

Reliable Techniques for complex Assembly design in Autodesk Inventor

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Class summary

In this class we will learn simple and effective strategies for building parametric, stable assemblies that can easily be updated.

We will discuss best practice for structuring assemblies and how to scale when working with large assemblies. We will learn how to use relationships effectively, and when to use the alternatives.

We will learn how to prepare a design for 'top down' parametric change, and how we can trigger changes using iLogic.

Finally, we will learn how to document our design intent to ensure that our colleagues can work with our assemblies as effectively as we can.

Key Learning objectives

- Learn how to structure assemblies effectively
- Learn how to make use of relationships effectively, and when to use the alternatives.
- Learn how to manage large assemblies.
- Learn how to trigger 'Top Down' parametric changes with illogic.



Paul Munford

@PaulCADmunford

Carpenter

Drafter (AutoCAD & Inventor)

CAD/CAM Manager

Trainer & Consultant

Technical Marketing Manager for Autodesk

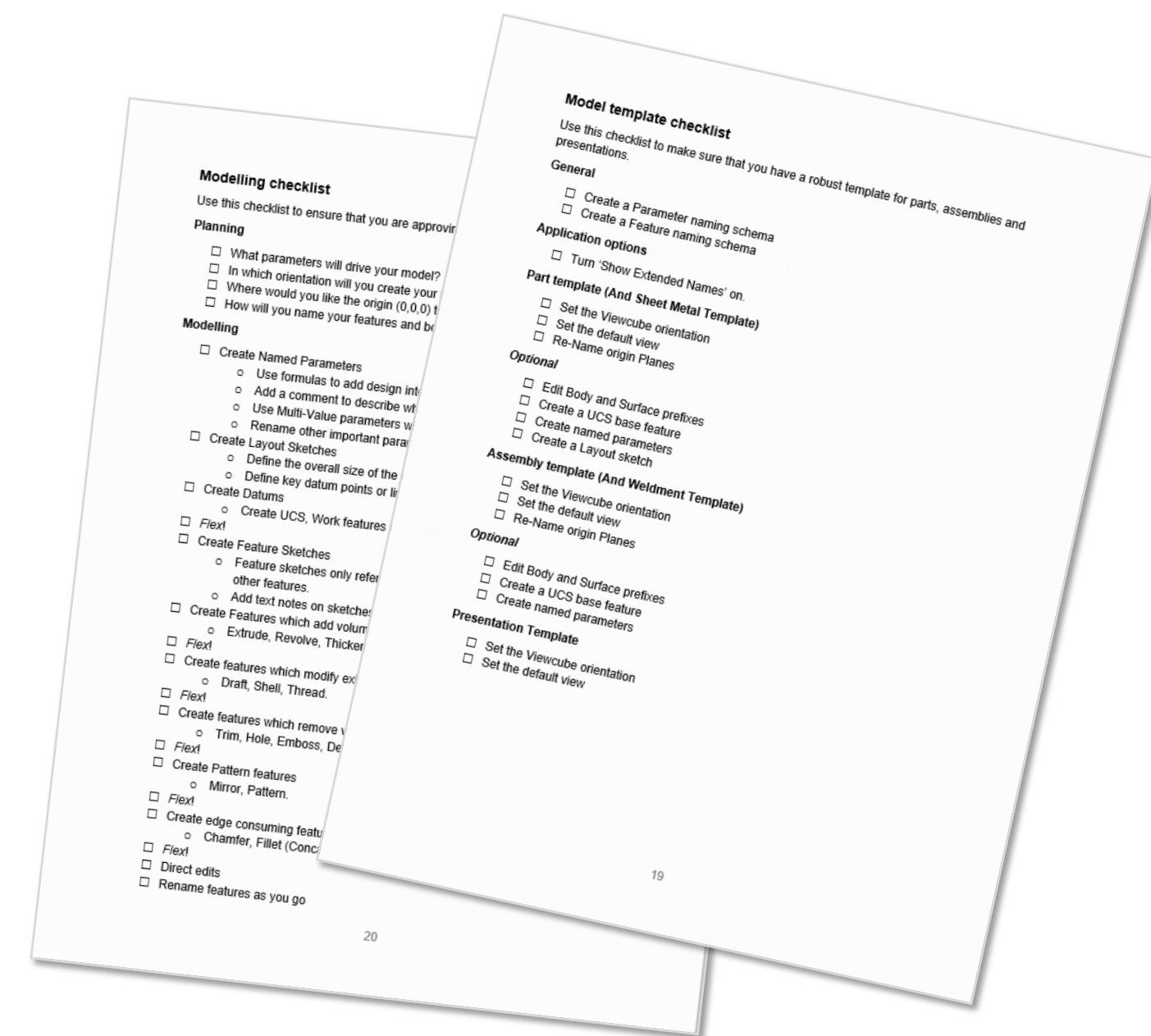
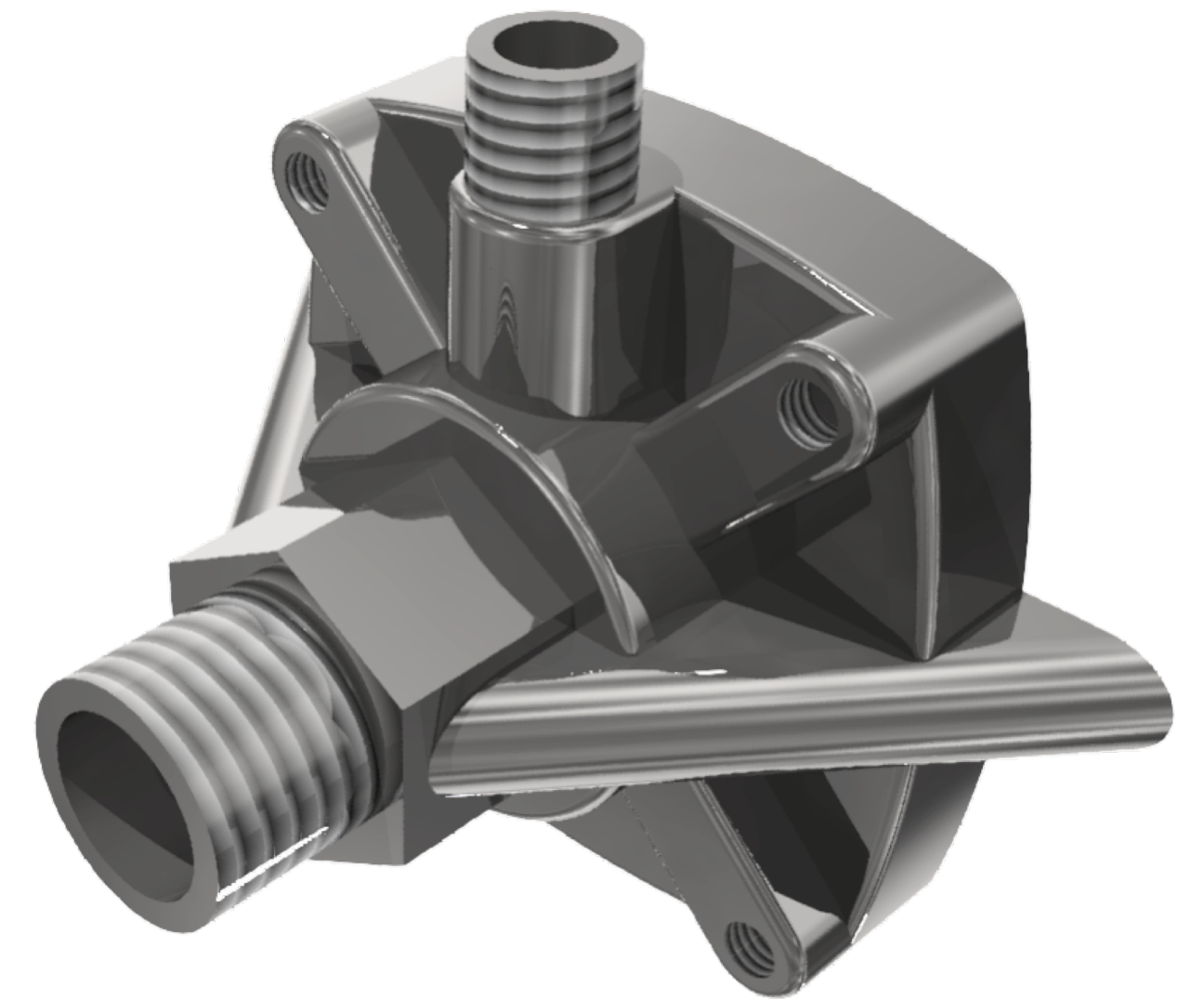
Reliable Modelling Techniques for Complex Part Design in Inventor

