



# Lining Up Your Data in ArcGIS

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DEVELOPER SUMMIT



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An abstract graphic featuring a stylized globe in the upper left corner, composed of various shades of blue, yellow, and red. The globe is surrounded by a network of lines and dots, suggesting a data map or a global network. The background is a solid blue color.

# My data is everywhere except...

Palm Springs Downtown Map Demo



An abstract graphic featuring a stylized globe in the upper left corner, composed of various colored segments (red, yellow, blue, green). Below the globe, there are several small, colorful dots (red, blue, green) scattered across the background. The background is a solid blue color. The text "My data has unknown coordinate system" is written in white, bold, sans-serif font, centered in the upper half of the image. Below it, the text "Palm Springs Downtown Map Demo" is written in a smaller, teal-colored, sans-serif font.

# My data has unknown coordinate system

Palm Springs Downtown Map Demo

An abstract graphic featuring a stylized globe in the center, surrounded by vibrant, flowing lines in shades of blue, yellow, and red. The background is a gradient of blue and teal. The text is centered over the globe.

# Filter and search for the predefined coordinate systems

Palm Springs Downtown Map Demo

An abstract graphic featuring a stylized globe in the upper left corner, composed of various shades of blue, yellow, and red. The globe is surrounded by a network of lines and dots, suggesting a data visualization or a map. The background is a solid blue color with a subtle gradient.

# What if my data is defined with incorrect coordinate system...

Palm Springs Downtown Map Demo

An abstract graphic featuring a stylized globe in the upper left corner, with a map of the United States in the lower left corner. The globe is composed of various colored segments (blue, green, yellow, red) and is surrounded by a network of lines. The map shows the outline of the United States with internal state boundaries. The background is a solid blue color.

# Missing transformation and how to select the right one

Palm Springs Downtown Map Demo






# Selecting the right projected coordinate system for my map

Palm Springs Downtown Map Demo







# Creating a custom projected coordinate system for my map

Palm Springs Downtown Map Demo



An abstract graphic featuring a stylized globe in the upper left corner, rendered in shades of blue, yellow, and red. The globe is surrounded by flowing, wavy lines in blue, yellow, and red. The background is a solid blue gradient. The text is centered in the middle of the image.

# I don't know which projection and what parameter values I should use

Palm Springs Downtown Map Demo



# How to use Project tool?

Palm Springs Downtown Map Demo







# My data also has heights...

NY Financial District Scene Demo





# Selecting a vertical coordinate system for the scene

NY Financial District Scene Demo





# Transforming vertical data

NY Financial District Scene Demo





# ArcGIS Coordinate Systems Data

Product Components

- Data and Content **3**
- Apps
- Database Support Files
- Developer Tools
- Language Packs

Media

- Download ISO Files
- Request Media

**Access to Coordinate Systems**

**Navigate to MyEsri**  
**Select My Organizations**  
**Downloads**  
**Data and Content**

Language: English

esri ArcGIS Industries About Support

My Esri

- Dashboard
- My Profile
- My Organizations **1**

Overview Transactions Licensing **Downloads**

Select the items below that you want to download.

coordinate systems X Sort By: Files

**2** Files Product Version

ArcGIS Coordinate Systems Data ArcGIS Pro	<a href="#">Additional Information</a>	2.1	920.81 MB	<a href="#">Download</a>
ArcGIS Coordinate Systems Data ArcGIS Desktop	<a href="#">Additional Information</a>	10.6	920.81 MB	<a href="#">Download</a>
ArcGIS Coordinate Systems Data ArcGIS Desktop	<a href="#">Additional Information</a>	10.5	903.16 MB	<a href="#">Download</a>
ArcGIS Coordinate Systems Data ArcGIS Desktop	<a href="#">Additional Information</a>	10.5.1	902.99 MB	<a href="#">Download</a>
ArcGIS Coordinate Systems Data ArcGIS Enterprise (Windows)	<a href="#">Additional Information</a>	10.5	903.16 MB	<a href="#">Download</a>
ArcGIS Coordinate Systems Data ArcGIS Enterprise (Windows)	<a href="#">Additional Information</a>	10.5.1	902.99 MB	<a href="#">Download</a>
ArcGIS Coordinate Systems Data ArcGIS Enterprise (Windows)	<a href="#">Additional Information</a>	10.6	920.81 MB	<a href="#">Download</a>

# ArcGIS Coordinate Systems Data

- 2 GB additional data install

- GEOCON / NADCON 5 (US)
- NTv2 (AU, BE, CA, IS, NL, ES, CH, UK)
- NADCON (SK)

Geographic  
Transformations

- VERTCON (US)
- Geoids (AU, JP, NZ, SI, CH, US)
- EGM2018 (world)

Vertical  
Transformations

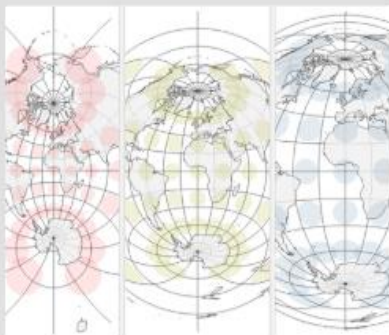
# Resources

- ArcGIS Pro and ArcGIS Desktop Online Documentation  
<https://esriurl.com/ArcGISPro-coordinate-systems-and-projections>  
<https://esriurl.com/ArcGIS-desktop-coordinate-systems-and-projections>
- Don't forget the Knowledge Base / Technical Articles!  
<http://esriurl.com/11518>
- Map Projections Learning Path  
<https://learn.arcgis.com/en/paths/map-projections>
- Make a Web Map without Web Mercator Lesson  
<https://learn.arcgis.com/en/projects/make-a-web-map-without-web-mercator>



# Map projections

Explore different ways to project the round earth onto a flat map.



