Michigan State Police
Crash Data
Process for Generating
Geospatial Crash Location
In Latitude and Longitude Coordinates

Introduction

The purpose of the document is to briefly summarize how crash events are located in the field and then assigned a location on the Michigan Geographic Framework (MGF) road centerline network.

Two public agencies work collaboratively to create latitude and longitudinal coordinates for each crash which results in the final release of the yearly crash data. These two agencies are the Michigan State Police (MSP) office of Traffic Records and the Michigan Center for Shared (CSS). Creation of these crash coordinates provides end users with the crash location in a data model (point data) that is more flexible and more broadly understood.

Background

Starting with the 2005 crash database the latitude and longitude coordinates (reported in decimal degrees) were added to the database to locate each crash reported using the UD-10 Traffic Crash Report or the UD-10E Electronic Crash Report. The crash location is generated by recording the crash event relative to the nearest public road intersection or signed mile point by the officer of record; the officer includes the crash location as part of the completing the UD-10 form. While in the end, geographical coordinates are assigned to a crash, the location process is truly dependent on the officer's description. It is important to stress that the officer's description is the key ingredient in this process. Providing coordinate data alone will not suffice as the Physical Road Number (PR), mile-point, intersecting road, intersection ID, comprise the full set of data deemed in the crash systems as supporting a located crash.

For example, the officer would report that the crash occurred on Oak Street 100 feet east of the intersection of Maple and Oak Street in Oakland County. Since both Maple and Oak streets are included in the Michigan Geographic Framework (MGF) road system they each have a physical reference number (PR #). In addition the crash location may also be referenced using intersecting road, mile-point and/or by intersection ID. The MGF for the road system was created and is maintained by Center for Shared Solutions. The MGF is a spatial model which digitally represents the centerlines for all public roads and also includes a linear referencing system or LRS.

Crash Data Migration to Public Roads

As new versions of framework are published annually, the Michigan State Police provide crash data tables to CGI. CGI then migrates these crashes to the appropriate version of MGF and then generates the crashes in latitude and longitudinal coordinates (decimal degrees). This is achieved using an Arc Macro Language (AML) and the dynamic segmentation algorithm to locate the crashes using the statewide framework attribute of PR# routes among other with locational elements of the MGF. The resulting coordinates are processed using the projection of the Michigan framework which relies on the Michigan GeoRef projection and generating Lat-Long coordinates. The details for the both the Geographic Coordinate System and Projection Coordinate System are provided below.

Process Publication Review

1) Sydney Smith, Manager
Traffic Crash Reporting Section
Michigan State Police
P.O. Box 30634
333 South Grand Avenue
Lansing, Michigan 48909
Tx: (517) 241-1750
Fax: (517) 241-1644
smiths57@michigan.gov

2) Brian Sine
Information Technology Programmer Analyst 12
Michigan Dept. of Technology, Management & Budget
Traffic Crash Reporting System
Van Wagoner Building
425 West Ottawa Street
P.O. Box 30050
Lansing, Michigan 48909
Tx: (517) 373-8589
Fax: (517) 241-0751
sineb@michigan.gov

3) Alicia Sledge
Traffic Records Program Coordinator
Office of Highway Safety Planning
333 South Grand Avenue
P. O. Box 30634
Lansing, MI 48909
(517) 241-1505 phone
(517) 241-2501 fax
Sledgea@michigan.gov

Distribution

Best Practices – CMISST Site (www.cmisst.org site)

Best Practice/Crash Data Information - MTCF Site (http://www.michigantrafficcrashfacts.org)

Version 1 (May 2013)

Glossary

UD-10

"The paper UD-10 Traffic Crash Report is a two-sided form designed to capture information about a motor vehicle crash. Each form is designed to capture information pertaining to two units, two injured passengers and up to four uninjured passengers. If there are more than two units involved in a crash additional forms will need to be submitted. In this case, a Serial Override number, will be used on the additional forms. The Electronic Traffic Crash Report is a means designed to capture information about a motor vehicle crash. Each report is designed to capture information pertaining to unlimited number of units and injured/uninjured passengers."

UD-10 Traffic Crash Report Manual, Michigan Department of the State Police, May 2012, full document available at : http://www.michigan.gov/documents/UD-10_Manual_2004_91577_7.pdf

Linear Referencing System (LRS)

"Another type of LRS uses unique names (or numbers) for all the different lines (roads), and distance or length measurements..,. The locations of observations or events (such as crashes) along linear features (such as highways, rivers, railroads or pipelines) can be recorded using a standard LRS, and thus enable the display the data on maps and analysis by Geographic Information Systems.
Adapted from the Michigan Geographic Framework Program and Prospectus updated May 25, 2012 (MGF Version 12) full document available at: www.michigan.gov/documents/cgi/framework_product_documentation_2012_402068_7.pdf.

Center for Shared Solutions
http://www.michigan.gov/cgi

Michigan GeoRef
Additional information for map projections is available at:
http://www.michigan.gov/documents/DNR_Map_Proj_and_MI_Georef_Info_20889_7.pdf
Projected Coordinate System: *Michigan_Georef_NAD83_meters*
Projection: Hotine_Oblique_Mercator_Azimuth_Natural_Origin
False_Easting: 2546731.49600000
False_Northing: -4354009.81600000
Scale_Factor: 0.99960000
Azimuth: 337.25556000
Longitude_Of_Center: -86.00000000
Latitude_Of_Center: 45.30916667
Linear Unit: Meter
Geographic Coordinate System: *GCS_North_American_1983*
Datum: D_North_American_1983
Prime Meridian: Greenwich
Angular Unit: Degree
E:\CGI_Framework9_10_11_recNov11\Lat_longGeneartion_CrashData

Authors:

Michelle A. Barnes, BSCE, MPA, MS-GIS
Senior Research Engineer
University of Michigan Transportation Research Institute
2901 Baxter Road
Ann Arbor, MI 49109
mbarnes@umich.edu
Direct Line: 734-647-5492D

Joshua L. Ross
Geographic Framework Analyst
Michigan Department of Technology, Management & Budget
Center for Shared Solutions
(517) 241-8840