AUTODESK. UNIVERSITY

AS468502-L AutoCAD Customization Boot Camp: Basic (No Experience Required)

Lee Ambrosius

Principal Learning Experience Designer | @leeambrosius (Twitter)

Who’s this Session For

Those that want to learn how to:

- **Customize and personalize the AutoCAD user interface**
- **Create custom**
  - Command aliases
  - Script files
  - Tool palettes

What you should already know:

- **AutoCAD 2021 (or AutoCAD 2016 and later)**

NO prior programming experience is required

About the Speaker

My name is Lee Ambrosius:

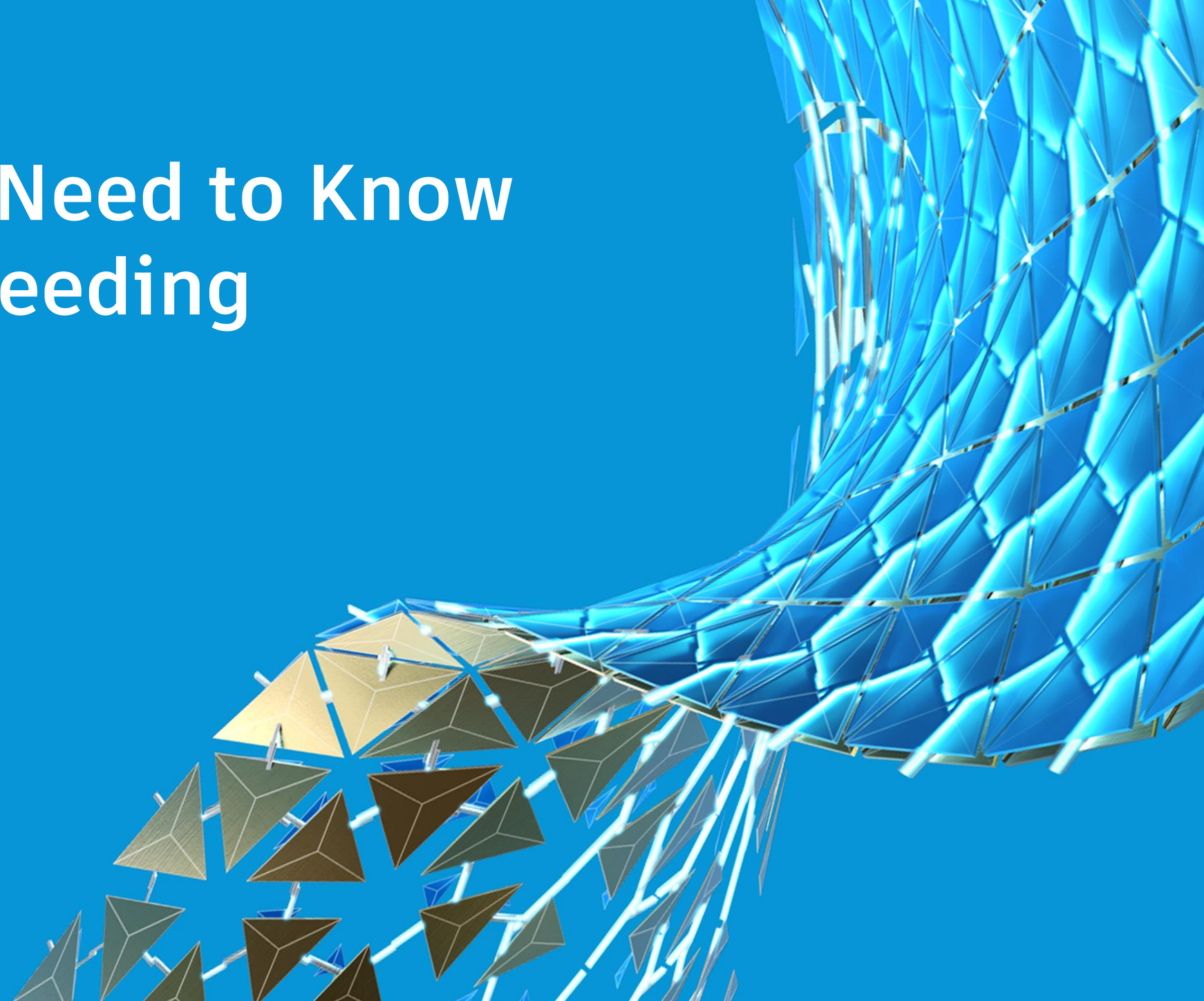
- **Principal Learning Experience Designer at Autodesk, Inc.**
  - Technical writer and data analyst
  - Customization, Developer, and CAD Administration documentation
- **Over 20+ years of AutoCAD customization and programming experience**
- **Authored AutoCAD Customization Platform book series published by Wiley & Sons**

My job in a nutshell:

- **Document the past and present AutoCAD releases for the future**

Yeah, running 48.6 miles in 4 Days is Dopey

Things You Need to Know Before Proceeding



What You Need to Get Started

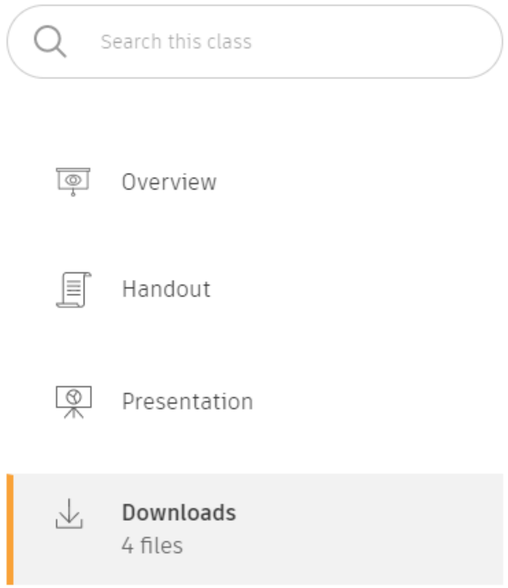
For this session, you will be using:

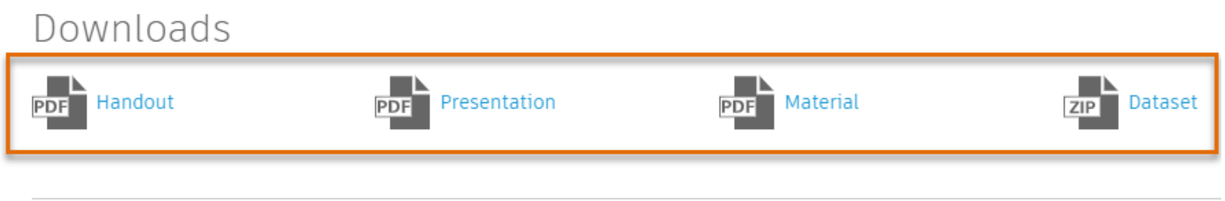
- **AutoCAD 2021 (or AutoCAD 2016 and later)**
- **Customize User Interface (CUI) Editor**
- **Notepad**
- **Materials for this session from the AU website**
  - Dataset
  - Handout
  - Supplemental handout

Setting Up for this Session

Materials for this session can be obtained by:

1. Going to the Autodesk University website and search on this session's ID of **AS468502**.
2. In the search results, click the entry for this session.
3. On the session page, click Downloads and then download
   a. Dataset
   b. Handout
   c. Material



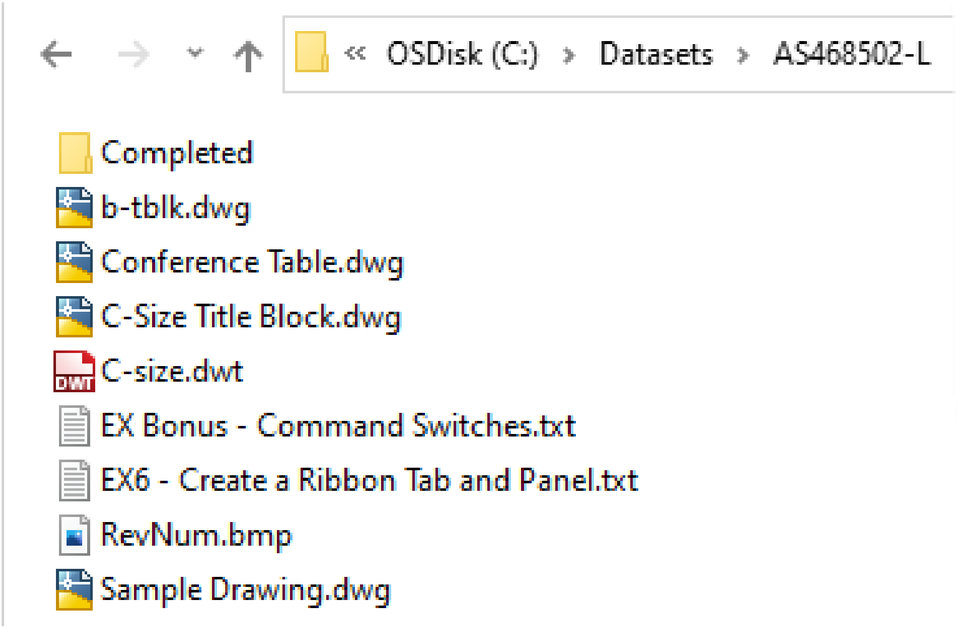


Setting Up for this Session

For this session:

- **Extract the Dataset to**

  C:\Datasets\AS468502-L



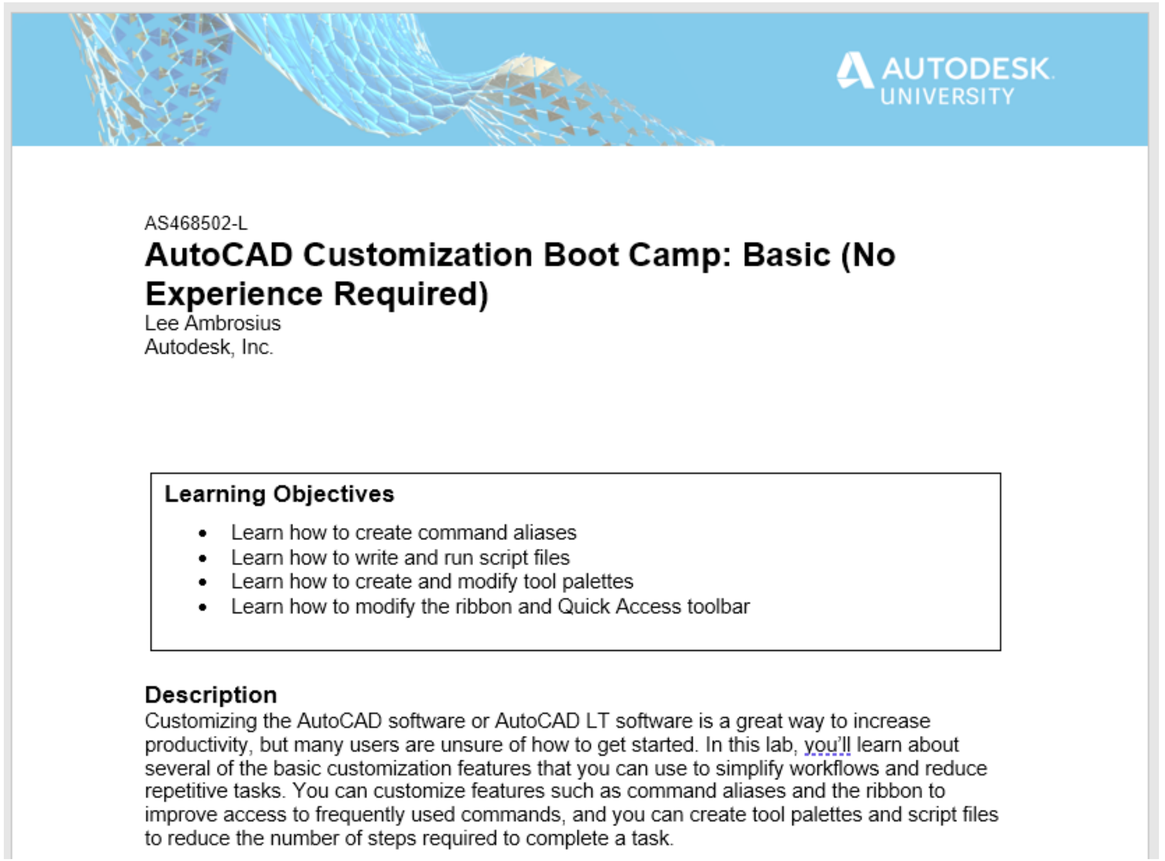
Setting Up for this Session

For this session:

- **Extract the Dataset to**

  C:\Datasets\AS468502-L

- **Open the handout**



AUTODESK UNIVERSITY

AS468502-L

AutoCAD Customization Boot Camp: Basic (No Experience Required)

Lee Ambrosius
Autodesk, Inc.

