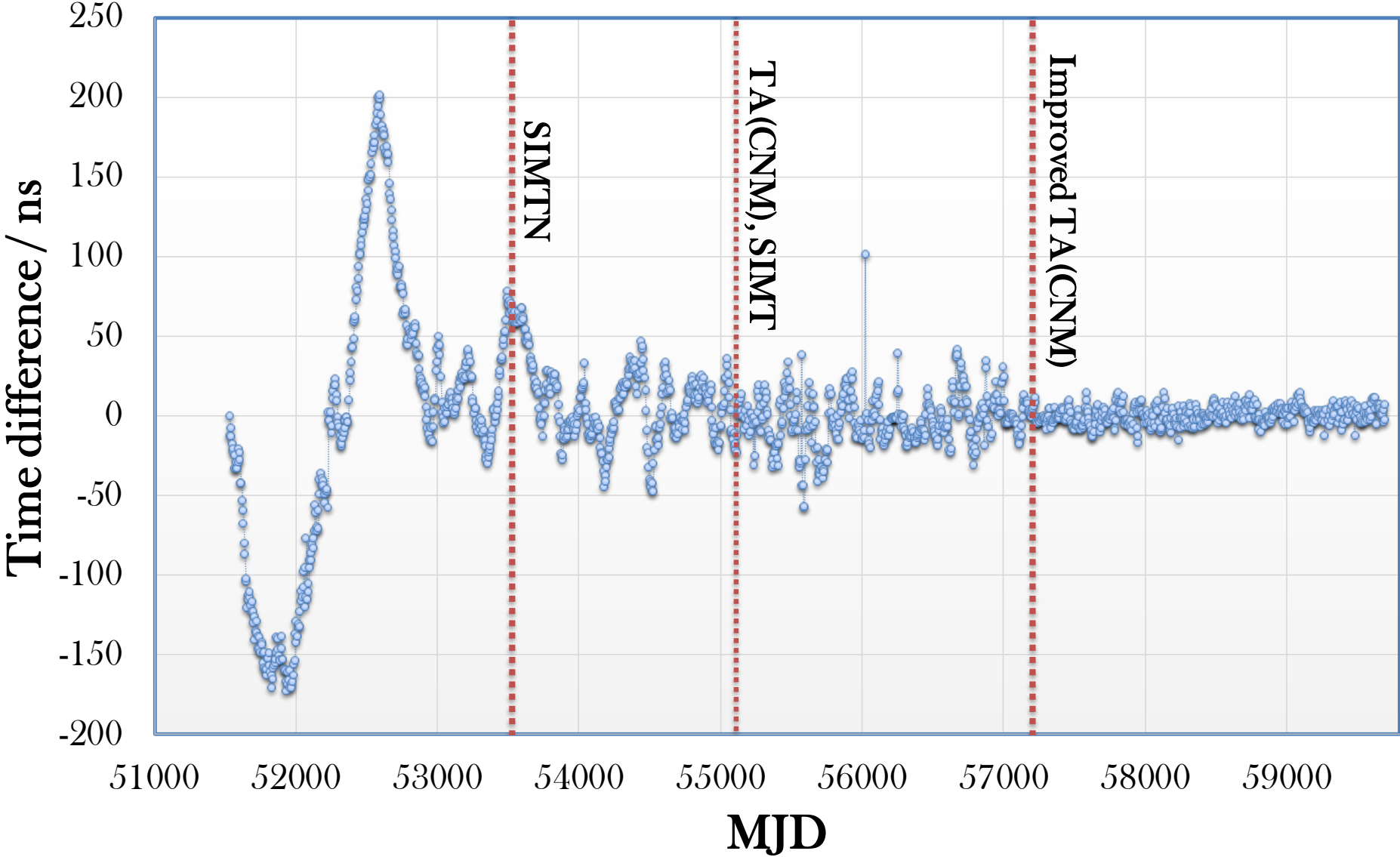


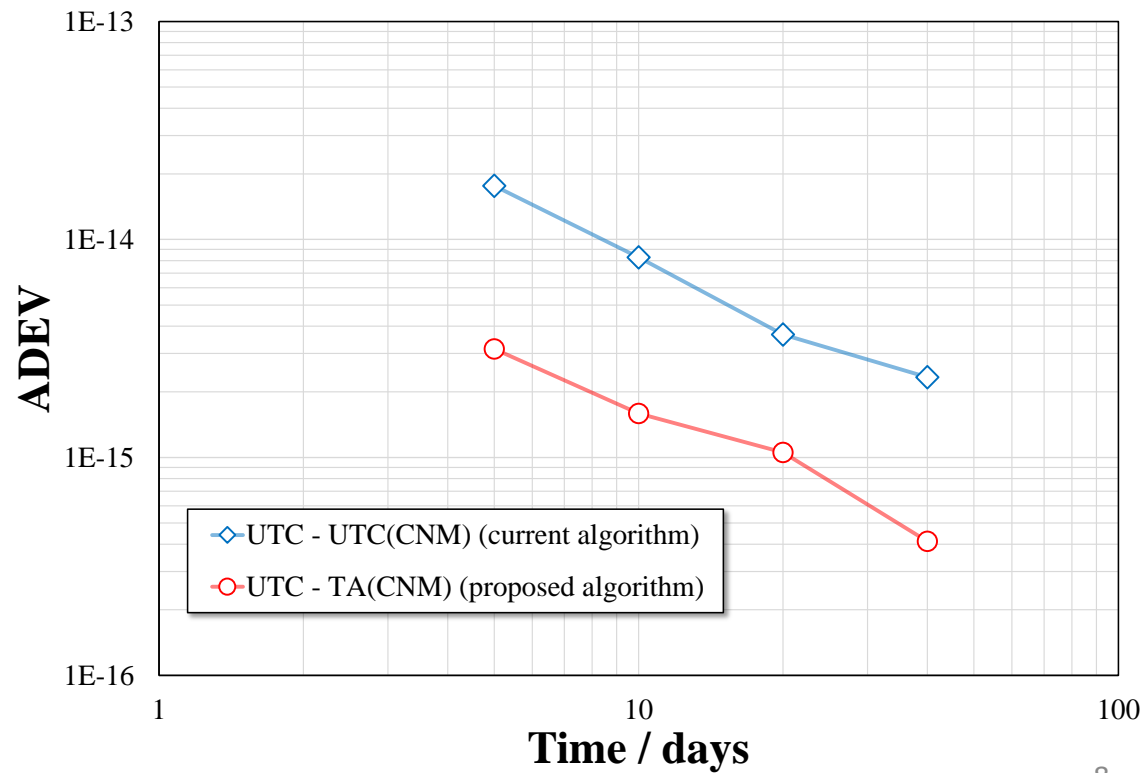