## Choose the right projection

Learn some tips for choosing an appropriate projected coordinate system for your map.

🕒 1 hr

🌐 Lesson

1



## Earth peel

Illustrate map projections by peeling a digital orange in ArcGIS Pro.

🕒 10 min

🌐 Article

English Only

3

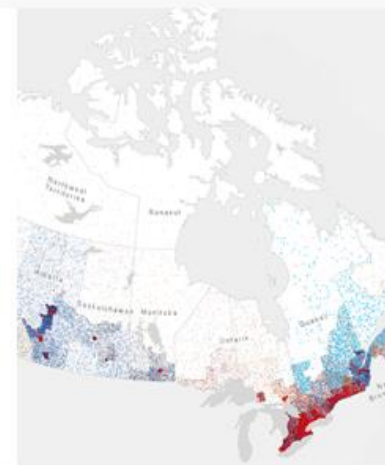
## Mercator, it's not hip to be square

The purpose and problems of the Mercator projection and some methods for replacing it in web maps.

🕒 30 min

🌐 Article

English Only



# Make a web map without Web Mercator

Make web maps with projections other than Web Mercator. Build and publish vector tiles from ArcGIS Pro to make a basemap in a chosen projected coordinate system.

Duration

🕒 50mins

Mapping

Education

As a GIS consultant in Bogotá, Colombia, you make web maps for clients, all with different needs. You have two upcoming projects that require you to make web maps with specific projections—not the default of Web Mercator.

In this lesson, you'll learn how to change the projection of a web map by changing the basemap. You'll also learn how to make your own basemap in ArcGIS Pro with a coordinate system of your choice, which you can then use to build projected web maps.

[View final result](#)

## Requirements

- Publisher or Administrator role in an ArcGIS organization (get a [free trial](#))
- ArcGIS Pro (get a [free trial](#))

## Lesson Plan

### Make an equal-area web map

Choose a projected basemap for web maps.

10 minutes

### Make a custom basemap

Build a custom basemap in ArcGIS Pro with a projection for Bogotá, Colombia.

25 minutes

<https://learn.arcgis.com/en/projects/make-a-web-map-without-web-mercator>

# Esri Projection Engine Database Documentation

The Esri Projection Engine (PE) libraries deal with coordinate reference systems and their projections and transformations, as well as providing many support functions such as calculating distances and areas, converting between lat/lon notations, importing/exporting objects from/to well-known text (WKT) strings, converting from/to well-known ID (WKID) values, etc.

To perform WKID conversion, the PE contains a comprehensive database of known coordinate systems, datums, ellipsoids, units, etc. This database is regularly updated and kept in sync with the EPSG database.

This documentation is based on ArcGIS Desktop version 10.8.1 (ArcGIS Pro version 2.6). Entries taken from EPSG are from the 9.8.6 version of the EPSG database.

## Contents

Documentation files are found in the following directories:

Directory	Contents	Filenames

## About

This repository documents the contents of the Projection Engine factory database and describes how to add user-provided entries to it.

Readme

Apache-2.0 License

## Releases

6 tags

[Create a new release](#)

## Packages

No packages published

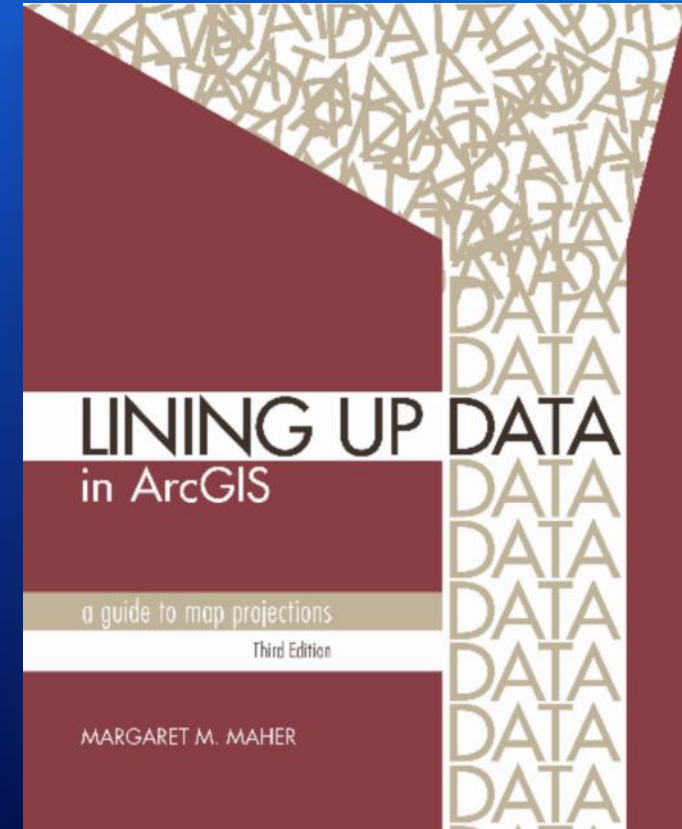
[Publish your first package](#)