Paul Munford & Luke Mihelcic
Autodesk Technical Marketing PDMC



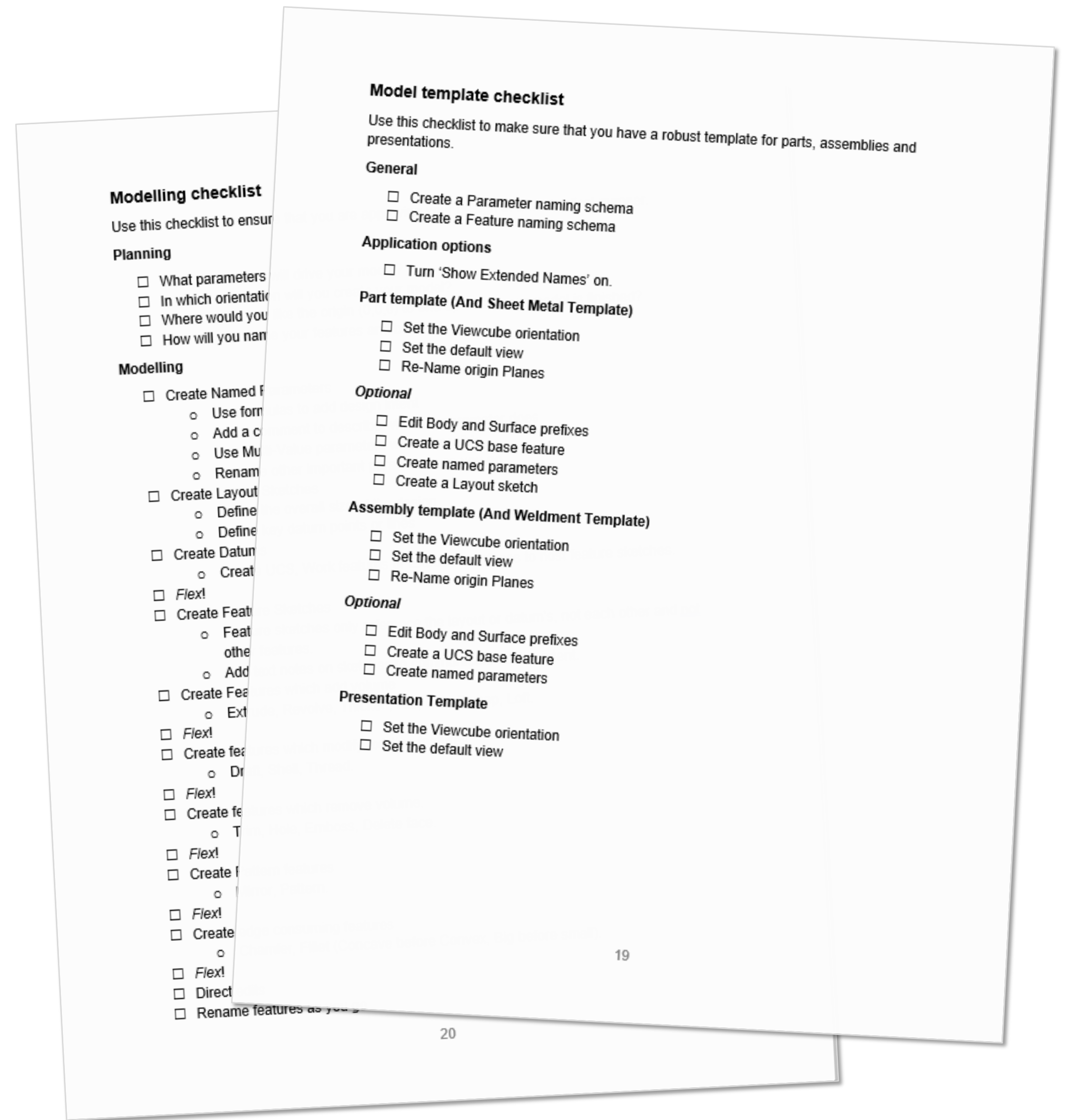
@PaulCADMunford

@Inventor_Luke



Checklists

- Template/Application options