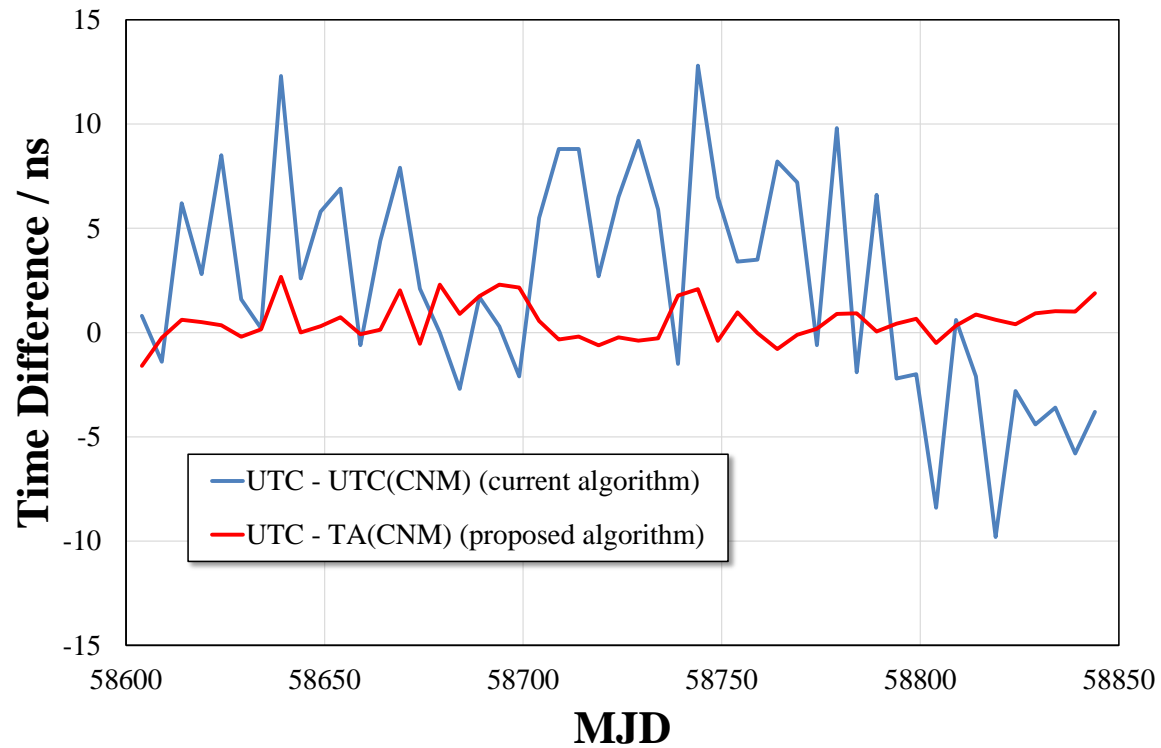
UTC - UTC(CNM) March 1996 - April 2022



