

ESP Training Sessions 1 & 2 (June 9, 2021)
Muddy Cards

Where can I find the training slides?
\$ESP_ROOT/training/ESP/lectures

Where can I find the starter files for the training exercises?
\$ESP_ROOT/training/ESP/data/sessionXX

Where can I find solutions for the training exercises?
\$ESP_ROOT/training/ESP/solutions/sessionXX

Can I see the tree view (like in session1,slide12) for understanding, modifying, and debugging longer or more complex designs.

Our initial thought is that watching in StepThru mode is probably more useful, but we will consider this. Also, if you open a Branch in ESP (as if you were editing it), the Branches that create the Bodys that are popped off the stack are marked with cyan in the TreeWindow and any Branch that uses the one being edited will be marked with yellow.

Is there csm syntax highlighting available for other editors (textmate, notepad++, etc...)?

Not at this time. But you can look at the end of ESP.js, which contains the various regexps that are used

Can you swap Body order on the stack before an intersection or subtraction?

Use new swap UDC or the sequence of commands
STORE temp 1
STORE temp 2
RESTORE temp 1
RESTORE temp 2

Do bodies have to be on the top of the stack for a boolean operation?

Yes. If they are not on the top of the stack, you can use RESTORE to get copies of them.

Does MARK delineate which bodies are affected by boolean operations?

The booleans always use the two Bodys on the top of the stack, except UNION (with the toMark option set), which uses all the Bodys back to the mark.

Is there a way to require a minimum version of ESP for a given OpenCSM script? For example, I know I'm using feature that requires at least v117.

There is a @version at-parameter so that you can test version numbers

Is the .egads format ESP-specific?

Yes, it is basically OpenCASCADE's .brep file with attributes added at the end

What format does ESP write out?

See the DUMP command

How does MARK work in a script?

See session 3

What language is ESP coded in?

The majority of the server is in C, although we use C++ where needed to interface to OpenCASCADE. We also have FORTRAN bindings to the EGADS functions. The browser code is largely javascript.

How do I pick the center of rotation when I want to rotate the model?

If you want to rotate the image on the screen, use the 8 or * key (in the GraphicsWindow) to set the rotation center. If you want to rotate the actual coordinates, use ROTATEX, ROTATEY, or ROTATEZ (or the gen_rot UDC)

When I do a boolean operation, do I lose the initial 2 bodies that go into it?

They aren't lost, but are popped off the stack. If you want to use them again, consider using STORE and RESTORE

Do you have a Python interface?

Yes, we have pyOCSM, which is a complete copy of the OpenCSM API. It has been developed to be fully compatible with pyEGADS and pyCAPS.

If I import a STEP file – does ESP convert/translate it into its parametric representation?

No, IMPORTs of .igs and .stp files result in a lump-o-geometry, which can however be used in other operations.

Can we add keyboard shortcuts for items in the "File" menu?

Since you have all the source, you can add whatever you want. But a note of caution: we may be creating shortcuts for other things in the future that might conflict with the shortcuts that you define, so beware.

Does Bodys denote two or more Bodies?

Yes

It's not clear if [Solid,Sheet,Wire]Bodys denotes a grouping of bodies in ESP or refers to multiple bodies.

Multiple bodies

Has ESP been used in any of your classes?

By a few students, but it is not in widespread use yet

The stack is hard to understand, as it is very different from other CAD software I have used.

Actually, all CAD systems with which I am familiar use a stack. But you typically do not even know that it exists because you cannot "program it" like you can with ESP

Would like to hear more about: how to use store, restore; how to add user-defined primitives.

See sessions 3 and 6.

I am on Windows 10. When I try to read homework files, it says "File not found".

Windows uses a backslash (\) to separate directories (folders) and files. So take the paths that are given and convert all the forward slashes (/) into back-slashes (\)

My Windows has the Desktop in the cloud. How can I get the ESP icons on my Desktop?

We have a work-around for this. Contact haimes@mit.edu for help

I am using OSX Catalina (or BigSur). Why does it complain about permissions?

You cannot download ESP119MAC.tgz via a web browser because of new "security" features. See the file `OSXcatalina.txt` for details.

Where can I find simple samples of the various commands?

Look in `$ESP_ROOT/data/basic`

What is the difference between UNION & JOIN?

JOIN is used when there are pairs of "almost-the-same" entities in the Bodys. Note that each Face-pair also has to have "almost-the-same" Edges and Nodes. It will NOT create little sliver Faces when the "almost-the-same" entities are not exactly the same

UNION is used when there are NOT pairs of "almost-the-same" entities in the Bodys. It will sometimes create little sliver Faces when the ``almost-the-same'' entries are not the same

Note: consider a "circular" feature. It is actually represented as a circle when created by a CYLINDER, but is approximated by a B-Spline when created by a RULE. Even though these are "almost-the-same", they can be far enough apart to cause sliver faces to be inserted

Can I use `-loadEgads`, `-dumpEgads`, and `-despmtrs` to efficiently build several related models?

Assume you have `myFile.csm` that has a `DESPMTR` that is used very late in the build (such as to deflect a flap)

```
DESPMTR flapDeflect 0
```

Double-click `ESP119` on your Desktop

To build the baseline configuration, enter:

```
serveCSM myFile.csm -batch -dumpEgads
```

To change the flap deflection, create a file called `flap.txt` that contains:

```
flapDeflect 10
```

To build the configuration with the new deflection, enter:

```
serveCSM myFile.csm -batch -loadEgads -despmtrs flap.txt
```

This will "recycle" `Bodys` from the previous case until it finds an operation that uses `flapDeflect`, after which it will actually start performing the indicated operation

Note: changing the value on the `DESPMTR` statement in the integrated code editor and pressing `Save` will do exactly the same thing

In examples, are `Length/Height/Depth` always in the `x-`, `y-`, and `z-` directions?

Generally yes. If you need more details, look at the solution in `$ESP_ROOT/training/ESP/solutions/session02/block.csm`

In the "Simple Block" example, is `Dist` the distance between the holes?

By looking at the "solution" file, it appears that `Dist` is not used (thanks for pointing this out)

If I use an external editor to develop a `.csm` file, how can I easily reload the case multiple times?

Assume that the file you are developing is called `myFile.csm`

Double-click on the `ESP119` icon on your Desktop

Enter:

```
serveCSM -dumpEgads -loadEgads myFile.csm
```

After you exit `serveCSM` (by closing the browser) and edit `myFile.csm`, simply hit the up-arrow in the `ESP119` window and `<enter>` to restart your program

Note: by using `-dumpEgads` and `-loadEgads`, as much of the build process as possible will be recycled from previous build (which

can save significant time)

When using the built-in editor, how can I save and reload multiple times?

Every time you hit Save in the editor, it automatically updates the file and rebuilds the configuration (with recycling when possible). BTW, if you have a UDC in your session, then you will have to "Press to Re-build" to build it manually (with recycling if possible)

Can you explain the \$order and index options for the SUBTRACT and INTERSECT commands?

It is possible that these commands can produce more than one Body. But the rule of Booleans (in ESP) is that they each only produce one Body. \$order and index allow you to pick which Body you really want