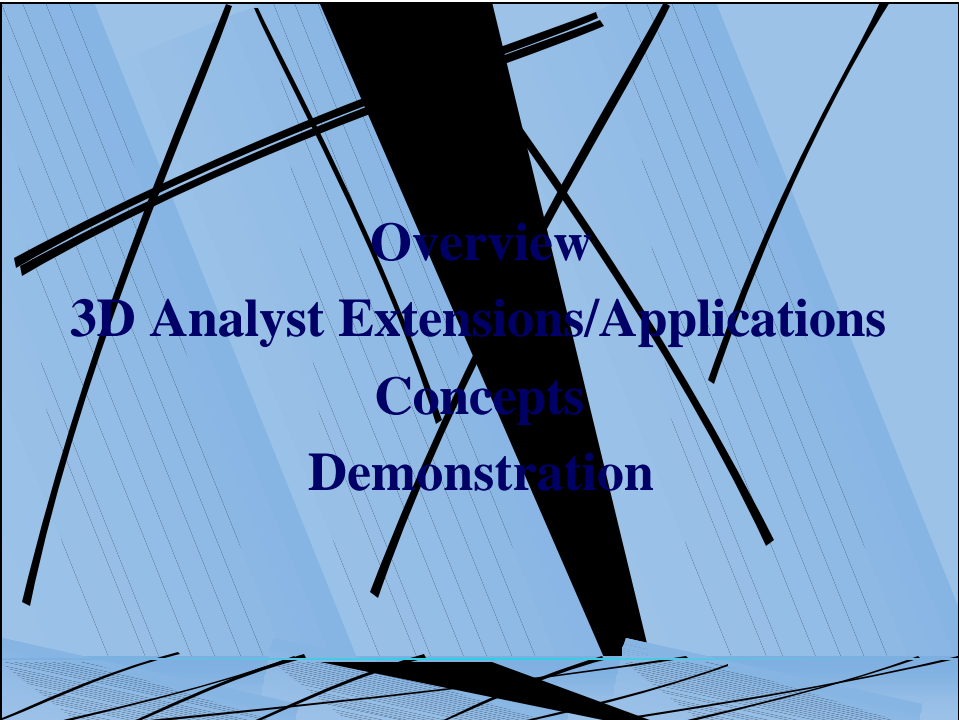


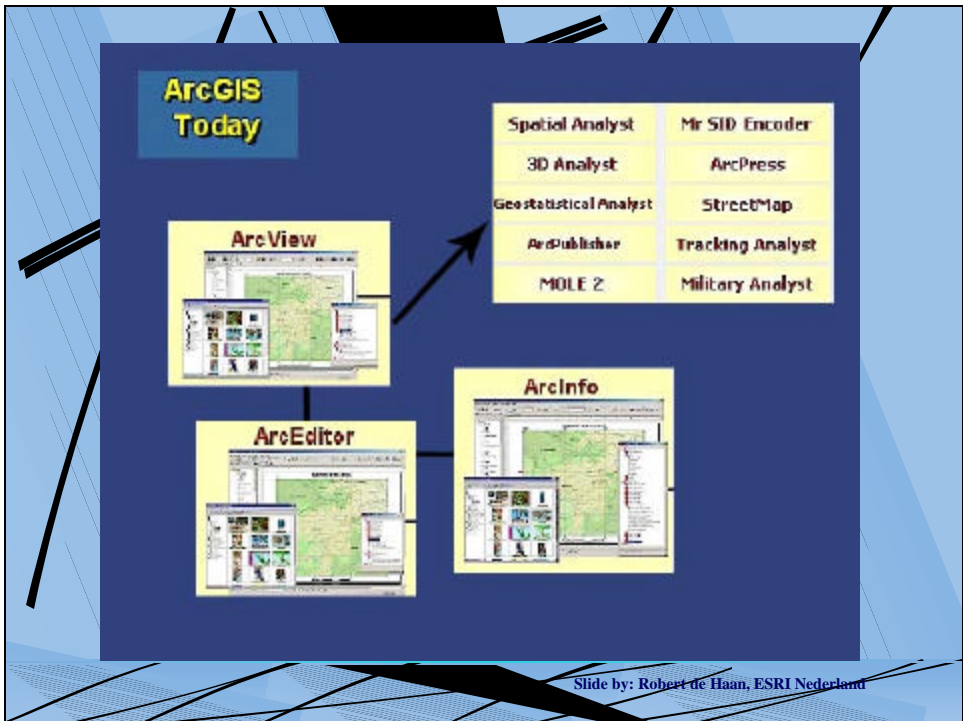
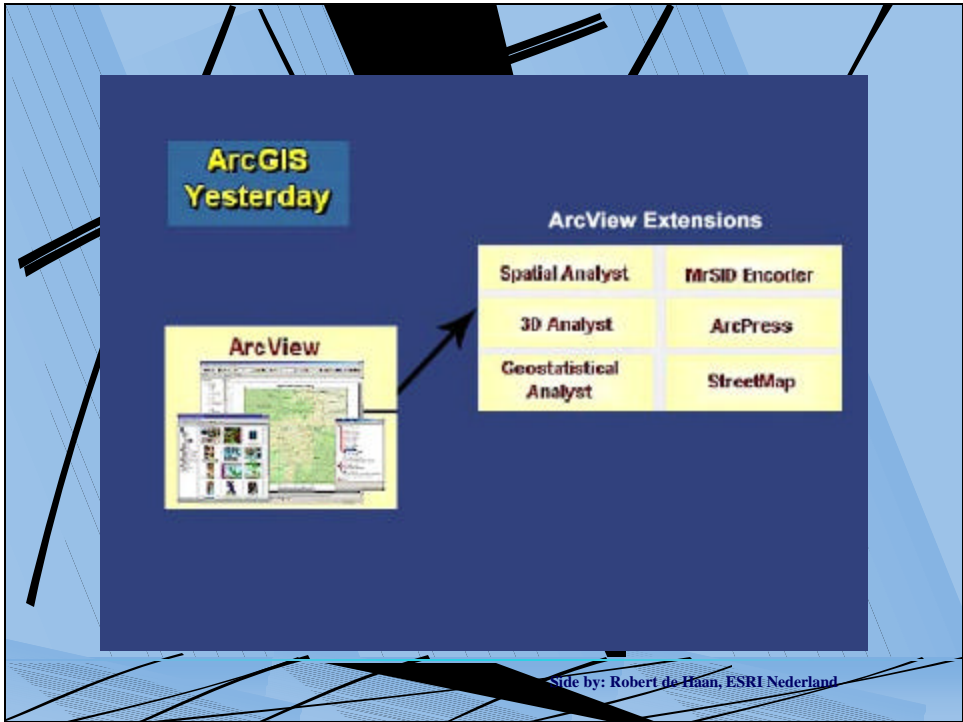
The slide features a blue background with a central black vertical bar and several black diagonal lines. A small globe icon is positioned to the left of the main title.

# ArcGIS 3D Analyst

by  
Jackie Rosenstern

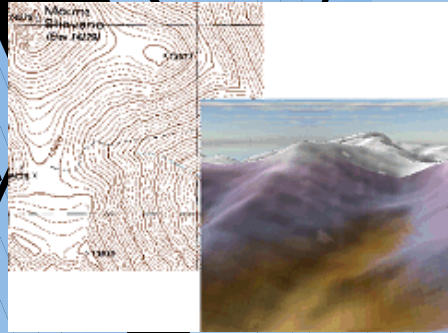
The slide features a blue background with a central black vertical bar and several black diagonal lines, matching the design of the title slide.

**Overview**  
**3D Analyst Extensions/Applications**  
**Concepts**  
**Demonstration**



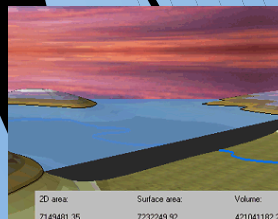
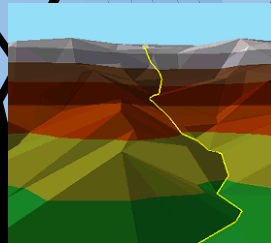
# 3D Maps and 3D Analyst

- 3D mapping makes it easier to interpret data



# 3D Maps and 3D Analyst

- Combine 3D mapping with GIS and you can perform many types of analysis – e.g.:
  - Finding steepest path down a hill
  - Calculating the volume of water a reservoir can hold



## 3D Analyst defined:

- **3D Analyst is the three-dimensional (3D) visualization and analysis extension to ArcGIS**