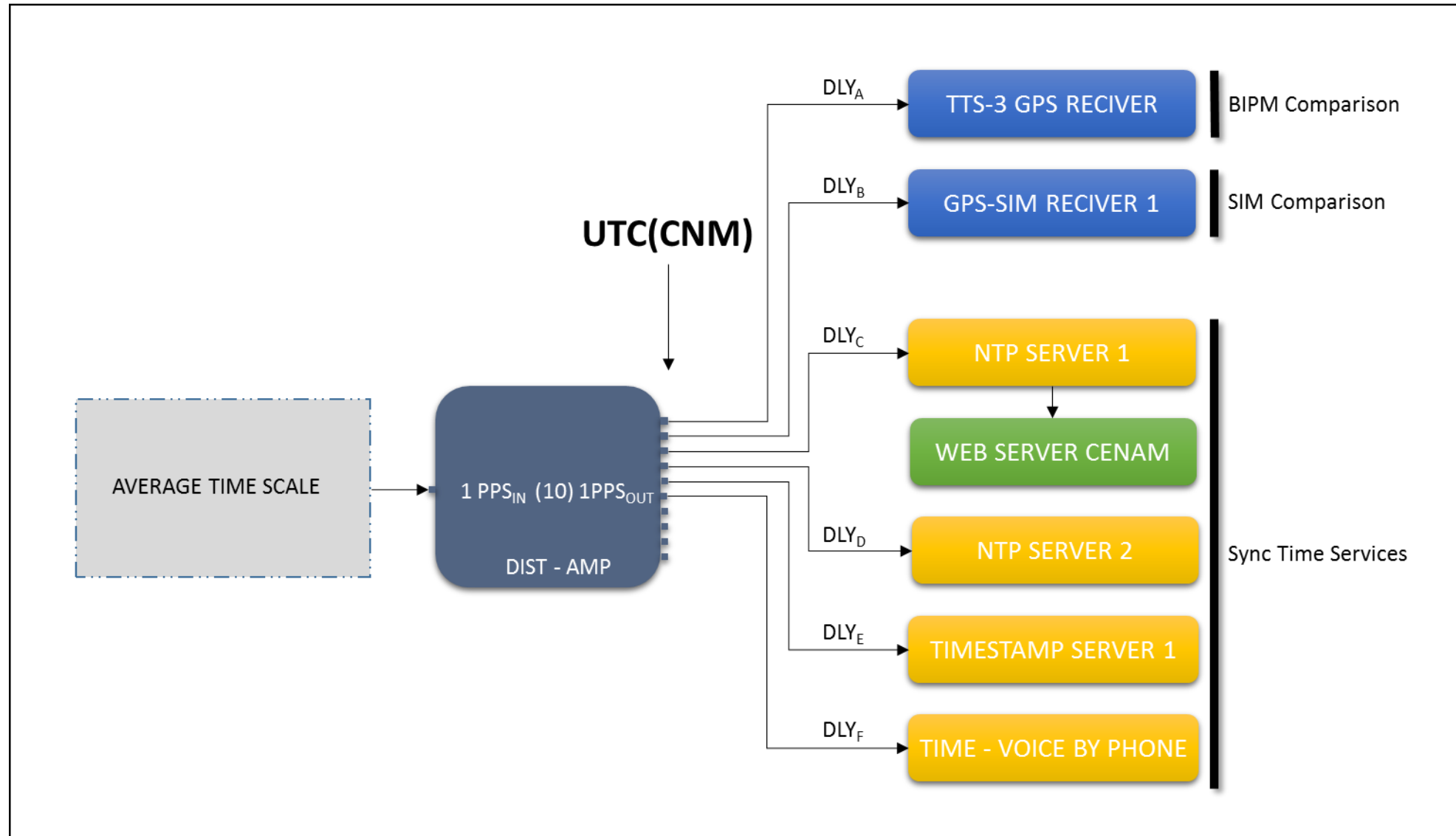


UTC - UTC(CNM) January 2000 - April 2022

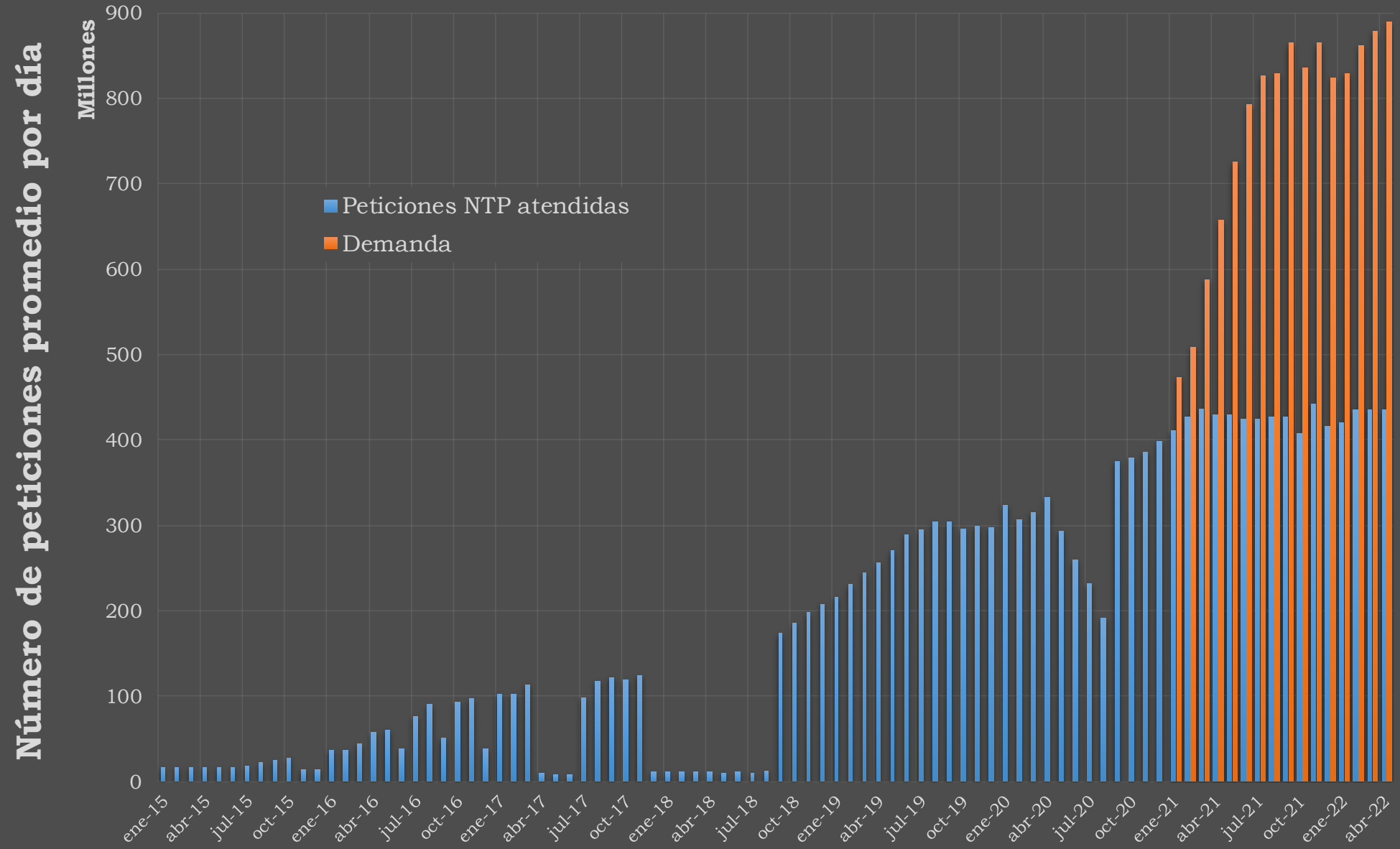




UTC(CNM) links and dissemination



Historial de peticiones NTP

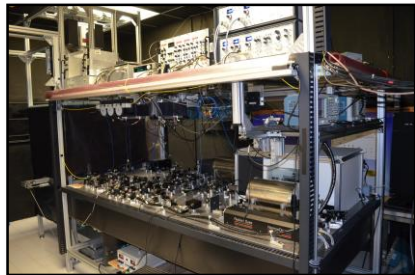


Primary Metrology

Time & Frequency