Learning Objectives

- Learn how to create command aliases
- Learn how to write and run script files
- Learn how to create and modify tool palettes
- Learn how to modify the ribbon and Quick Access toolbar

Description

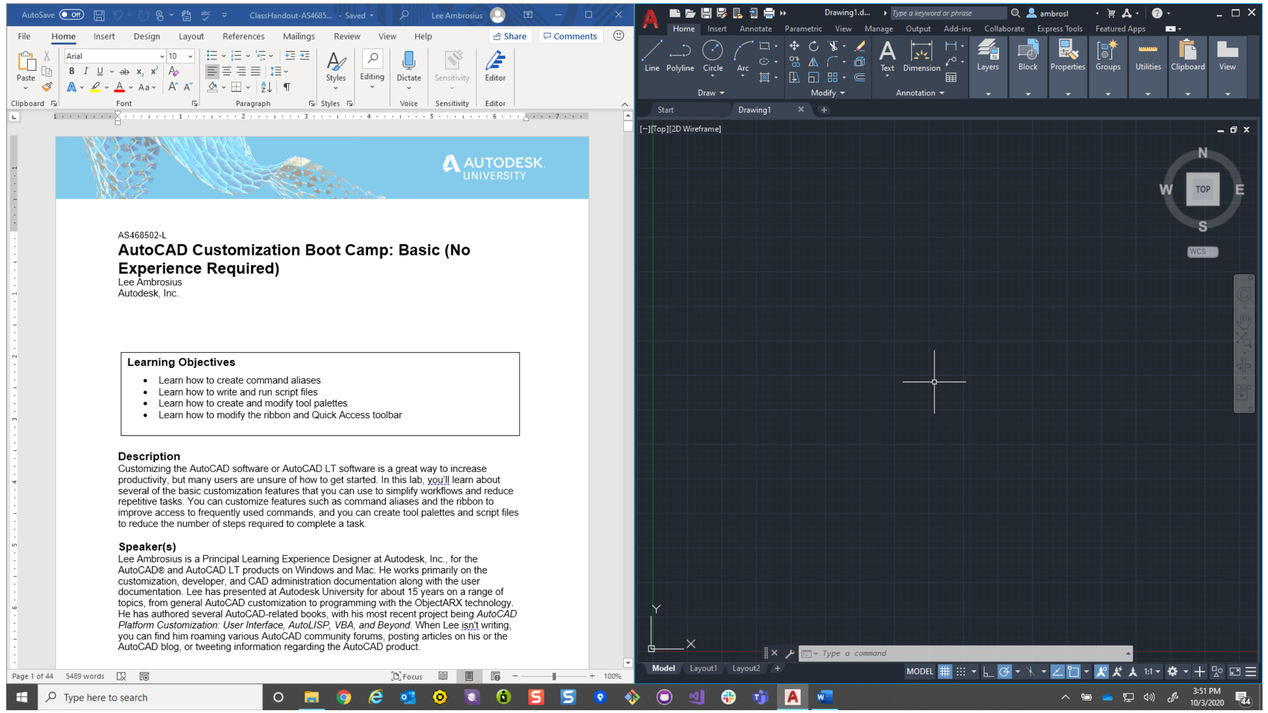
Customizing the AutoCAD software or AutoCAD LT software is a great way to increase productivity, but many users are unsure of how to get started. In this lab, you'll learn about several of the basic customization features that you can use to simplify workflows and reduce repetitive tasks. You can customize features such as command aliases and the ribbon to improve access to frequently used commands, and you can create tool palettes and script files to reduce the number of steps required to complete a task.

Setting Up for this Session

For this session:

- Extract the Dataset to

  C:\Datasets\AS468502-L
- Open the handout
- Recommend snapping the handout and AutoCAD side by side



E0 - Download and Setup the Dataset Folder and Add it to AutoCAD's Support File Search Path

In this exercise, you will:

- Add the dataset folder to the current AutoCAD profile

Follow along with the video or go to page 3 of the handouts.

Welcome to Basic Training

What You Will Learn Today

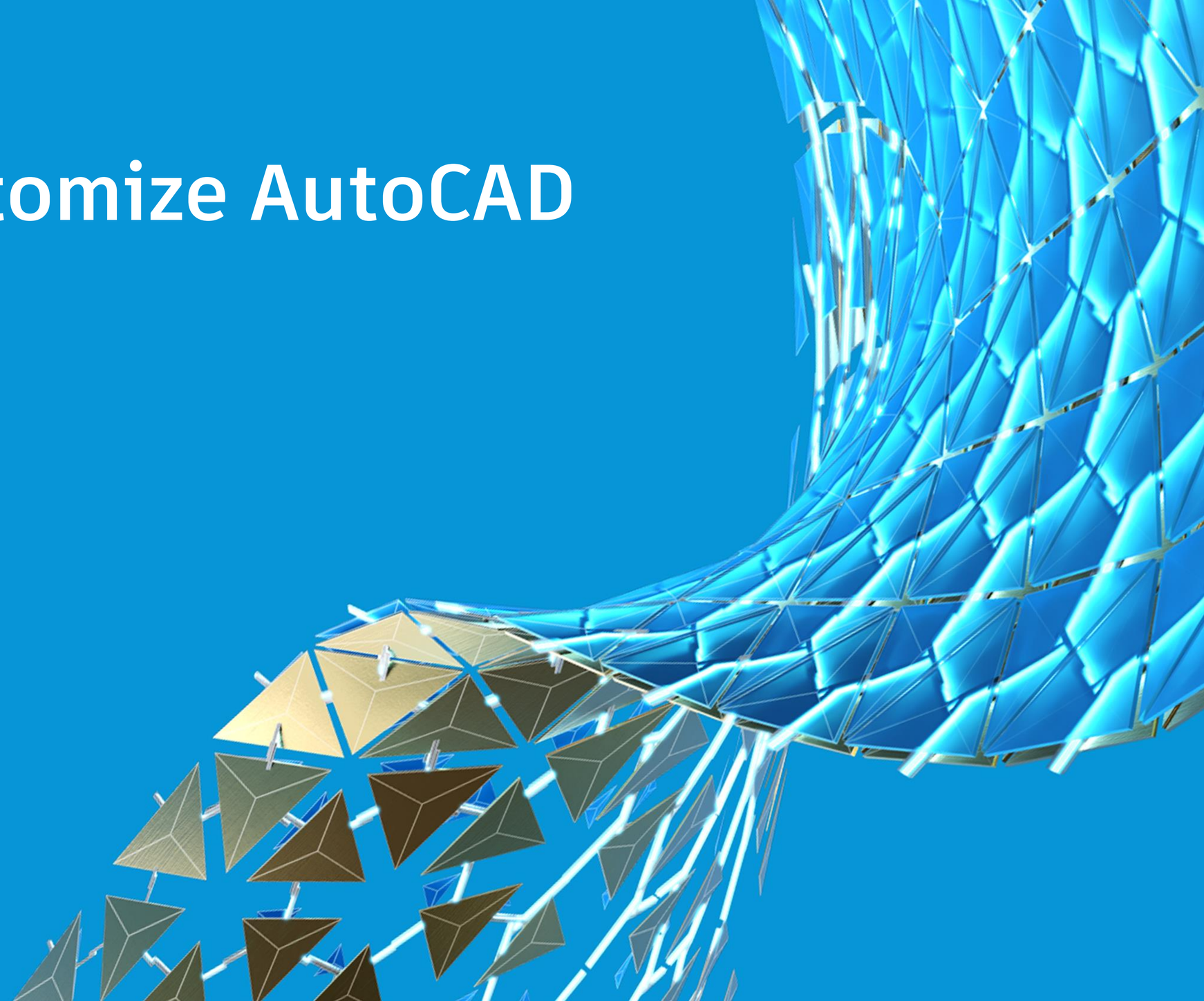
At the end of this session, you will know how to:

- Create and modify command aliases
- Create and run scripts
- Define tools and tool palettes
- Modify the QAT, ribbon, and workspaces

NO prior customization experience is required

Customization COULD BE programming, but not Today

Do You Customize AutoCAD Today?



Do You Customize AutoCAD Today?

Examples of AutoCAD customization:

- Define new blocks
- Add layers
- Modify or add annotation styles (text, dimension, …)
- Create drawing templates
- Change the colors of the user interface
- Create custom ribbon panels or tabs
- Create plot configuration or plot style files

Customization Options Available

Levels of customization expertise:

- Basic
- Intermediate
- Advanced (programming required)

Types of customization:

- Drawing
- Application

Basic Customization

DRAWING

- Layers
- Blocks
- Annotation styles (text, dimensions, multileaders, and tables)
- Materials for rendering
- Visual styles
- Drawing templates

APPLICATION

- Desktop icon
- Command aliases
- Tool palettes
- Workspaces
- User profiles
- Plot styles

Basic Customization

DRAWING

- Layers
- Blocks
- Annotation styles (text, dimensions, multileaders, and tables)
- Materials for rendering
- Visual styles
- Drawing templates

APPLICATION

- Desktop icon
- Command aliases
- Tool palettes
- Workspaces
- User profiles
- Plot styles

Intermediate Customization

DRAWING

- Dynamic Blocks

APPLICATION

- Action macros
- Scripts
- User interface (CUI Editor)
- DIESEL
- Custom linetypes and hatch patterns
- Custom shapes and text styles

Intermediate Customization

DRAWING

- Dynamic Blocks

APPLICATION

- Action macros
- Scripts
- User interface (CUI Editor)
- DIESEL
- Custom linetypes and hatch patterns
- Custom shapes and text styles

Advanced Customization (Programming)

APPLICATION

- AutoLISP / Visual LISP
- Visual Basic for Applications (VBA)
- ActiveX / COM
  (VBScript, VB.NET, C#, C++)
- Managed .NET (VB.NET, C#)
- ObjectARX (C++)
- JavaScript (JS)

- Sheet Set Object (SheetSet command)
- CAD Standards plug-ins
  (Standards/CheckStandards commands)
- Transmittal API (eTransmit command)
- Connectivity Automation Object (dbConnect command)
- Forge APIs