- Assembly Modelling



Downloads

Download the Handout and dataset via the AU app

Or

Handout

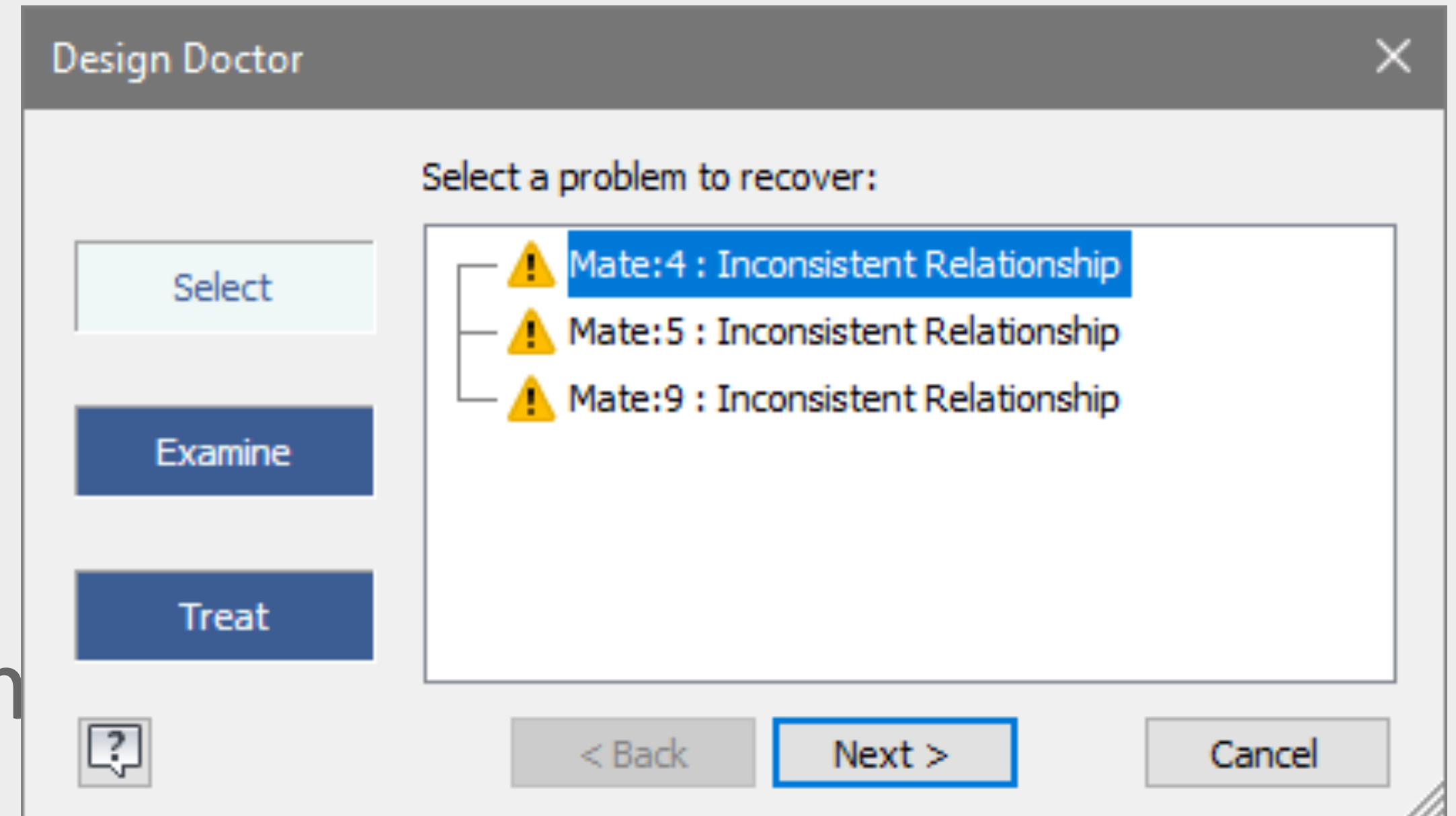
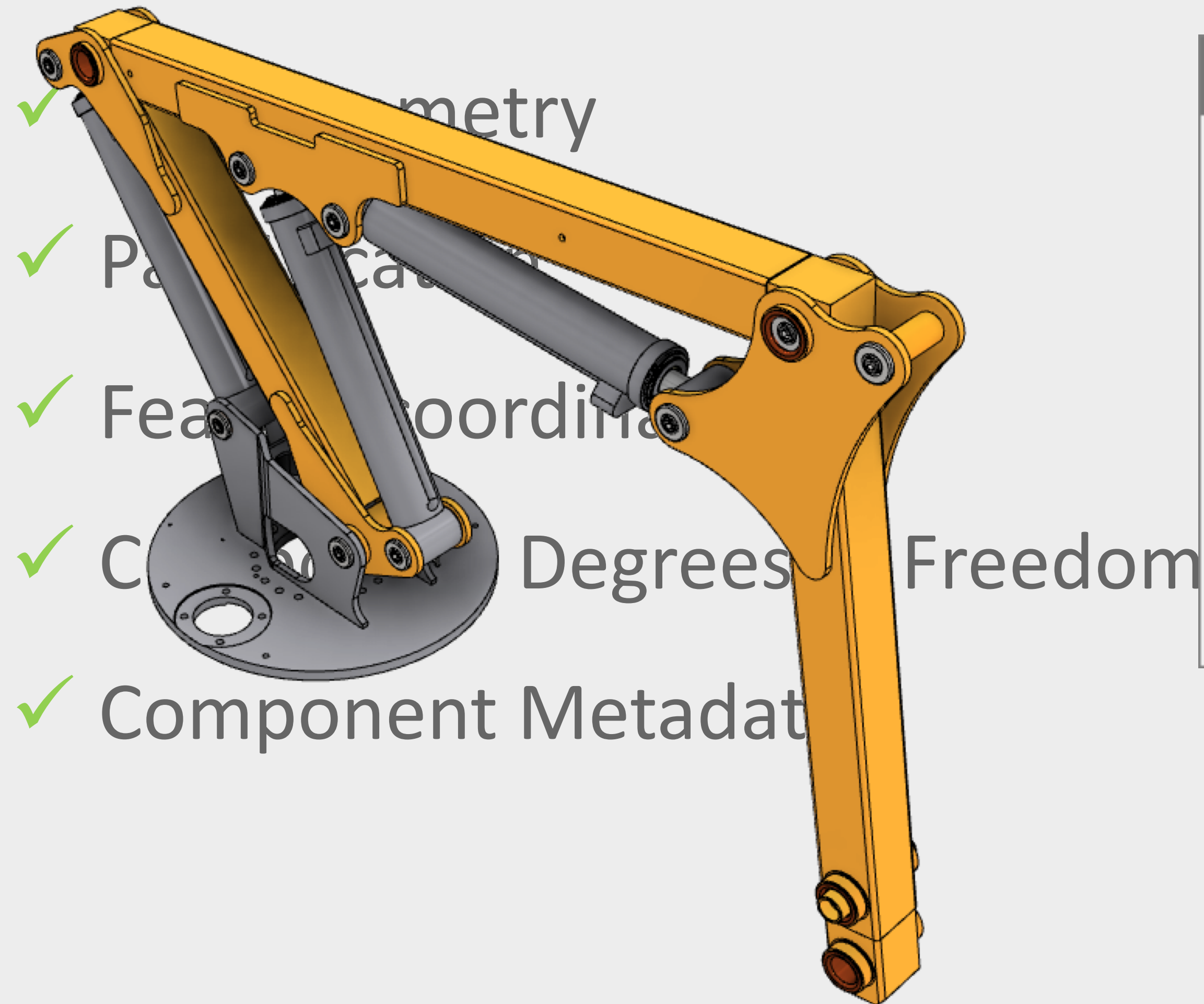
Dataset