Averaged Time Scale



Primary Frequency Standard

Other time-dependent magnitudes



STANDARDS & REGULATIONS

OFFICIAL TIME, UTC (CNM)

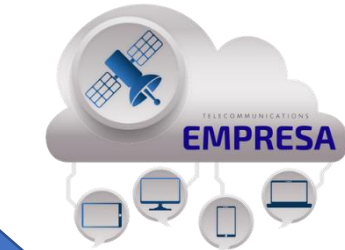


Certification Services Providers



18 million electronic invoices per day

Telecommunications companies



99 million synchronized mobile devices

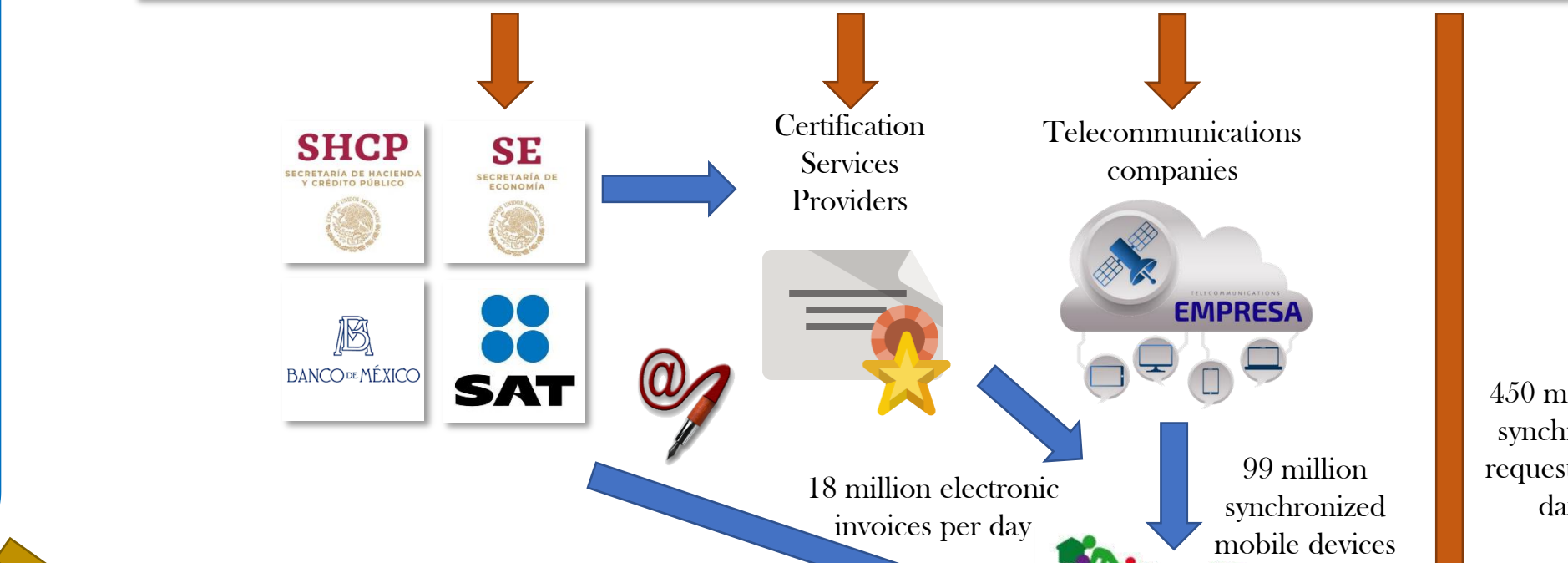
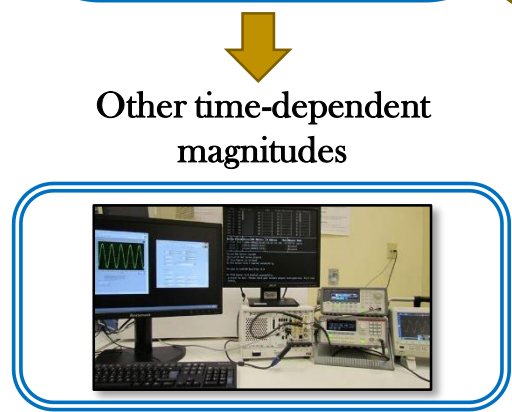
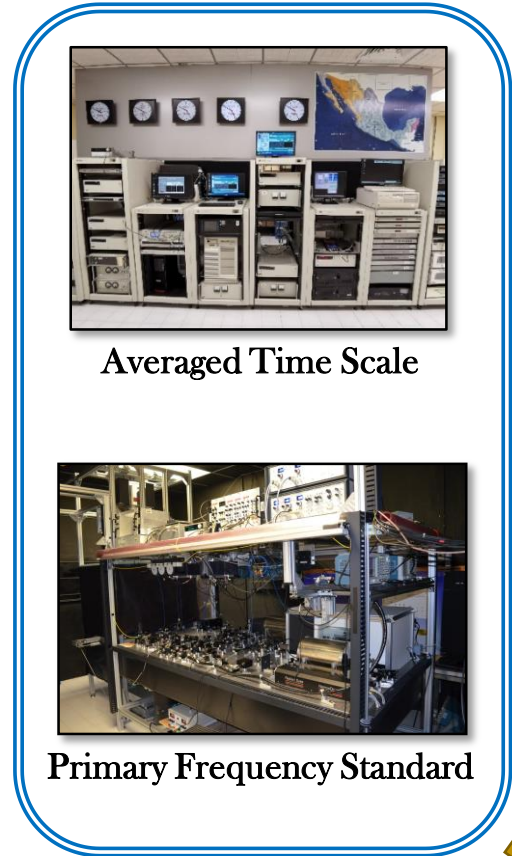
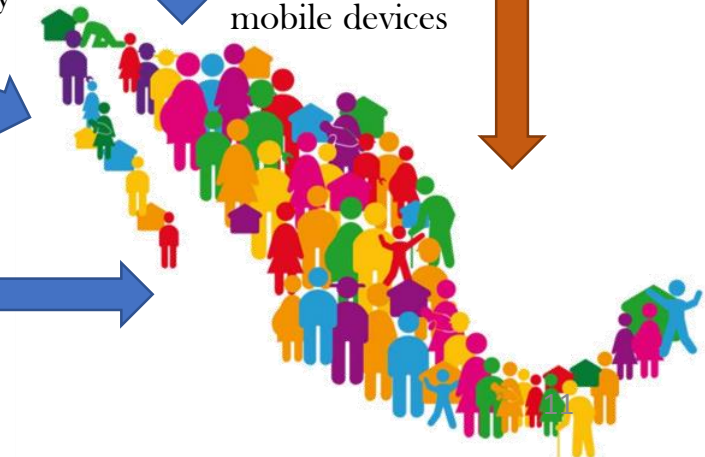
450 million synchrony requests per day