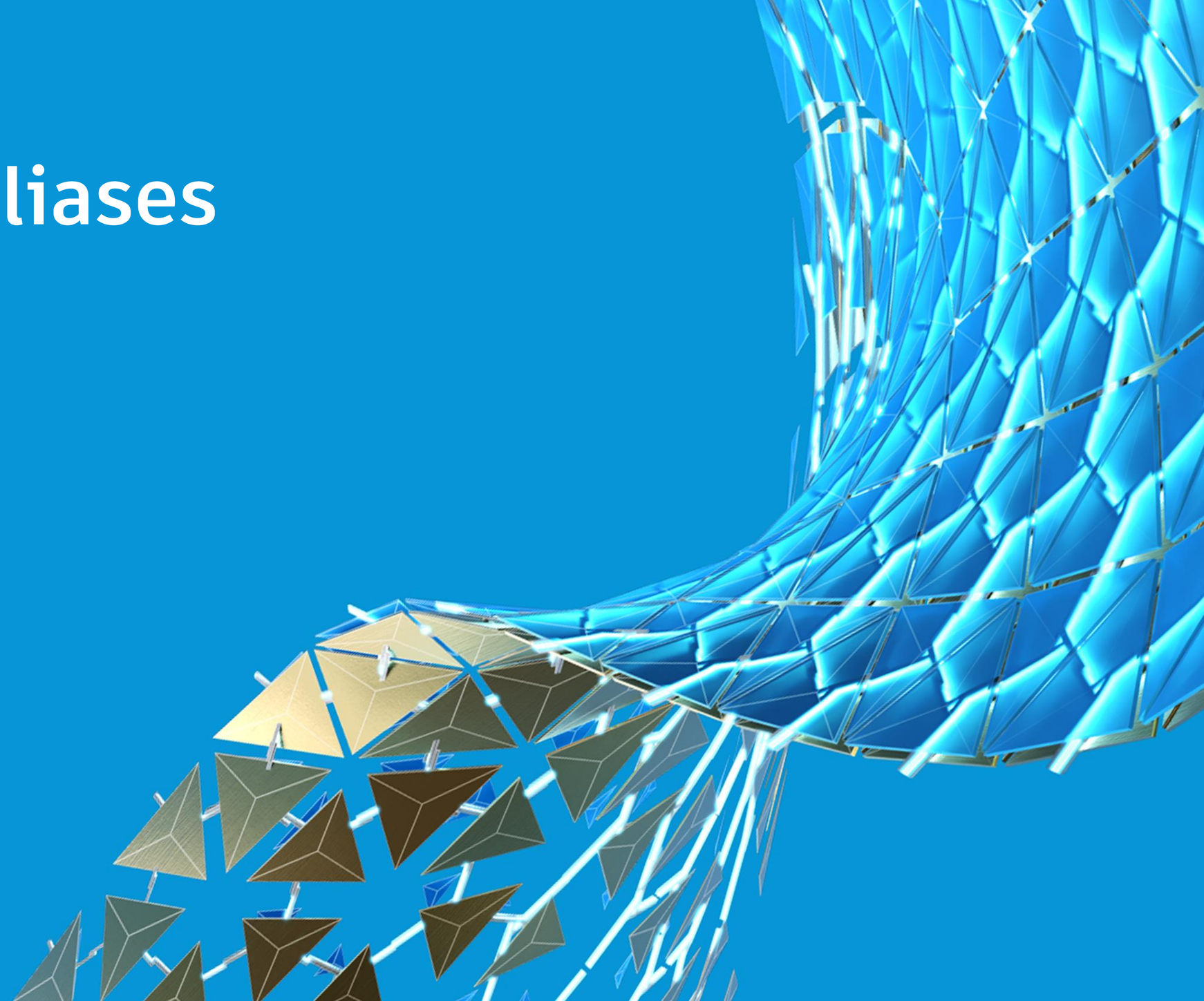
Advanced Customization (Programming)

APPLICATION

- AutoLISP / Visual LISP
- Visual Basic for Applications (VBA)
- ActiveX / COM
  (VBScript, VB.NET, C#, C++)
- Managed .NET (VB.NET, C#)
- ObjectARX (C++)
- JavaScript (JS)

- Sheet Set Object (SheetSet command)
- CAD Standards plug-ins
  (Standards/CheckStandards commands)
- Transmittal API (eTransmit command)
- Connectivity Automation Object (dbConnect command)
- Forge APIs

Command Aliases



Command Aliases

What is a command alias?

- Shortened name used to start a command
- DOESN’T support command options or values

Often consistent between releases

Stored in *acad.pgp* (AutoCAD) or *acadlt.pgp* (AutoCAD LT)

Command Aliases – Syntax

Syntax:

```
abbreviation, *command_name
```

Examples:

```
C, *CIRCLE
E, *ERASE
L, *LINE
M, *MOVE
```

To Create or Modify a Command Alias

1. **Open the program's PGP file.**
2. **Add or edit an existing command alias.**
3. **Save the changes to the PGP file.**
4. **Re-initialize the changed PGP file.**
   - REINIT command
   - Close/restart the program

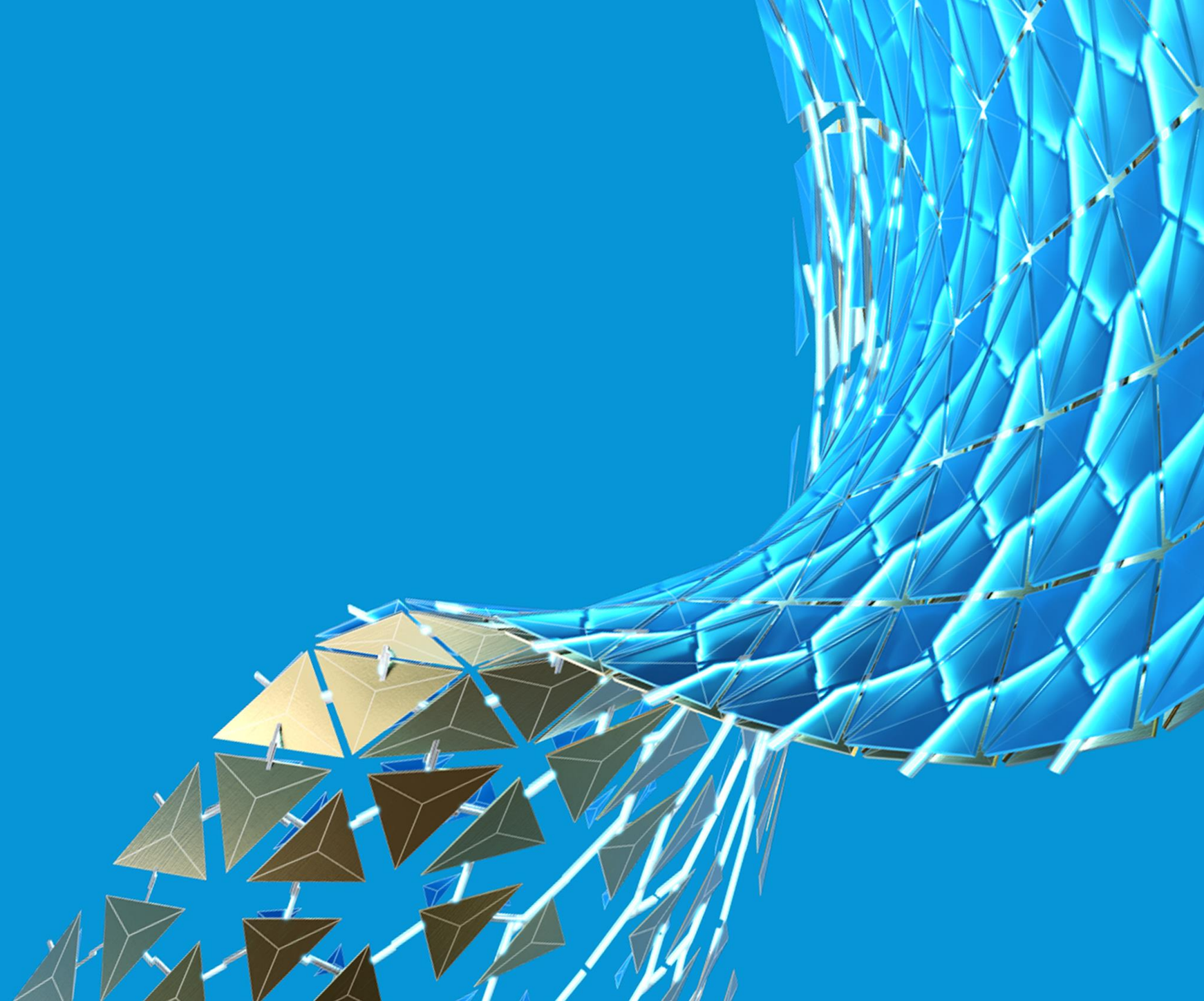
Exercise: E1 - Define Custom Command Aliases

In this exercise, you will:

- Open the PGP file associated with AutoCAD
- Create a few new command aliases and override an existing command alias
- Re-initialize the PGP file in AutoCAD

Follow along with the video or go to page 6 of the handouts.

Script Files



Script Files

What is a script file?

- An ASCII text file with the SCR extension
- Sequence of commands and system variables to be executed
- Can include AutoLISP statements

Script Files

Why create or use scripts?

- Low learning curve
- Leverage your knowledge of commands and system variables
- No special editor or programming skills required
- Execute many commands rapidly without user input
- Work across multiple releases and toolsets
- Transparent execution is supported

Script Files – Known Limitations

Known limitations while a script is running:

- **Commands**
  - Can’t accept user input
  - Execute as if FILEDIA and CMDDIA are set to 0
- **Dialog boxes can’t be displayed**
- **In AutoCAD 2015 and earlier, only one script can be executed at a time**

Script Files

Example of input entered at the Command prompt:

```
Command: LIMITS

Reset Model space limits:

Specify lower left corner or [ON/OFF] <0.0000,0.0000>: 0,0

Specify upper right corner <12.0000,9.0000>: 1056,816

Command: ZOOM

Specify corner of window, enter a scale factor (nX or nXP), or
[All/Center/Dynamic/Extents/Previous/Scale/Window /Object] <real time>: E

Command: GRIDDISPLAY

Enter new value for GRIDDISPLAY <3>: 2
```

Script Files

Example of input entered at the Command prompt:

```
Command: LIMITS
Reset Model space limits:
Specify lower left corner or [ON/OFF] <0.0000,0.0000>: 0,0
Specify upper right corner <12.0000,9.0000>: 1056,816
Command: ZOOM
Specify corner of window, enter a scale factor (nX or nXP), or
[All/Center/Dynamic/Extents/Previous/Scale/Window /Object] <real time>: E
Command: GRIDDISPLAY
Enter new value for GRIDDISPLAY <3>: 2
```

Script Files

Examples of scripts with the same input:

```
LIMITS
0,0
1056,816
ZOOM
E
GRIDDISPLAY
2
```

```
LIMITS 0,0 1056,816
ZOOM E
GRIDDISPLAY 2
```

Script Files

Formatting of a script file:

- **Commands and options aren’t case specific**
- **Text values**
  - Are case sensitive
  - With spaces must be surrounded with double quotation marks; in most cases
- **A space or new line is equivalent to pressing Enter**
- **A blank line must always be placed at the end of the file**

Script Files

Formatting of a script file (cont.):

- Period ensures execution of the natively defined command

```
.LINE
```

- Underscore forces the use of a global command or option name

```
_ZOOM _E
```

```
_.ZOOM _E
```

- Semi-colon denotes a comment in a script

```
; Created on: 10/03/2020
```

Script Files

Methods to run a script file:

- SCRIPT command
- Drag and drop (Windows only)
- /b (Windows) or –b (Mac OS X) command line switch
- ScriptPro (Windows only) - http://autode.sk/2fS0Rml

Script Files

Commands related to script files:

- **SCRIPT** – Runs a script file
- **SCRIPTCALL** – Used to run a nested script file; AutoCAD 2016 and later
- **RSCRIPT** – Repeats the previously executed script
- **DELAY** – Interrupts a script for a specified duration (in milliseconds)
- **RESUME** – Resumes a script that was paused with the Backspace key

Script Files

Commands related to script files:

- SCRIPT – Runs a script file
- SCRIPTCALL – Used to run a nested script file; AutoCAD 2016 and later
- RSCRIPT – Repeats the previously executed script
- DELAY – Interrupts a script for a specified duration (in milliseconds)
- RESUME – Resumes a script that was paused with the Backspace key

To Create a Script File

1. In AutoCAD, walkthrough the commands and options to execute.
2. Create the script (SCR) file.
3. Add the commands and options to the SCR file.
4. Save the SCR file.
5. Create or open a drawing file.
6. Run the SCR file and validate the results.