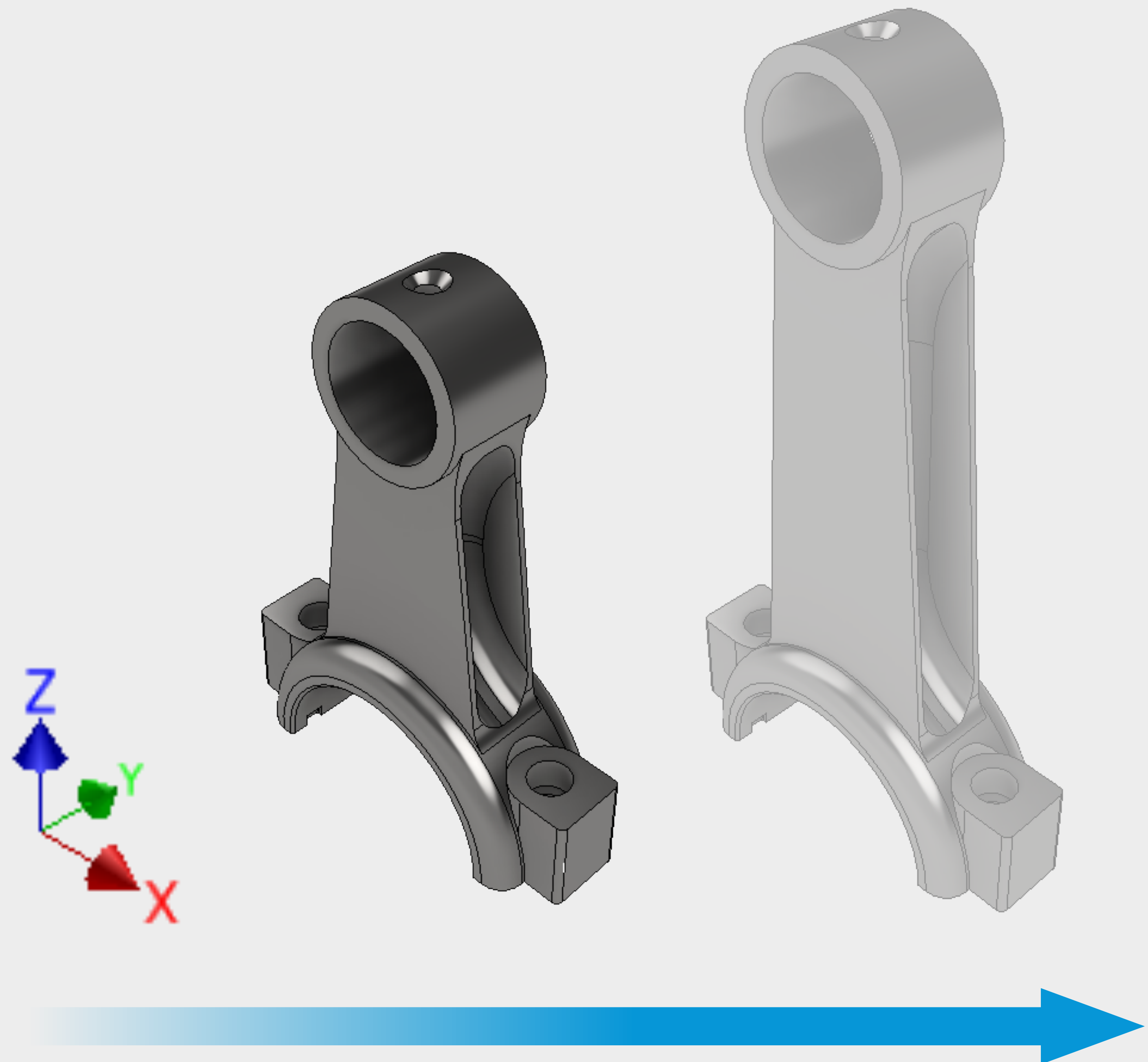
A 3D CAD model of a mechanical linkage system. The main components are colored yellow, including a long horizontal link, a vertical link, and a base plate. A grey hydraulic cylinder is connected between the horizontal and vertical links. The base plate is circular with a central hole and several smaller holes around its perimeter. The text "How do I use Inventor Properly?" is overlaid on the image in a white, italicized font.

How do I use Inventor Properly?