## 3D Analyst Extension

- **Allows for a 2D surface to be built into a 3D Model**



## 3D Analyst Applications:

- **ArcScene**
- **ArcMap**
- **ArcCatalog**

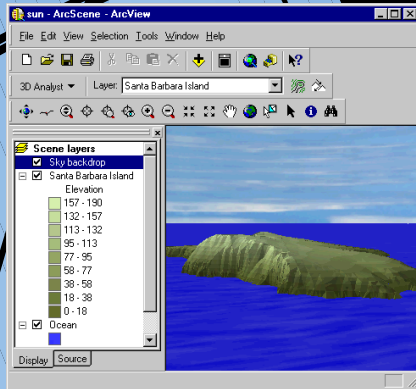
## 3D Analyst Applications:

- **ArcScene**
  - **New and Unique to 3D Analyst**
- **ArcCatalog & ArcMap**
  - **3D Analyst extension is enabled**

# ArcScene

- Provides the interface for:

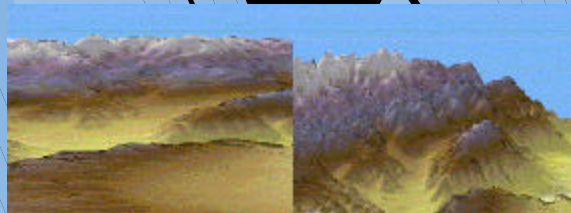
- Viewing multiple layers of 3D data
- Visualizing data
- Creating surfaces
- Analyzing surfaces



- ArcScene documents end with a .sxd extension

# Visualizing Data

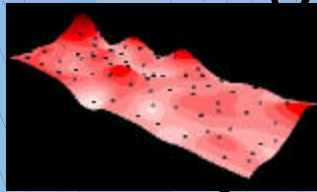
Vertical dimensions of a scene exaggerated



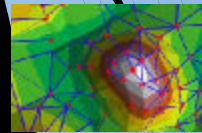
- 3D Analyst lets you drape images or vector data over surfaces and extrude vector features from a surface to create lines, walls, and solids.

## Creating Surfaces

- Create surface models from your GIS data
  - You can interpolate raster surfaces and create or add features to TIN surfaces



raster surface



TIN surface

## Concepts:

### ● Raster Data

- A raster is an array of equally-spaced cells, or pixels, which taken as a whole represent a thematic map or an image
- 3D Analyst uses the cell values stored with your raster data to display it in 3D

### ● Triangulated Irregular Networks (TIN)

- Represents space using a set of non-overlapping triangles that border one another and vary in size and proportion



## Analyzing Surfaces

- 3D Analyst lets you interactively query the values in a raster surface and the elevation, slope, and aspect of TINs

You can:

- Derive new rasters of slope from surface models
- Derive new rasters of aspect from surface models
- Create contours
- Find the steepest paths on a surface
- Analyze the visibility between different locations on a surface
- Create rasters that show the level of illumination on a surface (given a sun altitude and direction)
- Reclassify raster data for display, analysis, or feature extraction purposes

## Tools unique to ArcScene (and 3D navigation in ArcCatalog)



Navigate - rotate your data with the Navigate tool



Fly - dynamic way to explore your data, since the target and observer coordinates continually change while you fly over the data



Zoom In/Out - to control the distance between a target and observer



Center on Target



Zoom to Target

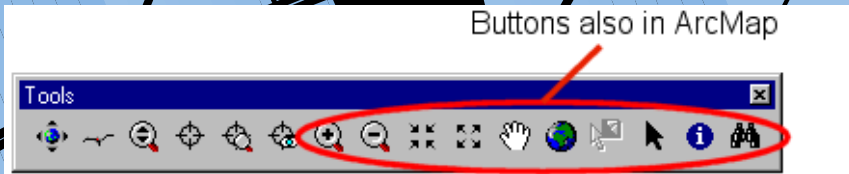


Set Observer



## Toolbar

Buttons also in ArcMap



Narrow Field of View button



Expand Field of View button



Pan tool - used to move your data horizontally, vertically, or diagonally across the scene display