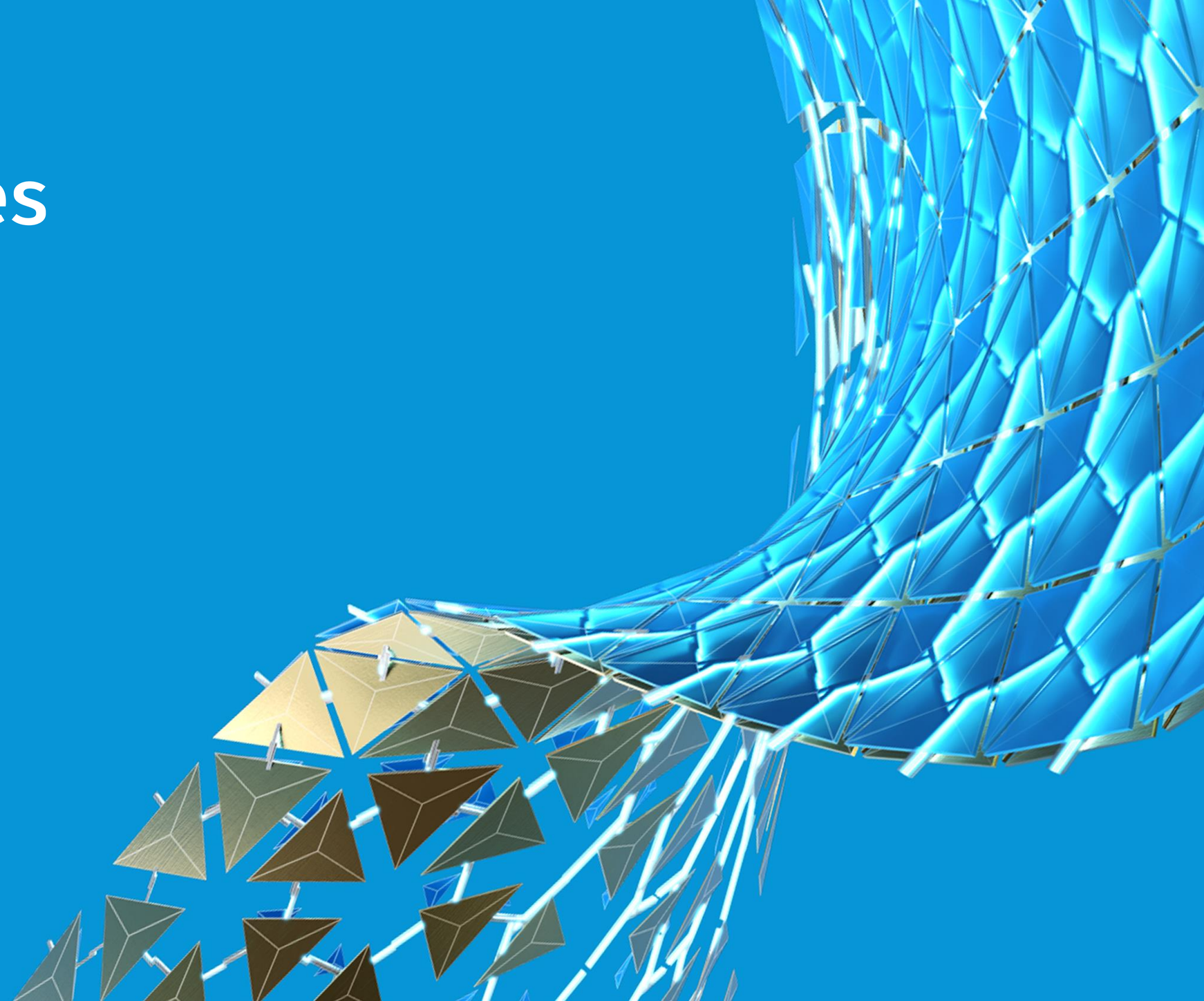
Exercise: E2 - Create and Run a Script

In this exercise, you will:

- Create a new script file
- Add commands, options, values, and system variables
- Run a script file with the SCRIPT command

Follow along with the video or go to page 7 of the handouts.

Tool Palettes



Tool Palettes

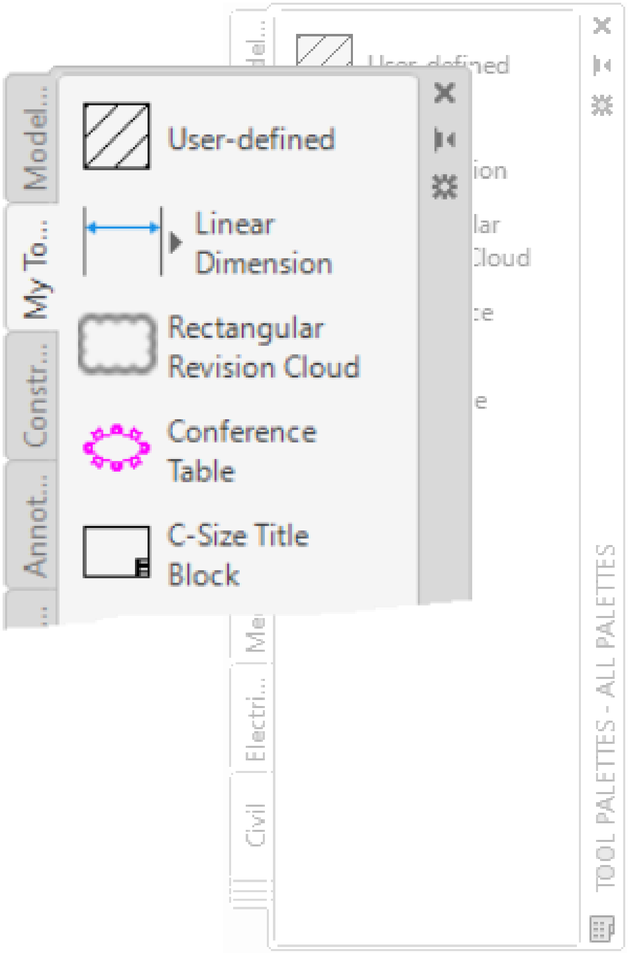
Collection of tools that can be used to:

- Start commands
- Create new geometry
- Insert or attach external files

New tool palettes can be created

Similar tool palettes can be grouped together

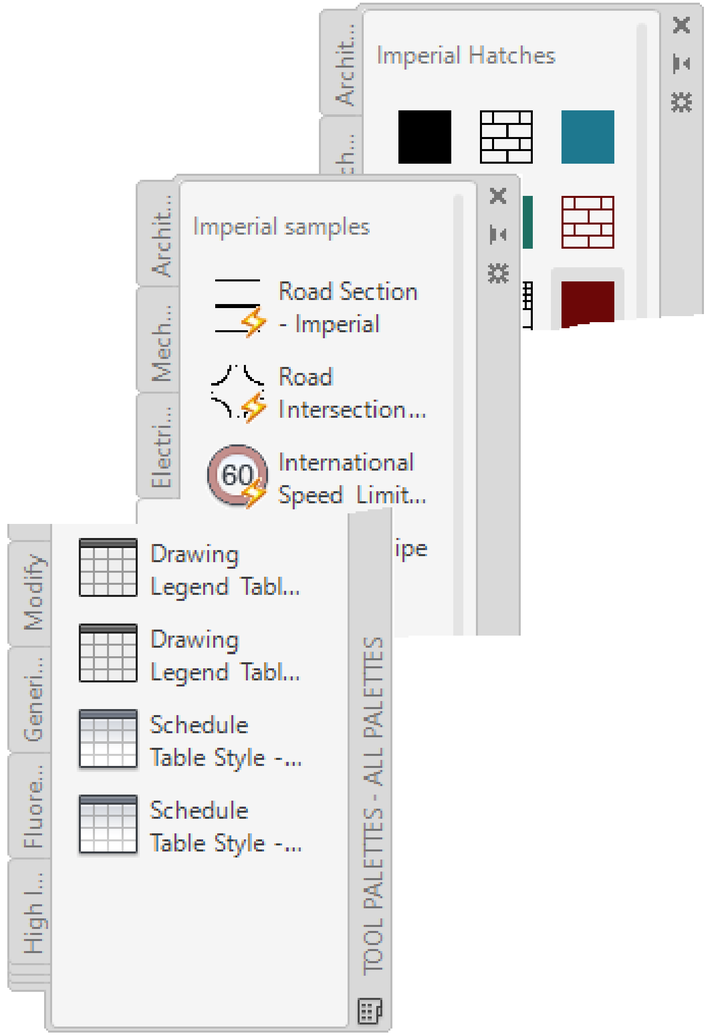
Can be shared with others



Tool Palettes

Tools can be created from:

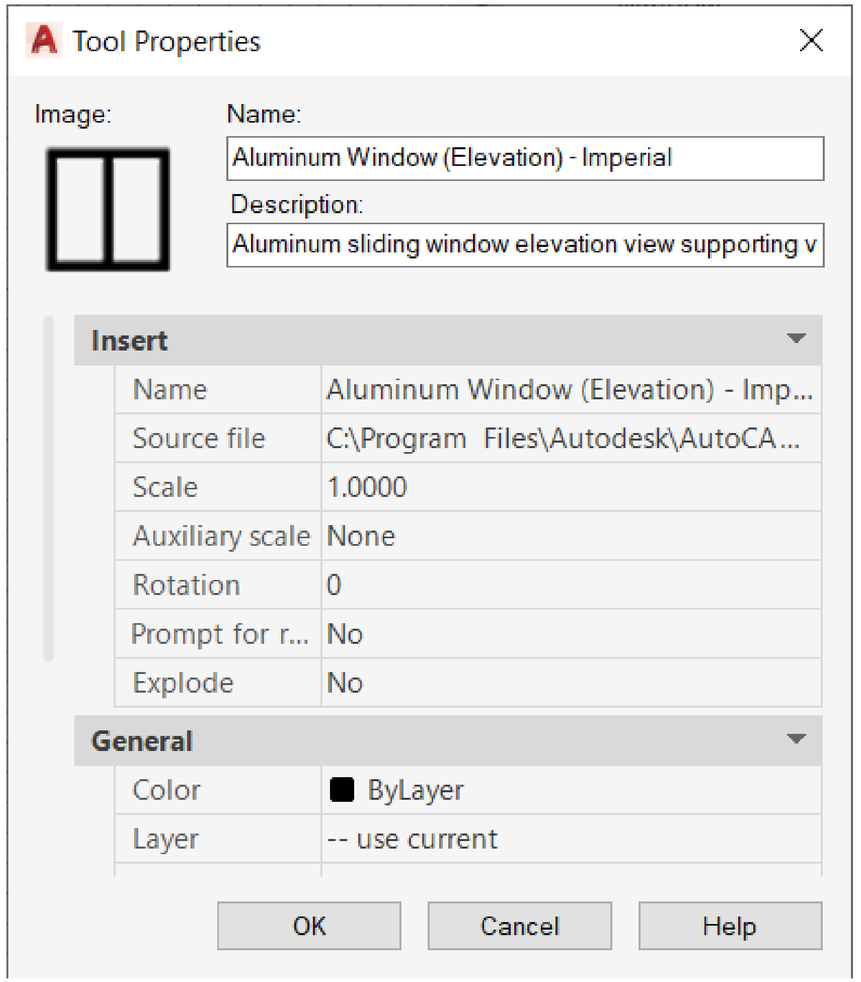
- Geometry and annotation objects in a drawing
- Visual styles, lights, cameras, and materials in a drawing
- Commands from the Customize User Interface (CUI) Editor
- Hatch patterns and blocks with DesignCenter
- Drawing and other files from File Explorer