✓ Correct Data

✓ Easy to update





Unintentional relationships + Feature **Regeneration**

- ↳ **Unpredictable** Updates

 - ↳ Design intent **lost**

 - ↳ Time lost '**fixing**' designs

 - ↳ Re-build rather than **Re-use**

Editable models

Design intent is captured

Obvious Models

Design Intent is documented

Reusable Models

Re-use rather than Re-Build

Component **File type**

Component **Complexity**

Component **Quantity**

Component **Relationships**

Component **Adaptivity**

Derived **Components**

Linked **Parameters**

Multiple Updates

By Multiple People



1. No **unintended** Relationships
2. Relationships are kept to a **minimum**
3. All relationships are **planned** and **purposeful**
4. All relationships are **obvious & easily understood**

SET UP

Model template checklist

Use this checklist to make sure that you have a robust template for parts, assemblies and presentations.

General

- Create a Parameter naming schema
- Create a Feature naming schema

Application options

- Turn 'Show Extended Names' on.

Part template (And Sheet Metal Template)

- Set the Viewcube orientation
- Set the default view
- Re-Name origin Planes

Optional

- Edit Body and Surface prefixes
- Create a UCS base feature
- Create named parameters
- Create a Layout sketch

Assembly template (And Weldment Template)

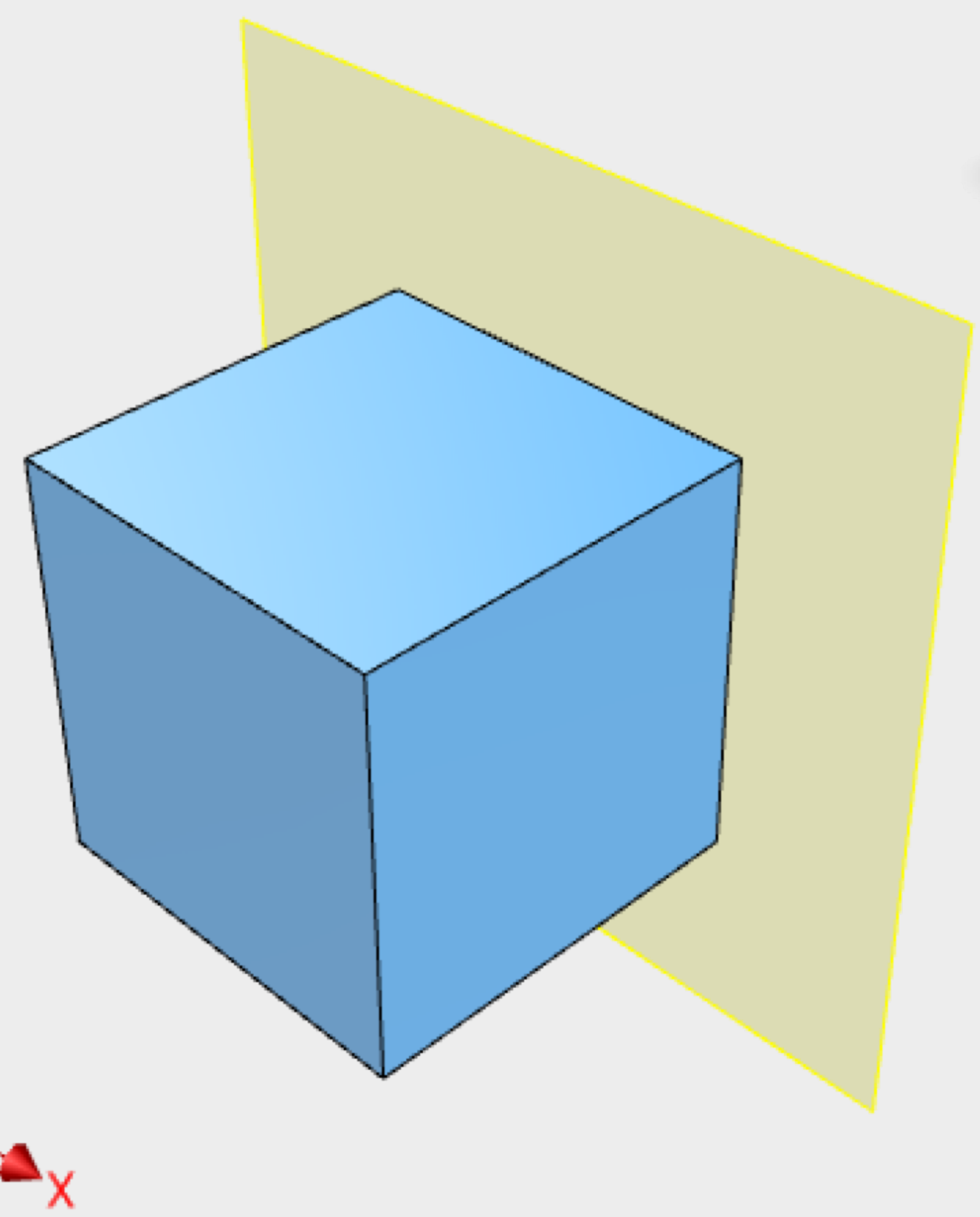
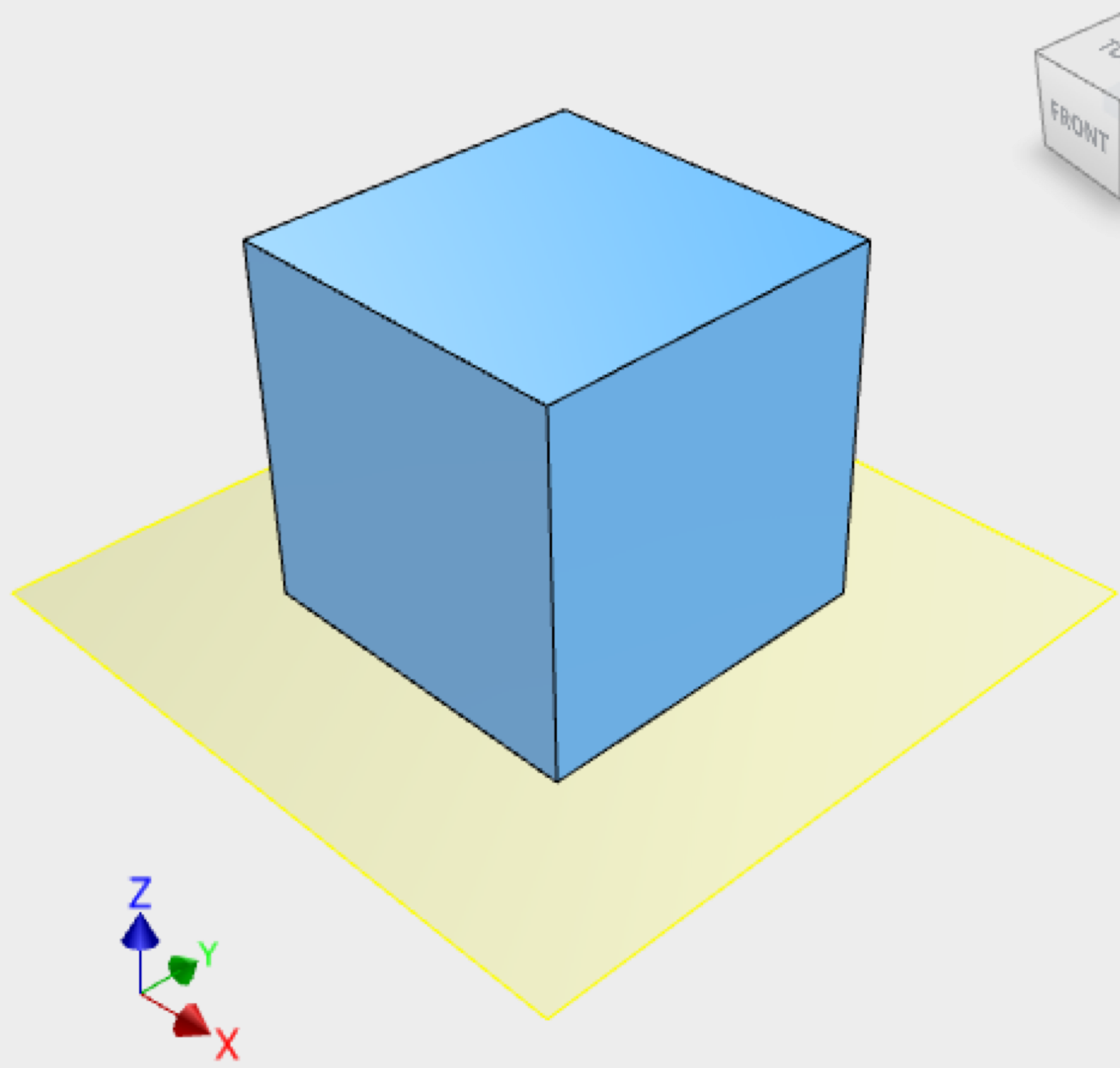
- Set the Viewcube orientation
- Set the default view
- Re-Name origin Planes