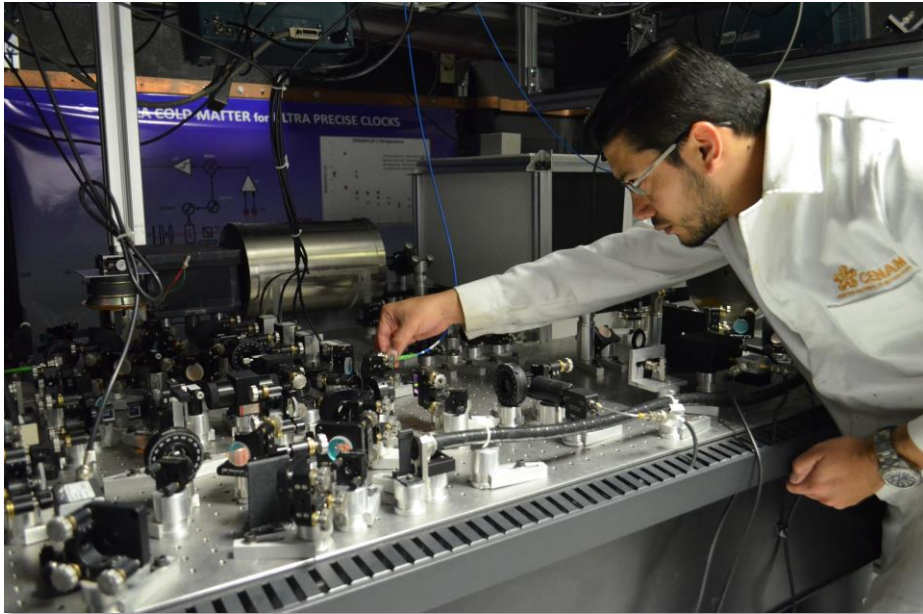
Calibration Secondary Laboratories

Accreditation

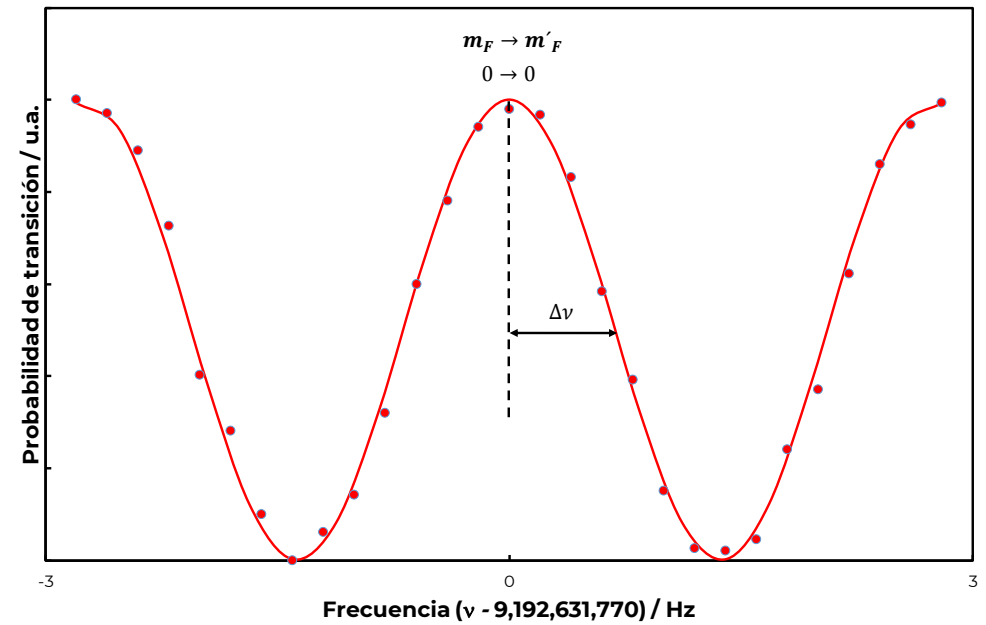
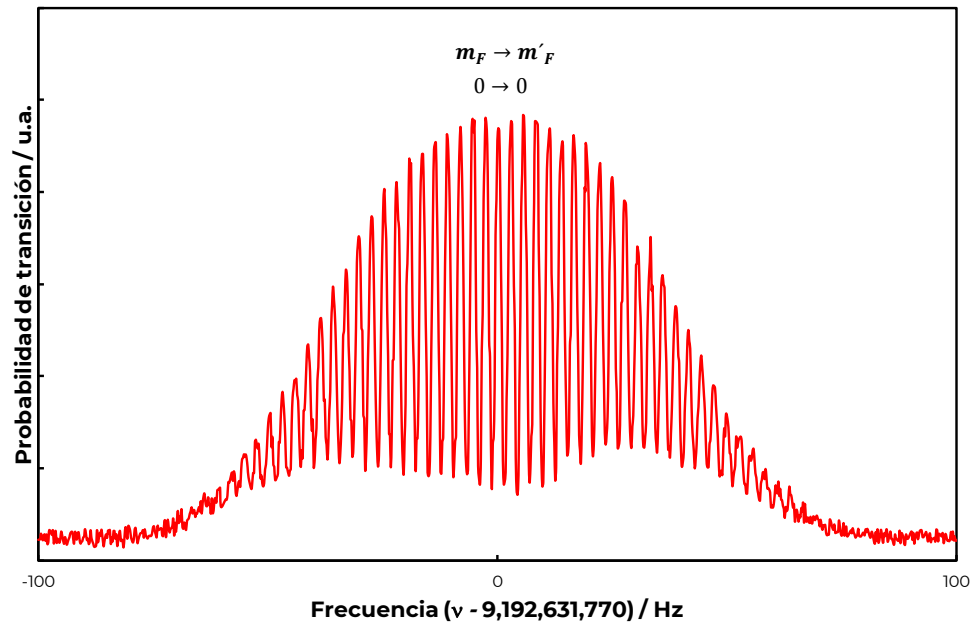