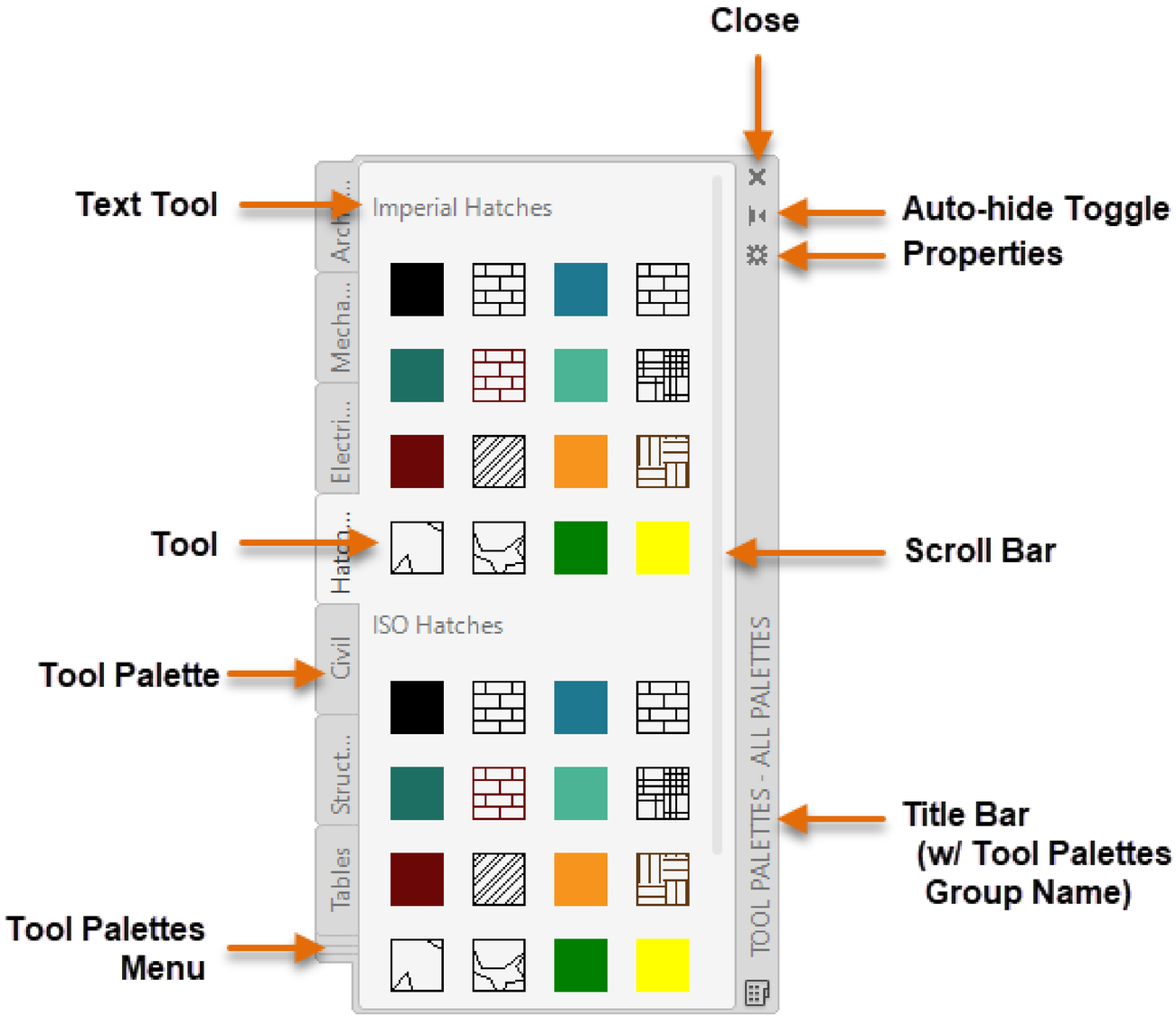
Tool Palettes

After a tool has been created, you can:

- Edit its properties
- Use the tool (via drag and drop, or a simple click)
- Organize similar tools with text and separators



Tool Palettes



To Create and Add Tools to a Tool Palette

1. Create a new or work with an existing tool palette.
2. Add tools to a tool palette.
3. Edit the properties of tools.
4. Test new tools created.
5. Organize tools on a tool palette
6. Group related tool palettes.

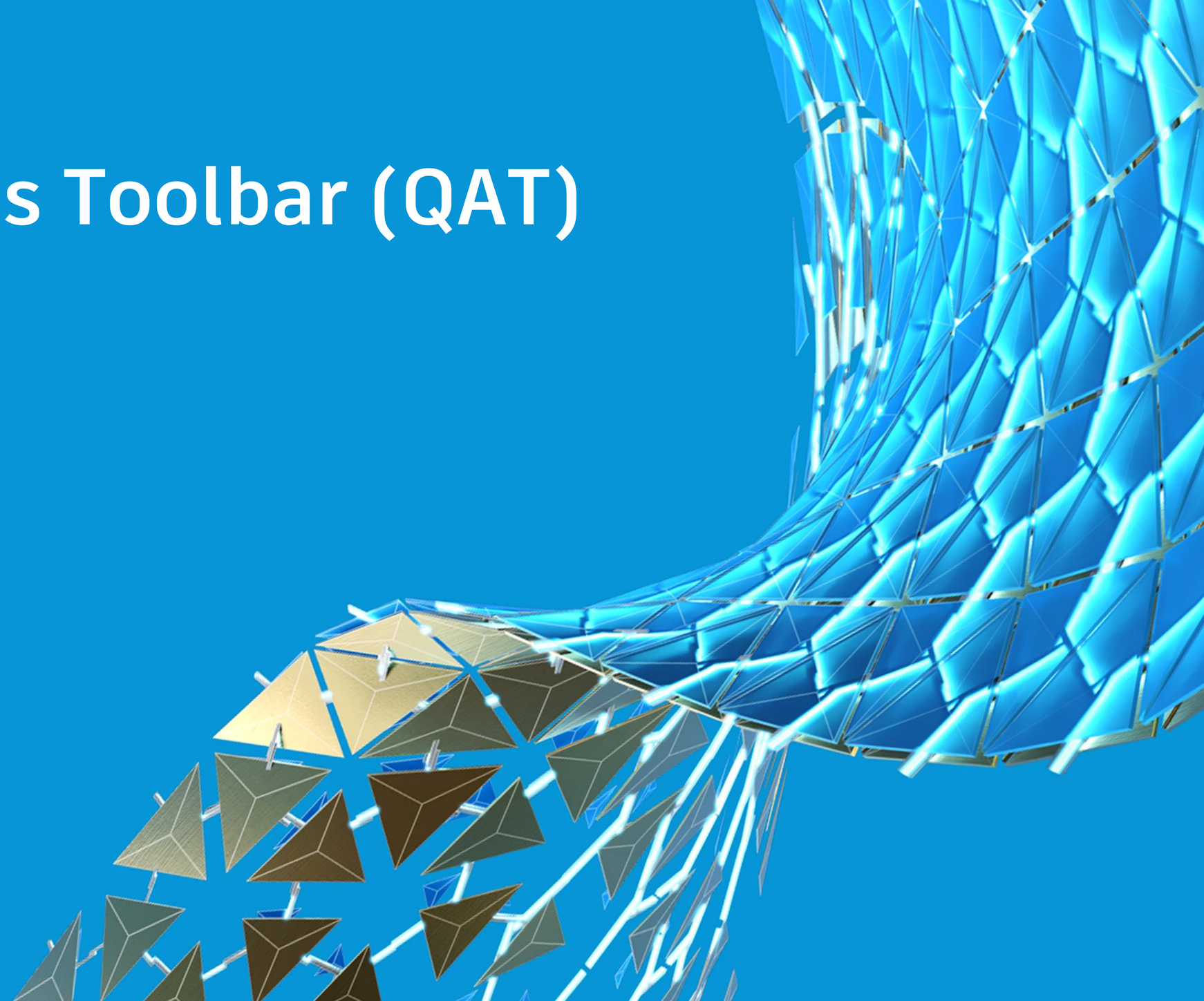
Exercise: E3 - Create a Tool Palette and Tools

In this exercise, you will:

- Create a new tool palette
- Add tools to the new tool palette
- Modify the properties of tools on a tool palette

Follow along with the video or go to page 10 of the handouts.

Quick Access Toolbar (QAT)



Quick Access Toolbar (QAT)

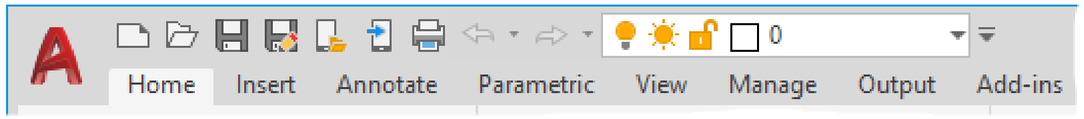
Common across all ribbon tabs

Contains drawing file management related tools:

- Creating
- Opening
- Saving
- Plotting

Displayed in upper-left corner of application

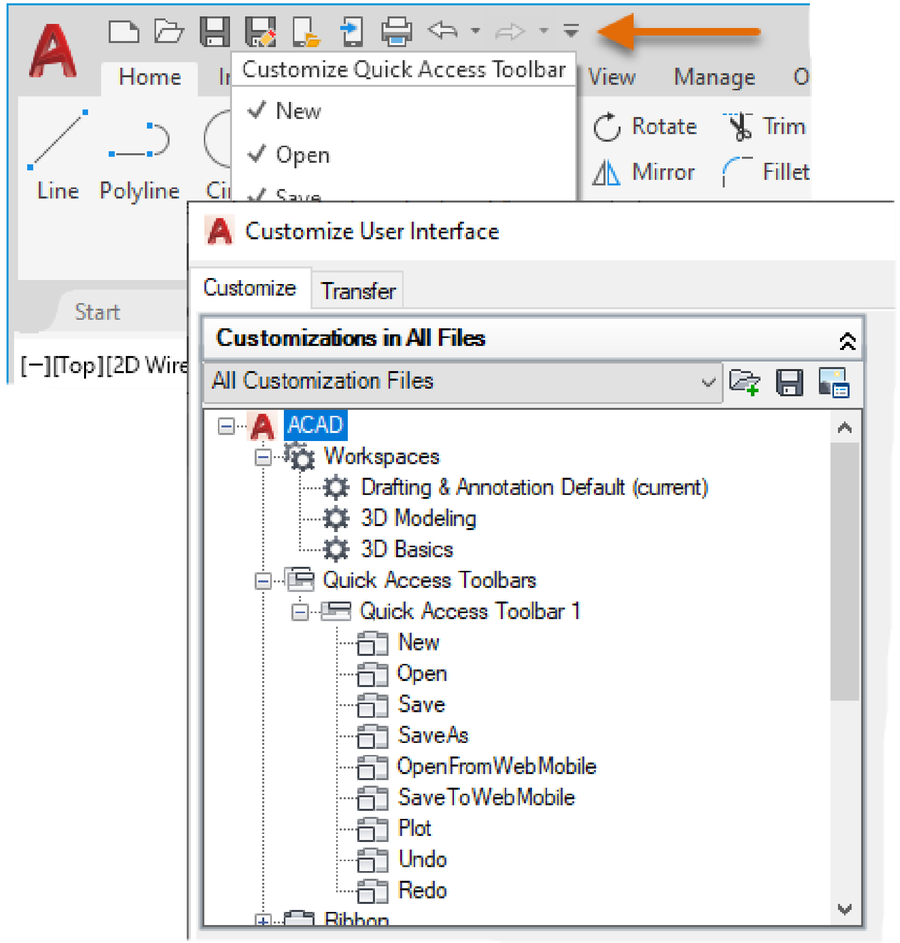
Multiple QATs can be created; only one can be displayed



Quick Access Toolbar (QAT)

Can be customized by:

- Customize button on the QAT (right side)
- Contextual menu of a button on the QAT or ribbon
- Customize User Interface (CUI) Editor



To Create a Quick Access Toolbar (QAT)

1. Start the Customize User Interface (CUI) Editor.
2. Create a new QAT.
3. Add or remove commands from the QAT.
4. Assign the new QAT to a workspace.
5. Set the modified workspace current.

