



NGS

Electronic Distance Measuring Instrumentation Calibration Baseline Program Policy

Policy Document National Geodetic Survey National Ocean Service National Oceanic and Atmospheric Administration	
AUTHORIZED BY: <hr/> Director, National Geodetic Survey Juliana P. Blackwell	Tracking Number: NGS 2021-1208-01 Effective Date: 2/1/2021
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Official Policy Title: NGS Electronic Distance Measuring Instrumentation Calibration Base Line Program Policy

Tracking Number: NGS 2021-1208-01

Date Reviewed by ESC: January 19, 2021

Effective Date: February 1, 2021

Internal or External: External

Associated Procedures/Policies:

NOS NGS-8 Establishment of Calibration Base Lines

NOS NGS-10 Use of Calibration Base Lines

NGS Electronic Distance Measuring Instrumentation Calibration Base Line Program Procedures

Authority/Reference: none

Supersedes: NGS Electronic Distances Measuring Instrument Calibration Base Line Program Policy, 2017-1208-01

Review Schedule: 2 years

Responsible Office/Position: Geodetic Services Division's Instrumentation & Methodologies Branch/ Chief – Instrumentation & Methodologies Branch. The Geodetic Services Division Chief has the authority to approve procedures associated with this policy.

Purpose/Scope:

The National Geodetic Survey's (NGS) Electronic Distance Measurement Instrumentation (EDMI) Calibration Base Line (CBL) Program, hereafter referred to as the CBL Program provides support to the EDM I user community in establishing accurate and conveniently located CBLs for efficient, routine testing of equipment. These high-accuracy CBLs provide local access to the national standard for length. CBLs also provide the surveying and engineering community with a means to detect and quantify errors in EDM I.

NGS provides procedures documents for the EDM I user community regarding how to establish an EDM I CBL, how to use a CBL to test your EDM I and how to participate in the CBL Program. NGS provides the following procedures documents supporting these activities:

- NOS NGS-8 Establishment of Calibration Base Lines
- NOS NGS-10 Use of Calibration Base Lines
- NGS EDM I CBL Program Participation Procedures

NGS maintains a database of EDM I CBL data and metadata. Additionally, NGS provides software suitable for the establishment of CBLs and testing of EDM I.

All CBL data, procedures and related products are available on the CBL Program web page, found through <https://www.geodesy.noaa.gov/>.

Background:

Surveying and engineering professionals use CBLs to test their EDM before and/or after projects requiring accurate distance measurements. Not only is testing EDM good practice, in many cases the testing is legally required by statute or contractual agreement. Since the mid 1970's, NGS has collaborated with Federal, State and Local government agencies and institutions to establish over 400 CBLs, with at least one CBL located in every state. NGS maintains a database of these CBL data, making the data available by download at the CBL Program webpage.

In 2016 the NGS State Geodetic Advisor Branch transitioned into the NGS Regional Advisor Branch. The NGS State Geodetic Advisor Branch was an integral component of the previous CBL Program policy dated 10/02/2010. Additionally, NGS objectives to make the CBL Program more useful for the EDM community and sustainable into the future necessitated a change in this policy. The CBL Program policy was revised in 2017 for these reasons.

Definition of Terms:

Electronic Distance Measuring Instrumentation (EDMI) – A two-part system for measuring distances made up of 1) a light-wave-emitting device with a return signal interpreter and 2) a remote reflector or reflective surface; the former is the distance measuring part of a total station theodolite or tacheometer, but it is also found in modular and stand-alone devices.

Calibration Base Line (CBL) – A locally accessible standard for length realized as a series of four or more very stable survey marks set in accordance with NOS NGS-8 Establishment of Calibration Base Lines. Distances between all combinations of marks are determined very accurately and traceable to the National Institute of Standards and Technology.

Electronic Distance Measurement Instrument Calibration Base Line Policy:

The National Geodetic Survey (NGS) will serve the high-precision needs of the U.S. surveying and engineering communities by providing a CBL database, procedures documents and software for the establishment and use of CBLs. Additionally, NGS will provide technical support to those who wish to participate in the NGS EDM CBL Program.

In support of the NGS EDM CBL Program, NGS will:

- Maintain a minimum of one CBL per state
- Provide software and procedures for the EDM community to maintain and establish additional CBLs in each state
- Provide software and procedures suitable for testing EDM over a CBL
- Maintain a database of CBL data accessible through the NGS EDM CBL webpage

The NGS EDM CBL Program is voluntary.

RECORD OF REVIEW AND CHANGES

This policy is a living document that is reviewed every two years. It will be updated, when appropriate, to reflect changes in controlling Federal policies, organizational strategic goals/objectives, technology, or other matters that may have an impact on this policy. Modifications made to this document are recorded in the below table. This record shall be maintained throughout the life of the document.

Version Number	Date	Section/ Page Affected	Summary of Change or Annual Review	Author / Reviewer
1.0	3/7/2017	All	New Document	Kendall Fancher, Steven Breidenbach, Charles Geoghegan
1.0	1/19/2021	n/a	All pages were reviewed. No edits were necessary from the previous version.	Kendall Fancher, Steven Breidenbach, Charles Geoghegan