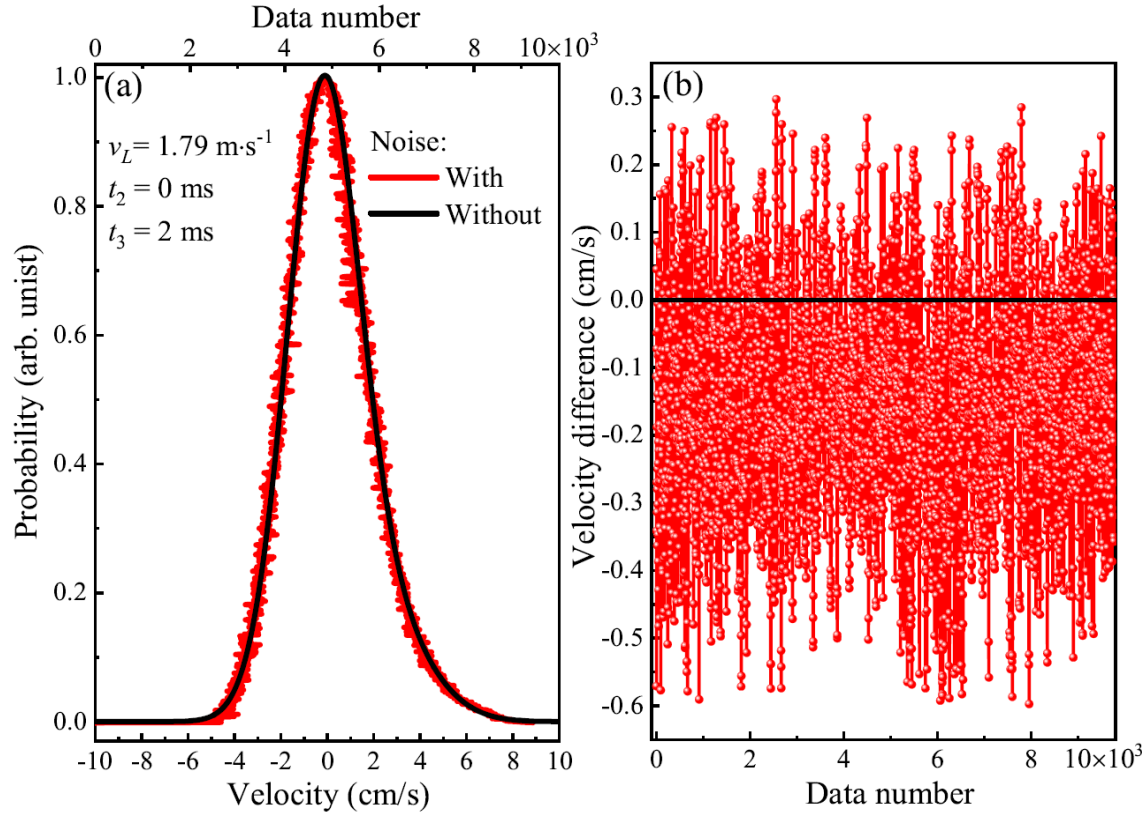
Industry





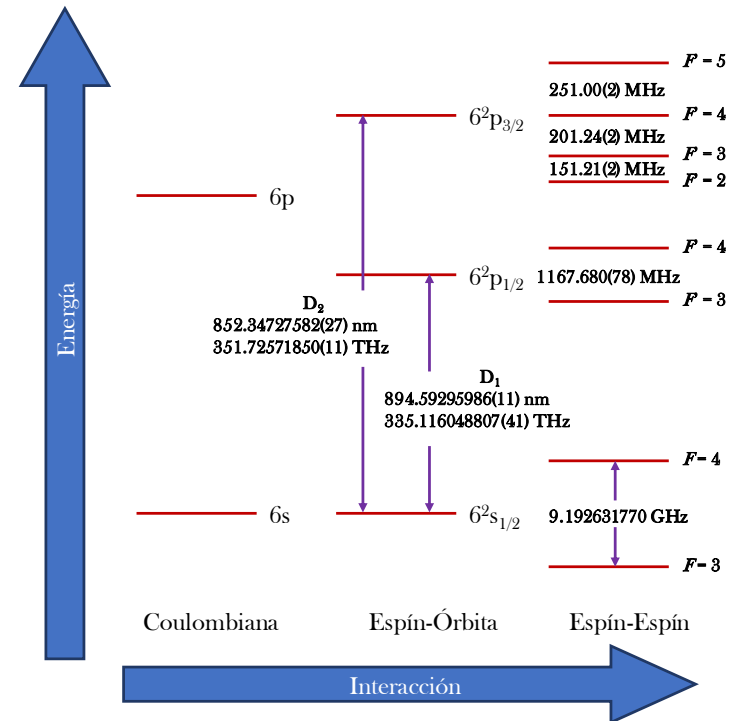
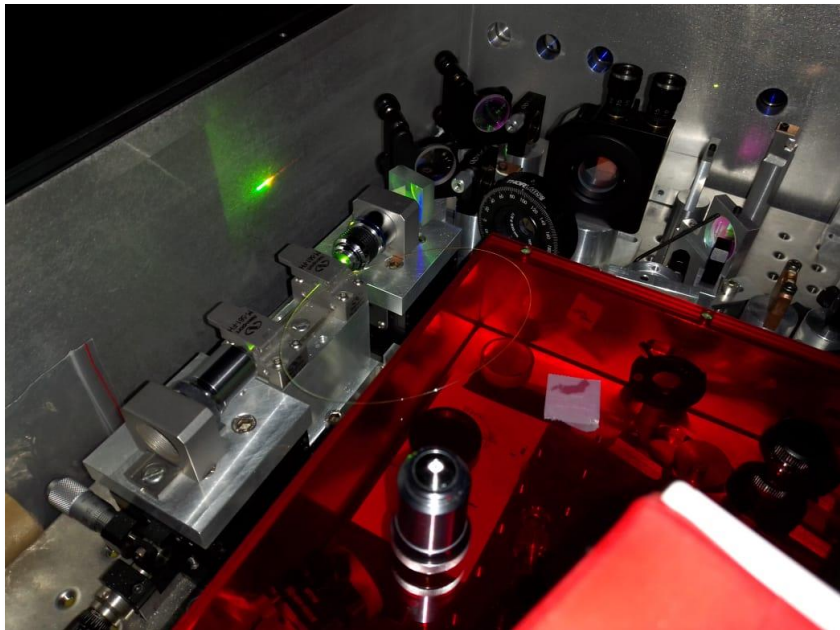
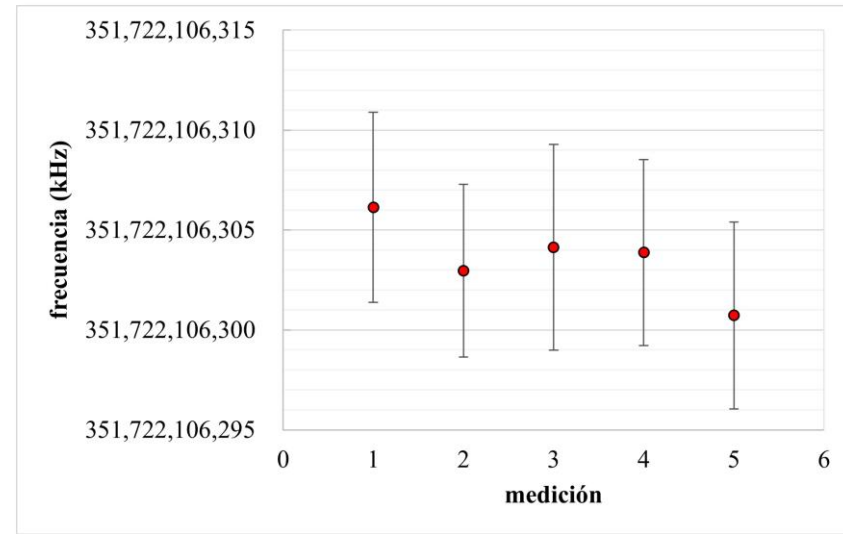
$$U = k[(2.2 \times 10^{-13} / \sqrt{\tau})^2 + (1.6 \times 10^{-15})^2]^{1/2}$$