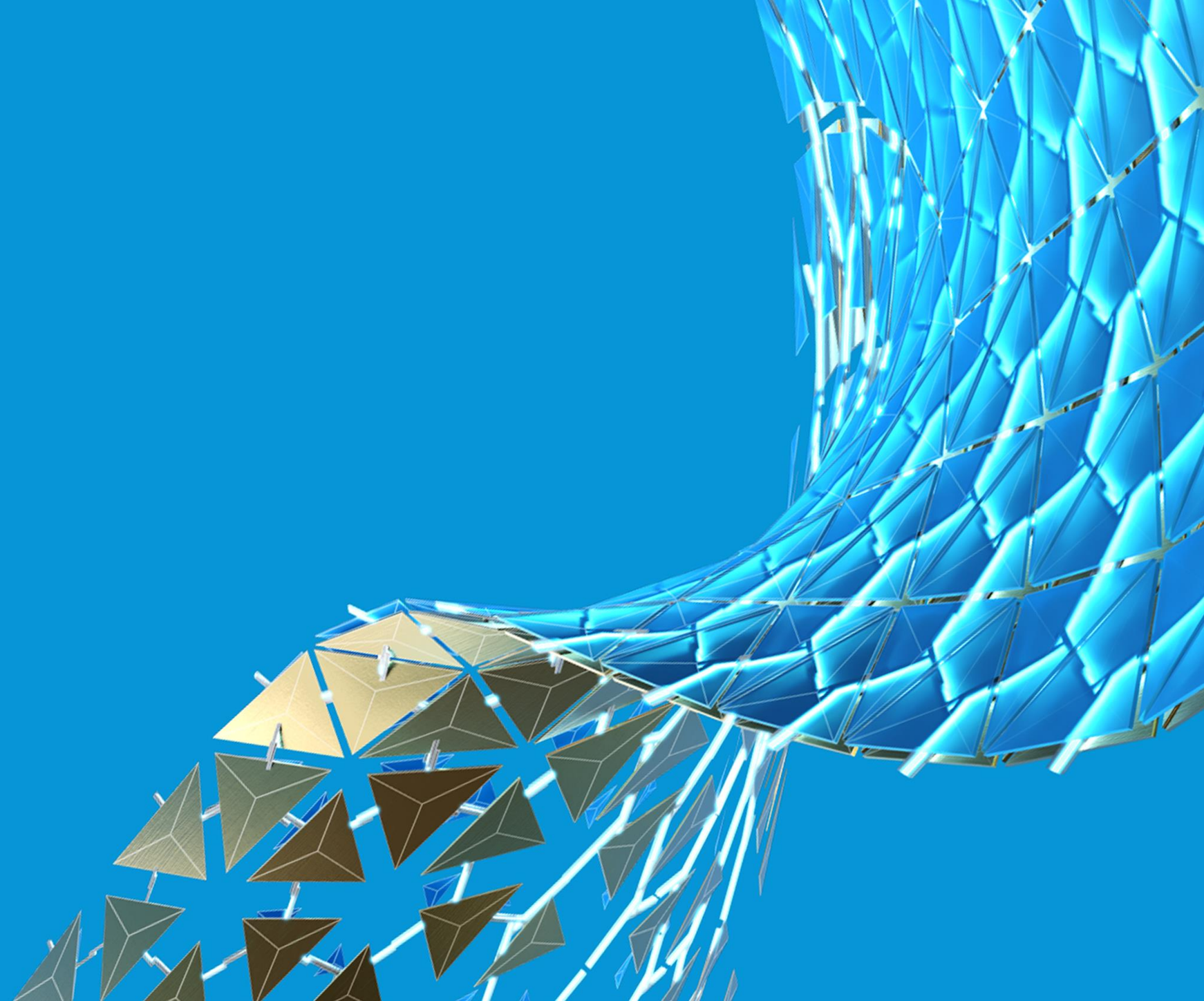
Exercise: E4 - Create a Quick Access Toolbar

In this exercise, you will:

- Create a new Quick Access toolbar (QAT)
- Add a few commands to the new QAT
- Remove a command from the new QAT
- Assign the new QAT to a workspace

Follow along with the video or go to page 15 of the handouts.

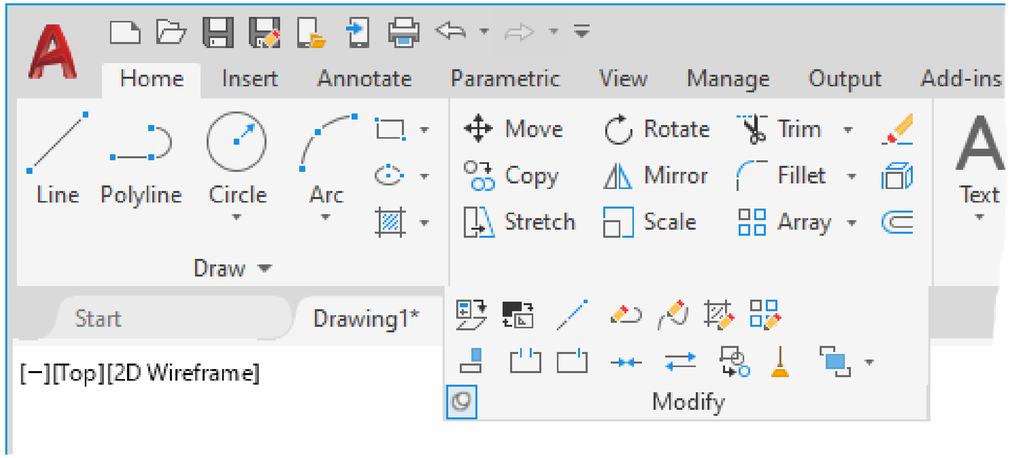
Ribbon



Ribbon

Contains tools organized by task, such as:

- Creating and editing objects
- Working w/ blocks and references
- Adding annotation
- Outputting drawings



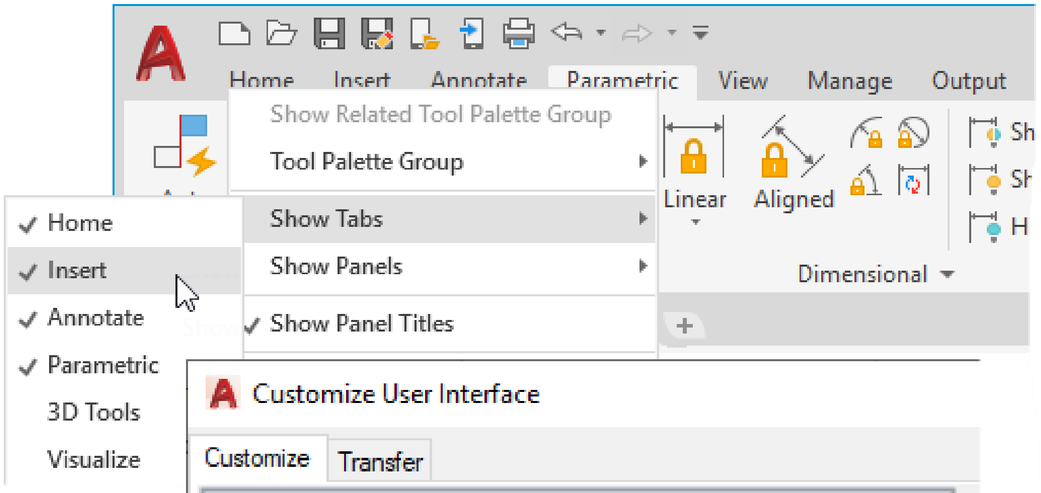
Displayed near the top of the application window

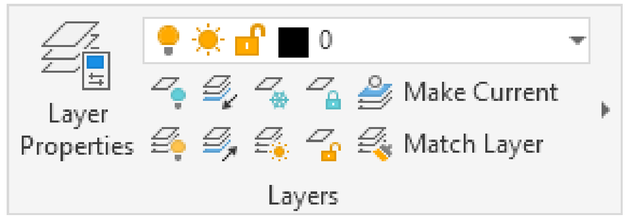
Ribbon

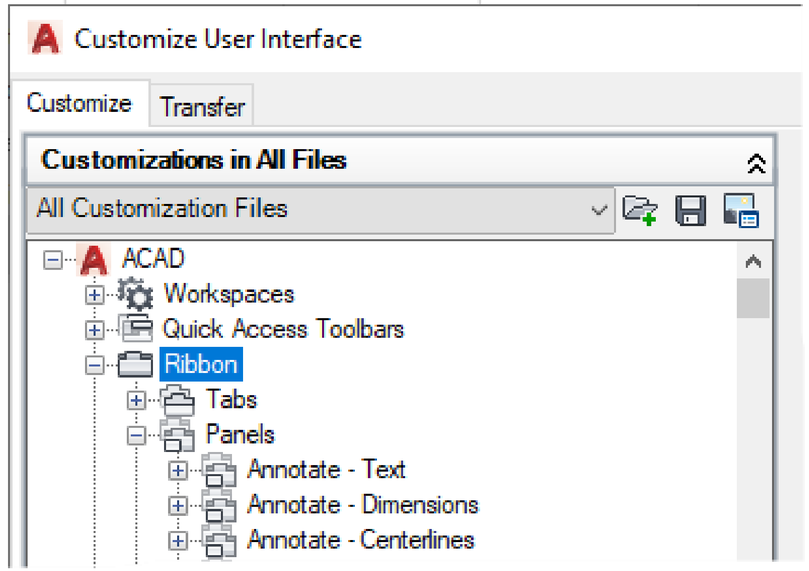
Can be customized by:

- Ribbon panel or tab contextual menu
- Customize User Interface (CUI) Editor

Ribbon panels can be floated over the drawing area







To Create Ribbon Panels and Tabs

1. Start the Customize User Interface (CUI) Editor.
2. Create a new ribbon panel and add commands/controls to it.
3. Create a new ribbon tab and add ribbon panels to it.
4. Assign new ribbon panels to a new ribbon tab.
5. Assign a new ribbon tab to a workspace.
6. Set the modified workspace current.

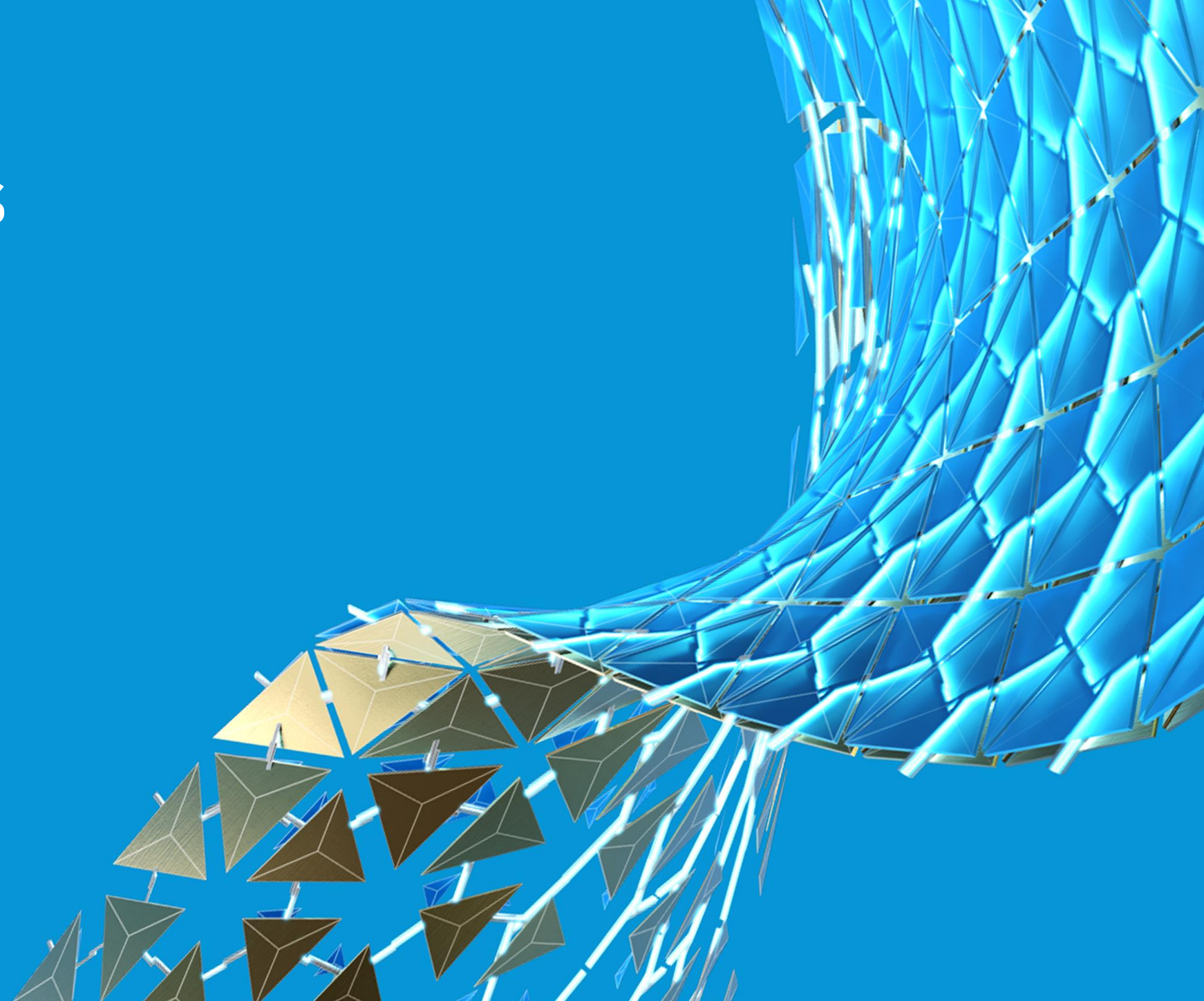
Exercise: E5 - Create a Ribbon Tab and Panel

In this exercise, you will:

- Create a new ribbon panel
- Add commands to a ribbon panel
- Create a new ribbon tab
- Add a ribbon panel to a ribbon tab
- Assign a ribbon tab to a workspace

Follow along with the video or go to page 22 of the handouts.