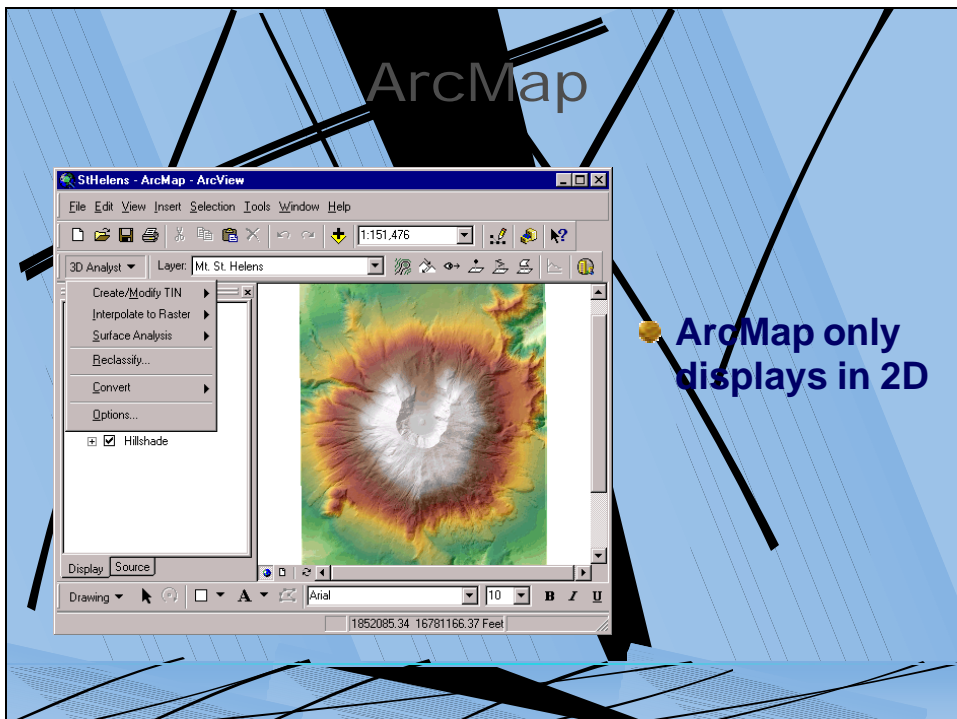
Full Extent - reset the view

## Steps to enable 3D Analyst for ArcCatalog & ArcMap

1. **Click the Tools menu**
2. **Click extensions and check 3D Analyst**
3. **Close**

## Steps for adding 3D Toolbars for ArcMap & ArcCatalog

1. Click the View menu.
2. Point to Toolbars.
3. Click 3D View Tools.

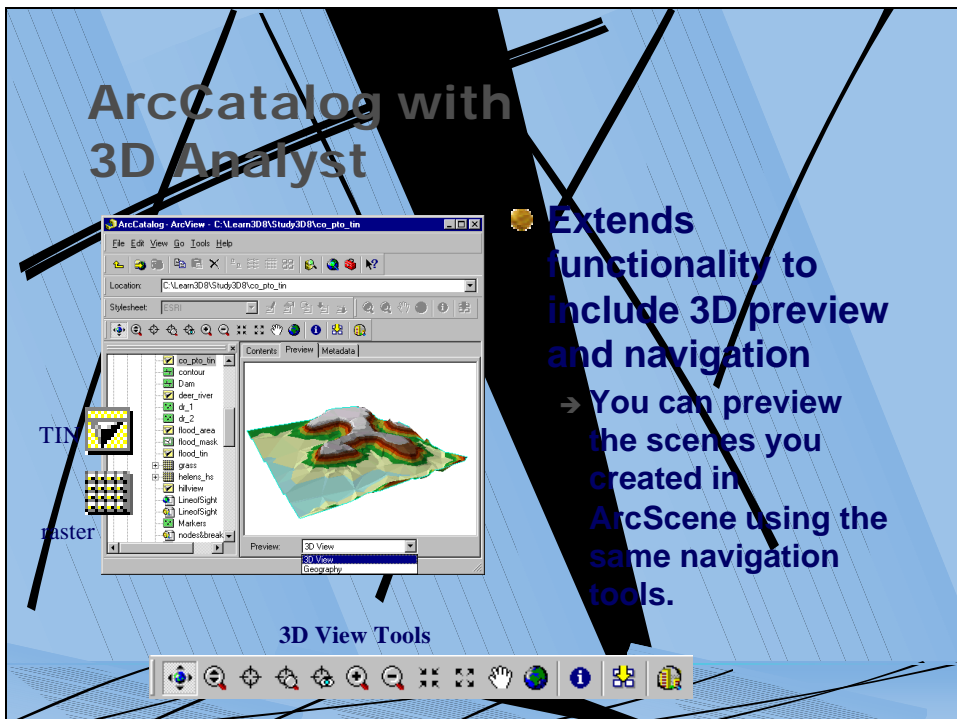


## ArcMap with 3D Analyst

- **Functionality is increased:**
  - Includes several methods for surface analysis and surface creation
- **Some 3D analysis can only be done in ArcMap:**
  - A tool that lets you find lines of sight on a surface
  - Three tools for digitizing 3D features and graphics using z-values from a surface
  - A tool that lets you create graphs of the profile (change in elevation over distance) along a 3D line