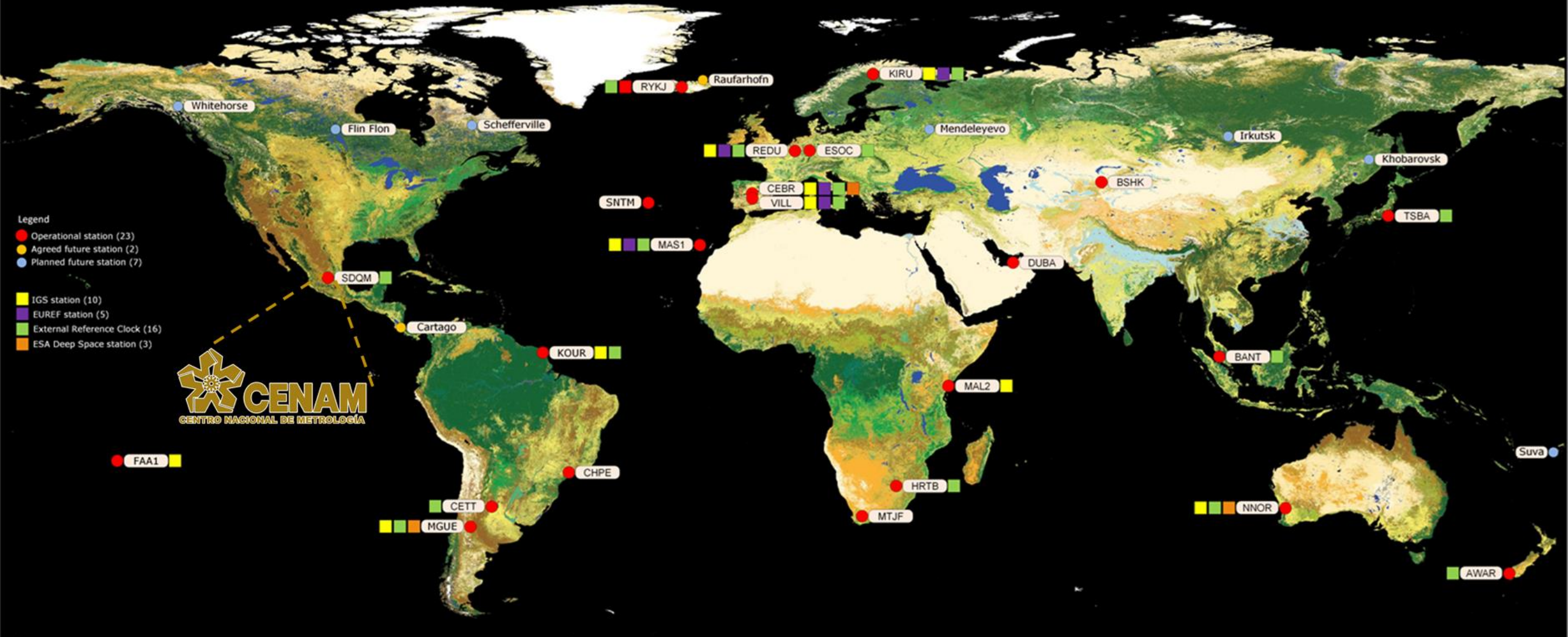


Accurate Temperature Measurement of Cold Atoms in Cesium Fountain Clocks

$v_L = 1.36 \text{ m}\cdot\text{s}^{-1}, t_2 = 0 \text{ ms}, t_3 = 4 \text{ ms}$			
	First Gaussian	Second Gaussian	Single Gaussian
Temperature (μK)	1.30	9.02	1.87
u_{SNR}	0.19	0.07	0.22
u_{beam}	0.05	0.02	0.06
u_{as}	0.01	< 0.01	0.01
u_{fit}	0.04	0.01	0.83
u_{PBP}		< 0.01	< 0.01
Total Uncertainty	0.20	0.07	0.86
$v_L = 1.79 \text{ m}\cdot\text{s}^{-1}, t_2 = 0 \text{ ms}, t_3 = 2 \text{ ms}$			
	First Gaussian	Second Gaussian	Single Gaussian
Temperature (μK)	3.81	7.13	4.80
u_{SNR}	0.14	0.10	0.17
u_{beam}	0.02	0.01	0.02
u_{as}	0.01	0.01	0.01
u_{fit}	0.07	0.05	0.27
u_{PBP}		< 0.01	< 0.01
Total Uncertainty	0.15	0.11	0.32







Mass dissemination of highly accurate time and frequency signals in Mexico

Towards a Synchrony National Network

Development of high accuracy time and frequency transfer systems:

- Satellite techniques
- Optical fiber
- Radio