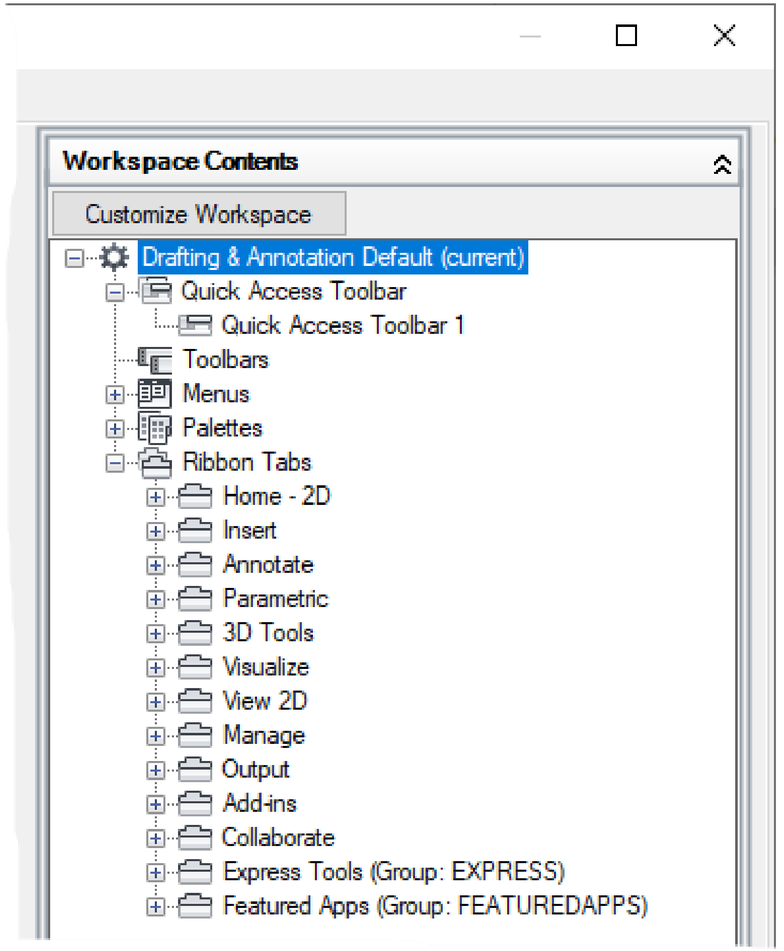
Workspaces



Workspaces

Controls visibility and placement of UI elements:

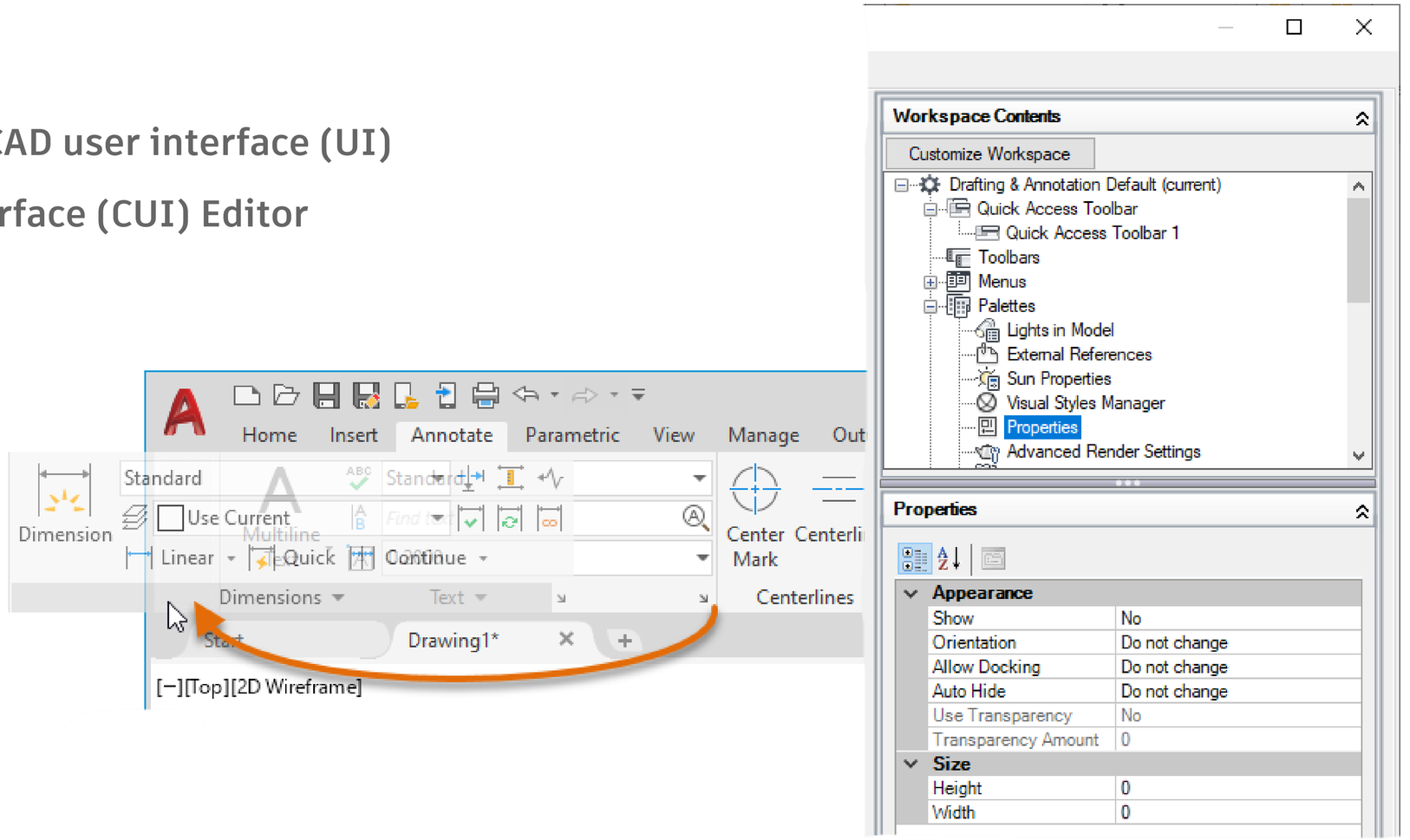
- Quick Access toolbar (QAT)
- Ribbon tabs
- Palettes
- “Classic” toolbars
- Pull-down menus



Workspaces

Can be customized:

- Directly in the AutoCAD user interface (UI)
- Customize User Interface (CUI) Editor



To Create a Workspace from the AutoCAD UI

1. Arrange the elements of the AutoCAD user interface (UI).
2. Start the WSSAVE command.
3. Enter the name of the workspace to create or modify.
4. Save the workspace.

To Create a Workspace with the CUI Editor

1. Start the Customize User Interface (CUI) Editor.
2. Create a new workspace.
3. Add or remove user interface (UI) elements to the workspace.
4. Set the modified workspace current.

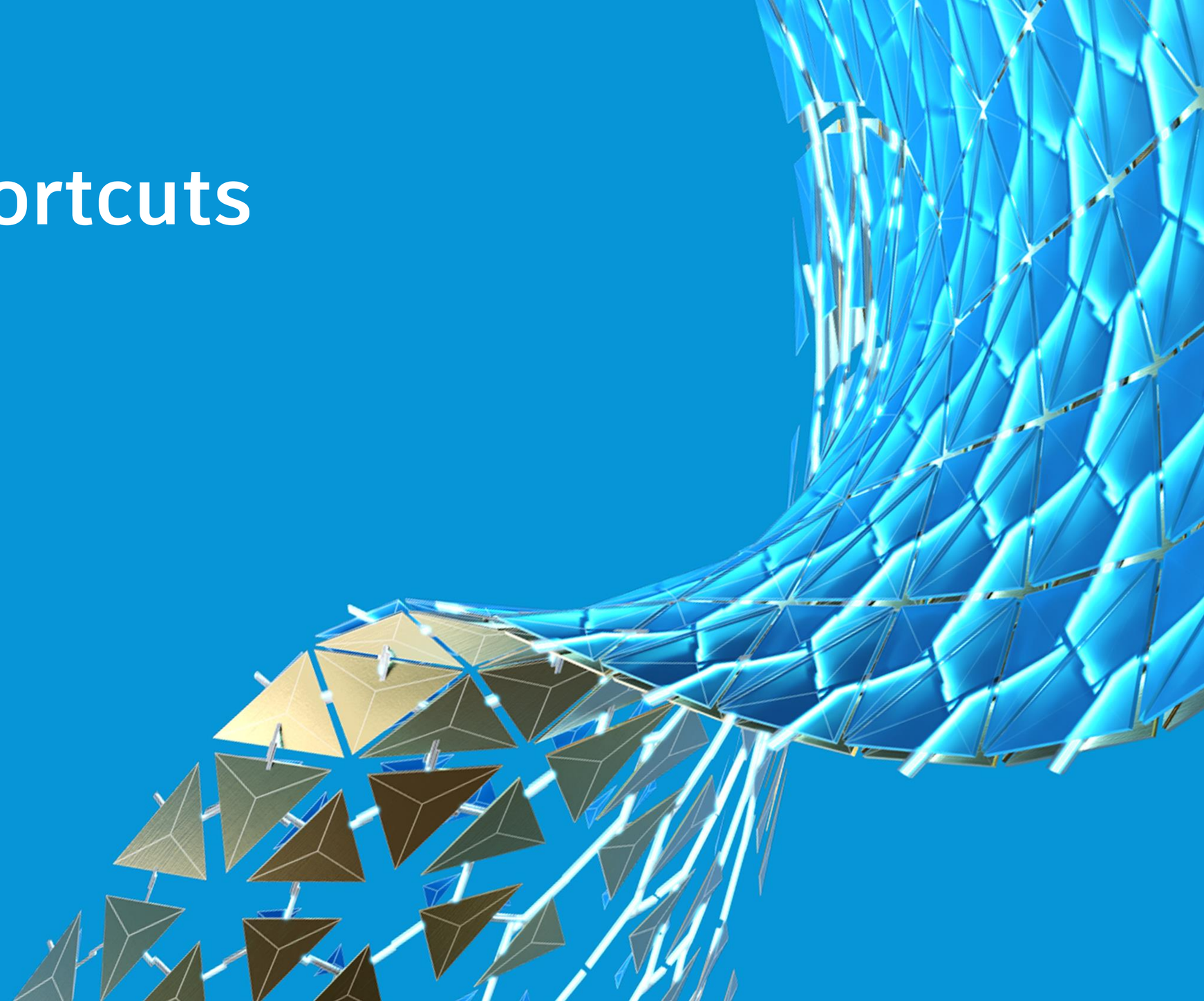
Exercise: E6 - Modify and Create a Workspace

In this exercise, you will:

- Modify the placement of elements in AutoCAD
- Control the visibility of a “Classic” toolbars and ribbon tabs
- Save changes to a workspace

Follow along with the video or go to page 31 of the handouts.