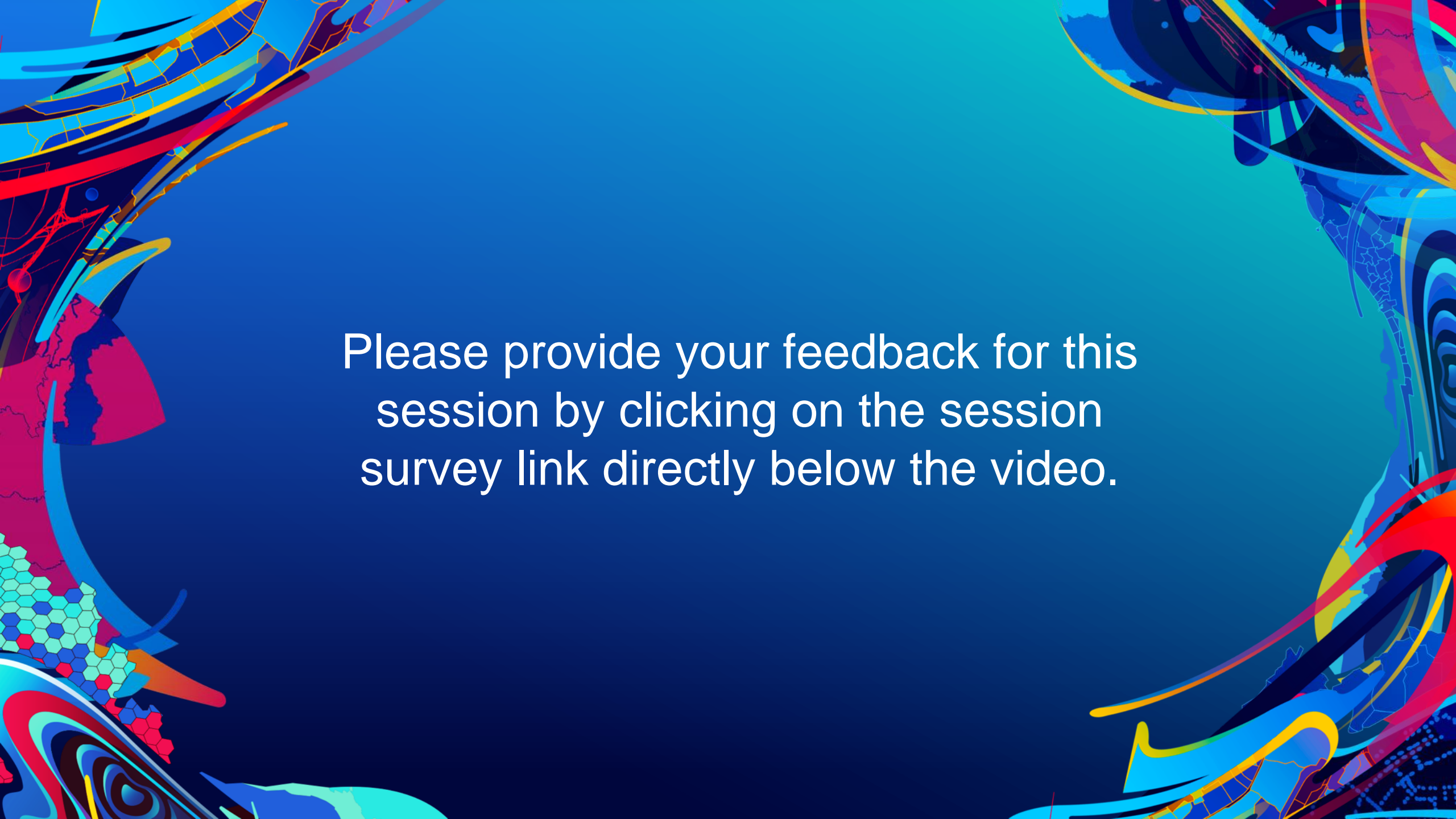
<https://github.com/Esri/projection-engine-db-doc>



# Resources

- Esri Projection Engine Database Documentation  
<https://github.com/Esri/projection-engine-db-doc>
- EPSG Geodetic Parameter Dataset ([epsg.org](https://epsg.org))
  - *Database of coordinate systems & transformations*
  - *Check Guidance Note 7-2 for formulas*
- GeoNet Community for user-to-user help  
<https://community.esri.com>
- Lining Up Data in ArcGIS: A Guide to Map Projections  
by Margaret M. Maher





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