

Upper Valley Transverse Mercator (UVTM) Coordinate Reference System

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The Upper Valley Transverse Mercator (UVTM) coordinate reference system (CRS) is a spatial reference system used to project geographic data for maps of the Upper Valley region on the border between the US states of Vermont and New Hampshire. The need for a standard, well-defined spatial reference system for this region comes from the following pair of circumstances:

- The region has a distinct shared identity that crosses state boundaries, with many cross-border institutions and socioeconomic connections, including the oldest inter-state school districts in the United States. Thus, there is a consistent demand for cartographic services using data covering both halves of the region.
- Existing commonly used spatial reference systems split the region between multiple zones. In the Universal Transverse Mercator (UTM) CRS it is divided between zones 18 and 19, and in US State Plane CRS it is divided between zones for Vermont and New Hampshire. The two neighboring UTM zones both have central meridians (75° and 69° West) that lie beyond the borders of the two states. Thus, mapping the region on both sides of the Connecticut River in any one of these existing coordinate systems involves more severe cartographic distortion than would be found in a new CRS centered on the region itself (Figure 1 and Figure 2).

In response, UVTM was developed at Dartmouth College in the early 2010s, and published on SpatialReference.Org on 21 February 2017. It is identical to the standard UTM zones, but with a central meridian of 72° West Longitude (the edge between UTM zones 18 and 19), and uses the North American Datum of 1983.

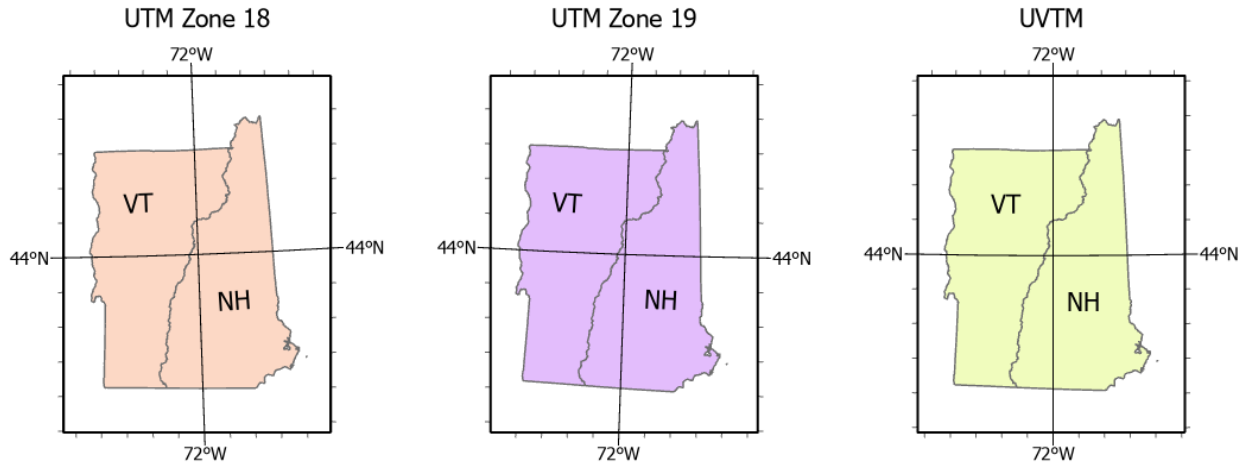


Figure 1. Comparison of UTM zones 18 (left) and 19 (center), and UVTM (right).

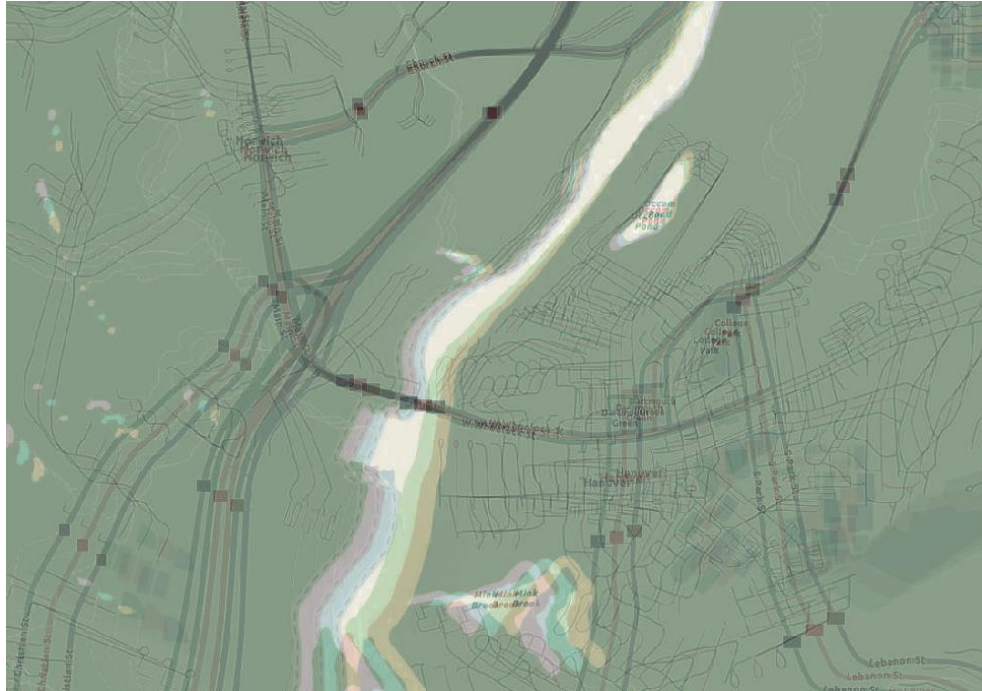


Figure 2. Color composite created by projecting a map of the Hanover, NH area into UTM zone 18 (blue), UTM zone 19 (green), and UVTM (red).

Technical specifications for the UVTM CRS are provided below:

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PROJCS["UVTM",
  GEOGCS["NAD83",
    DATUM["North_American_Datum_1983",
      SPHEROID["GRS 1980",6378137,298.257222101,
        AUTHORITY["EPSG","7019"]],
      AUTHORITY["EPSG","6269"]],
    PRIMEM["Greenwich",0,
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      AUTHORITY["EPSG","9122"]],
    AUTHORITY["EPSG","4269"]],
  UNIT["metre",1,
    AUTHORITY["EPSG","9001"]],
  PROJECTION["Transverse_Mercator"],
  PARAMETER["latitude_of_origin",0],
  PARAMETER["central_meridian",-72],
  PARAMETER["scale_factor",0.9996],
  PARAMETER["false_easting",500000],
  PARAMETER["false_northing",0],
  AUTHORITY["Custom"],
  AXIS["Easting",EAST],
  AXIS["Northing",NORTH]]

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