Desktop Shortcuts



Desktop Shortcuts

Used to:

- Launch an application
- Open a folder location or website

Command line switches alter the application startup

- AutoCAD supports 15+ command line switches

Standard AutoCAD 2021 Shortcut

"C:\Program Files\Autodesk\AutoCAD 2021\acad.exe" /product ACAD /language "en-US"

- /product – AutoCAD-based product to launch when multiple products are installed
- /language – Language pack to use when the product is launched

Common Command Line Switches

Here are some of the most used command line switches:

Command Line Switch	Description/Example
`/t`	Specifies the drawing template for the default drawing Example: *`/t "mytemplate.dwt"`*
`/w`	Sets a named workspace current from a loaded CUIx file Example: *`/w "2D Drafting"`*
`/p`	Sets a named user profile current or loads a previously exported user profile (ARG) file Example: *`/p "<<Unnamed Profile>>"`*
`/nologo`	Disables the splash screen at startup Example: *`/nologo`*

Shortcut w/ Additional Command Switches

"C:\Program Files\Autodesk\AutoCAD 2021\acad.exe" /product ACAD /language "en-US" /nologo /t
"C:\Datasets\AS468502-L\C-size.dwt" /w "3D Basics"

- /nologo – Suppresses the programs Splash screen
- /t – Drawing template to use for the default drawing
- /w – Workspace to set current

To Create a Desktop Shortcut

1. Copy the existing AutoCAD 2021 desktop shortcut.
2. Modify the properties of the copied desktop shortcut.
3. Add the command line switches you want to use.

Or

1. Create a new shortcut on the Windows Desktop.
2. Specify the location of the AutoCAD executable.
3. Add the command line switches you want to use.

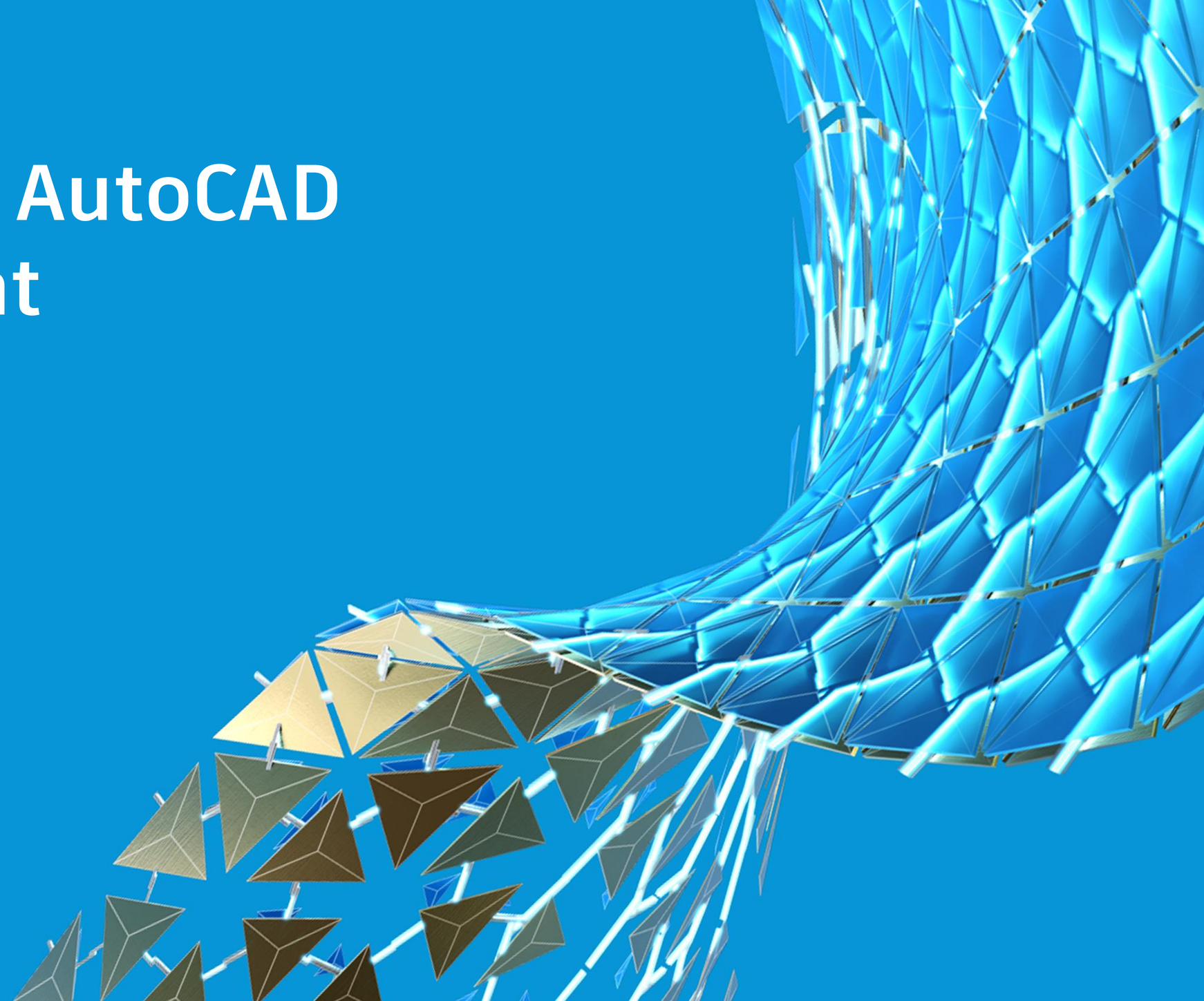
Exercise: E Bonus - Create a Desktop Shortcut

In this exercise, you will:

- Create a new AutoCAD shortcut
- Add command line switches to a shortcut

Follow along with the video or go to page 35 of the handouts.

Restore the AutoCAD Environment

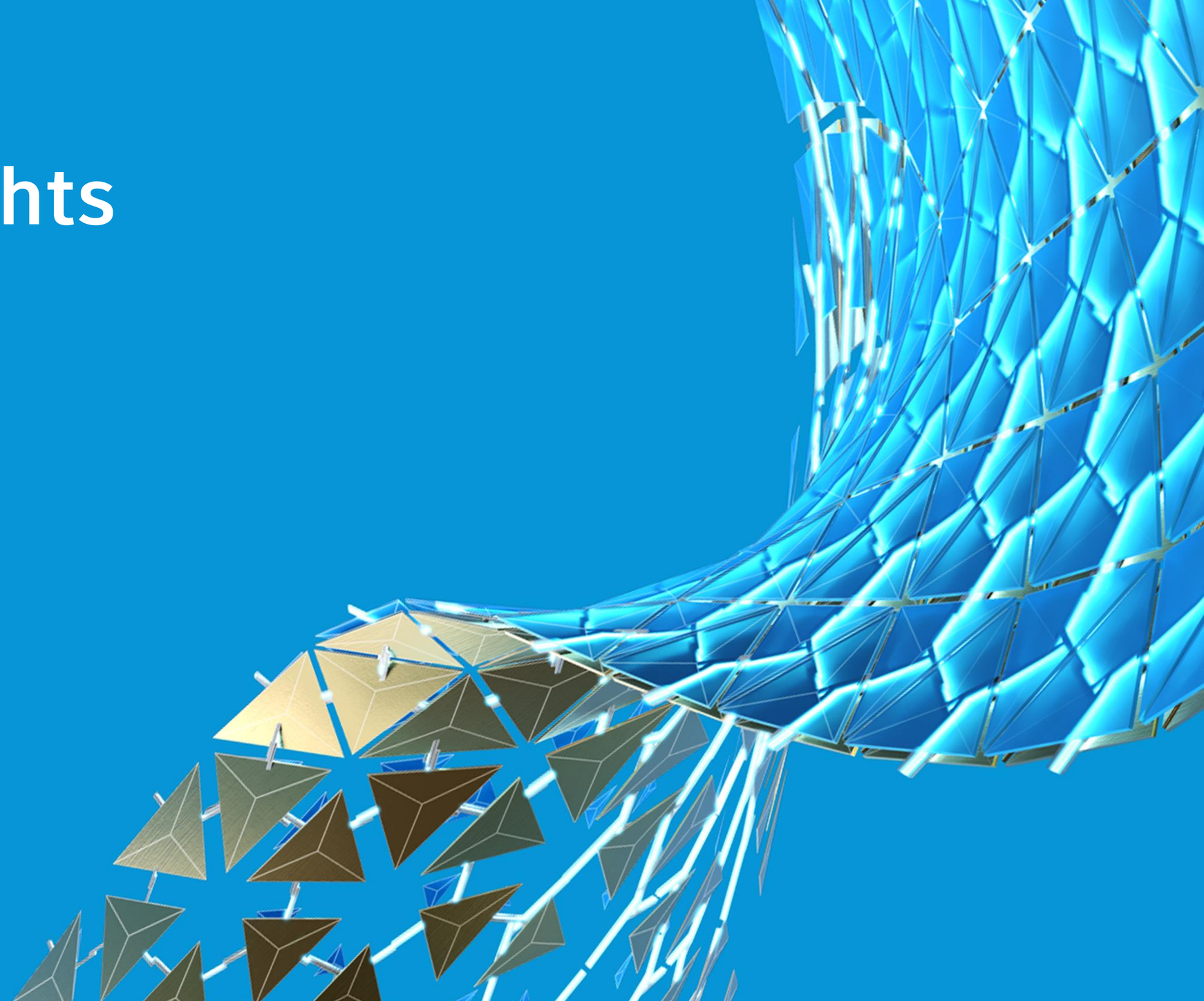


Restore the AutoCAD Environment

Follow the steps under “Restore the AutoCAD Environment”

- Remove the support file search path from the user profile
- Remove the newly added command aliases from *acad.pgp*
- Remove the My Tools tool palette
- Remove the new workspace, QAT, ribbon panel and tab
- Remove the new desktop shortcut

Final Thoughts



Final Thoughts

Customization and programming can:

- Enhance productivity
- Improve or introduce new workflows

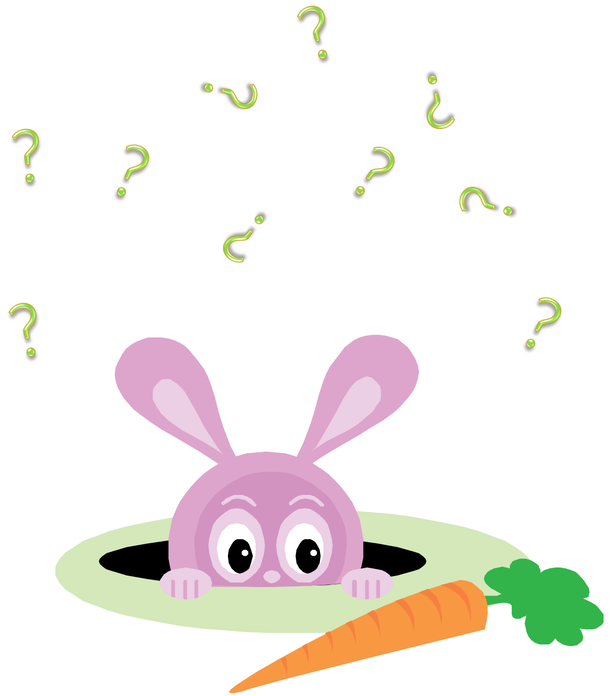
Customizing has many similarities to Wonderland in *Lewis Caroll's Alice's Adventures*.

Both

- Are virtually endless
- Hold many mysteries just waiting to be discovered

Final Thoughts

Questions? Questions? Questions?



If you have any questions, feel free to contact me via

email: lee.ambrosius@autodesk.com

twitter: @leeambrosius

Thanks for watching this session!