

PERFORMANCE EVALUATION OF THE SIM TIME SCALE IN THE LAST 10 YEARS

J. M López R.^{1,2}, M. Lombardi³, E. de Carlos L.², N. Diaz² and C. A. Ortiz C.^{1,2}

¹CINVESTAV, Libramiento Norponiente 2000, Querétaro, México

jm.lopez@cinvestav.mx

²CENAM, Carretera a los Cues km 4.5, Querétaro, México

³NIST, Boulder, Colorado, USA

Abstract

The Inter-American Metrology System (SIM) is one of the world's five major Regional Metrology Organizations (RMO's). Starting in 2005, the SIM Time and Frequency Metrology Working Group (SIM TFWG) developed a time and frequency comparison network for the Americas (SIMTN). Currently 23 NMIs from SIM region participate on the SIMTN. Since 2008 the SIM TFWG is producing a time scale called SIM Time Scale (SIMT). SIMT is an averaged time scale computed in near real-time (every hour) from time difference data that the SIMTN produces and publishes every 10 minutes. In this paper, a SIMT evaluation based on data from August 2016 to January 2018 is presented.

Index Terms

Time Scales, international comparison, atomic clocks.

INTRODUCTION

The measurement of time is of the utmost importance for many applications, including: global satellite navigation systems, communication networks, electric power transportation, astronomy, electronic transaction, and national defense and security. Both, the SIM Time Network (SIMTN) and the SIM Time Scale (SIMT) have led to better coordination and cooperation in the Americas in time and frequency metrology. The SIMT is believed to be the first multinational time scale whose results are computed and published in real time via the Internet, and 2018 will mark its 10-year anniversary. Within the SIM region, SIMT complements Coordinated Universal Time (UTC) by providing real-time support to operational timing and calibration systems. SIMT is sufficiently stable to measure the stability of most SIM local time scales and provides a good approximation of the UTC timing accuracy (± 10 ns). We show in this paper how the reliability, accuracy, and stability of SIMT has improved during its 10 years of operation.