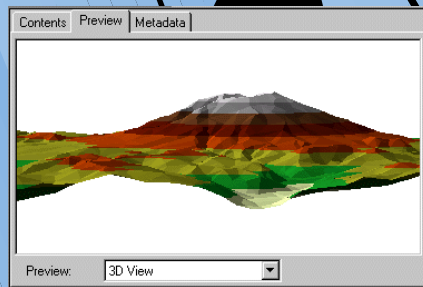
## ArcCatalog with 3D Analyst

- **Extends functionality to include 3D preview and navigation**
  - You can preview the scenes you created in ArcScene using the same navigation tools.



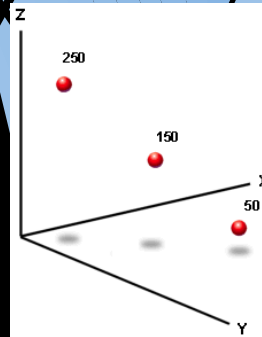
# ArcCatalog

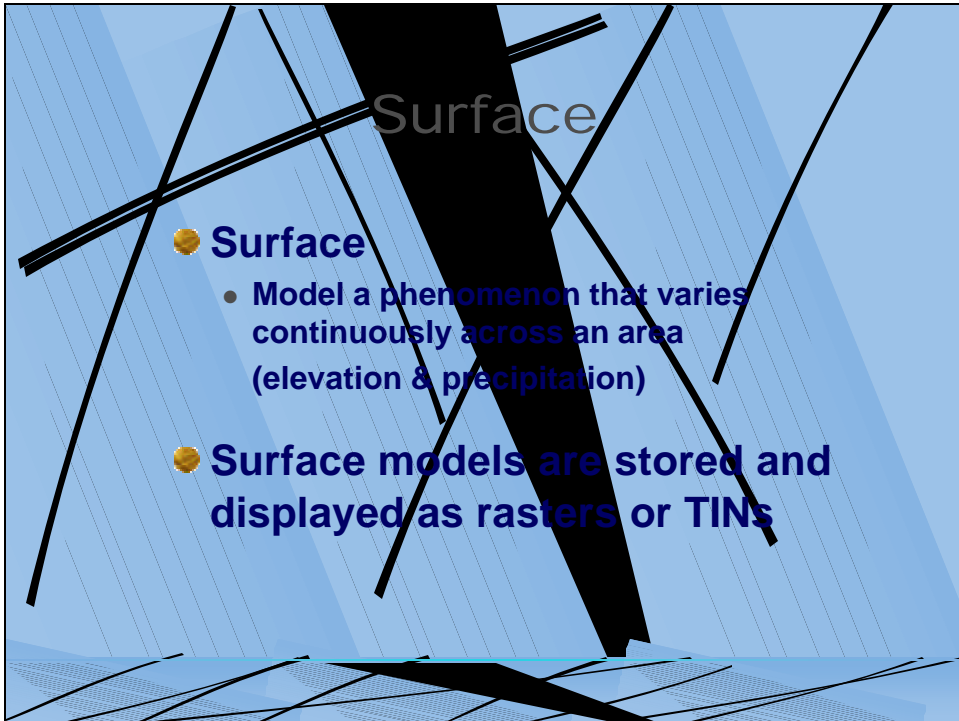
- Still operates as a data management application.
  - ▶ Move, copy, delete, preview and create metadata for 2D and 3D data



# Concepts:

- Z-Value
  - Represents elevation
  - Density or quantity of particular attribute
    - such as precipitation values





# Surface

- **Surface**
  - Model a phenomenon that varies continuously across an area (elevation & precipitation)
- **Surface models are stored and displayed as rasters or TINs**



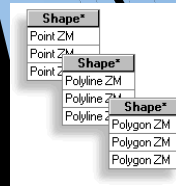
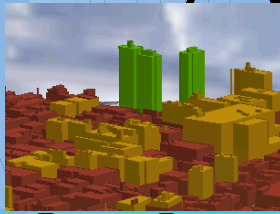
# Features

- **Features**
  - Represent entities with discrete boundaries (buildings, wells, telephone poles, and roads)

# Features

## ● 3D Features

- Display discrete geographic features (like buildings, rivers, and wells) found on or beneath surfaces
- 3D features can be stored in shapefiles or geodatabase feature classes
  - They are identified in the attributes table in the Shape field by the addition of ZM at the end of their values



END