Optional

- Edit Body and Surface prefixes
- Create a UCS base feature
- Create named parameters

Presentation Template

- Set the Viewcube orientation
- Set the default view

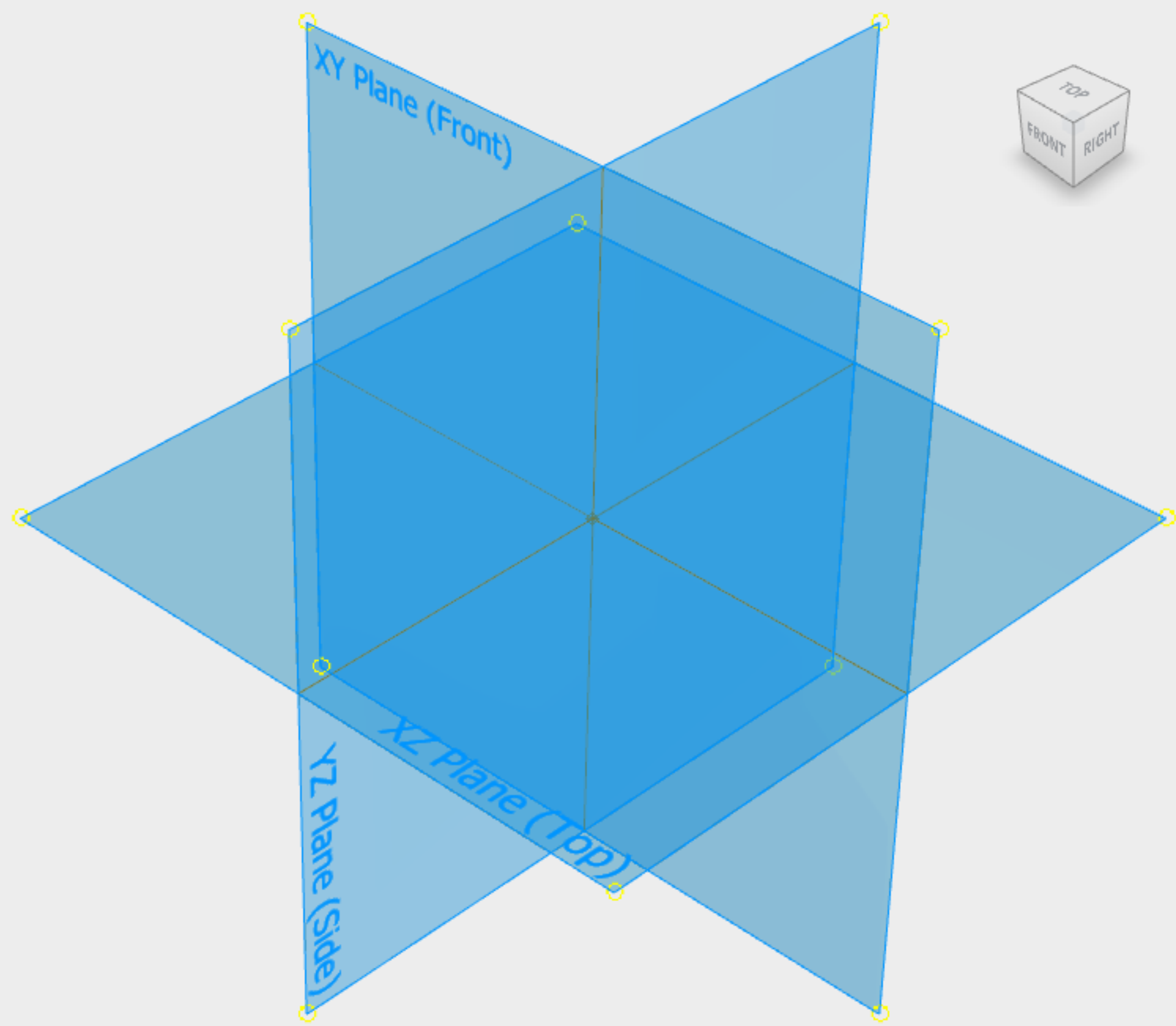




Model X + 🔍 ☰































[Assembly](#) | Modeling

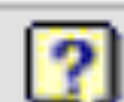
Assembly1

- Relationships
- + Representations
- Origin
 - YZ Plane (Side)
 - XZ Plane (Top)
 - XY Plane (Front)
 - X Axis
 - Y Axis
 - Z Axis
 - Center Point



Model Data  Structured  Parts Only

Item	BOM Structure	Part Number	Material	Appearance	Mass	Item QTY	Description
 1	 Normal	3136 1149 26	Steel, Mild	Metal-Steel(Polish)	19.714 kg	1	
 2	 Normal	3136 1149 28	Steel, Mild	Metal-Steel(Polish)	3.595 kg	1	
 3	 Normal	3136 1149 27	Steel, Mild	Metal-Steel(Polish)	3.595 kg	1	
 4	 Normal	3136 1149 29	Steel, Mild	Metal-Steel(Polish)	1.388 kg	1	Plate
 5	 Normal	3136 7044 74	Steel, Mild	Brokk-Gul	0.586 kg	8	Shaft
 6	 Normal	3136 7044 91	Steel, Mild	Brokk-Gul	0.932 kg	2	Shaft
 7	 Normal	3136 7044 79	Steel, Mild	Semi-Polished	0.085 kg	18	Washer
 8	 Normal	0301 2344 00	Steel, Mild	Semi-Polished	0.005 kg	1	Washer
 9	 Normal	3136 7057 14	Steel, Mild	Semi-Polished	0.050 kg	18	Screw
 10	 Normal	0147 1323 03	Steel, Mild	Semi-Polished	0.014 kg	2	Screw
 11	 Normal	3136 1094 43	Steel, Mild	Brokk-Gul	7.562 kg	1	
 12	 Normal	3136 1133 81	Steel, Mild	Brokk-Gul	1.631 kg	4	
 13	 Normal	3136 1094 58	Steel, Mild	Brokk-Gul	0.116 kg	3	
 14	 Normal	3136 1144 21	Steel, Mild	Brokk-Gul	1.487 kg	5	
 15	 Normal	0500 4500 24	Copper	Metal-Copper(Polish)	0.103 kg	10	Flanged bearing



Import...

Export...

Done

Arm System.iam

Relationships

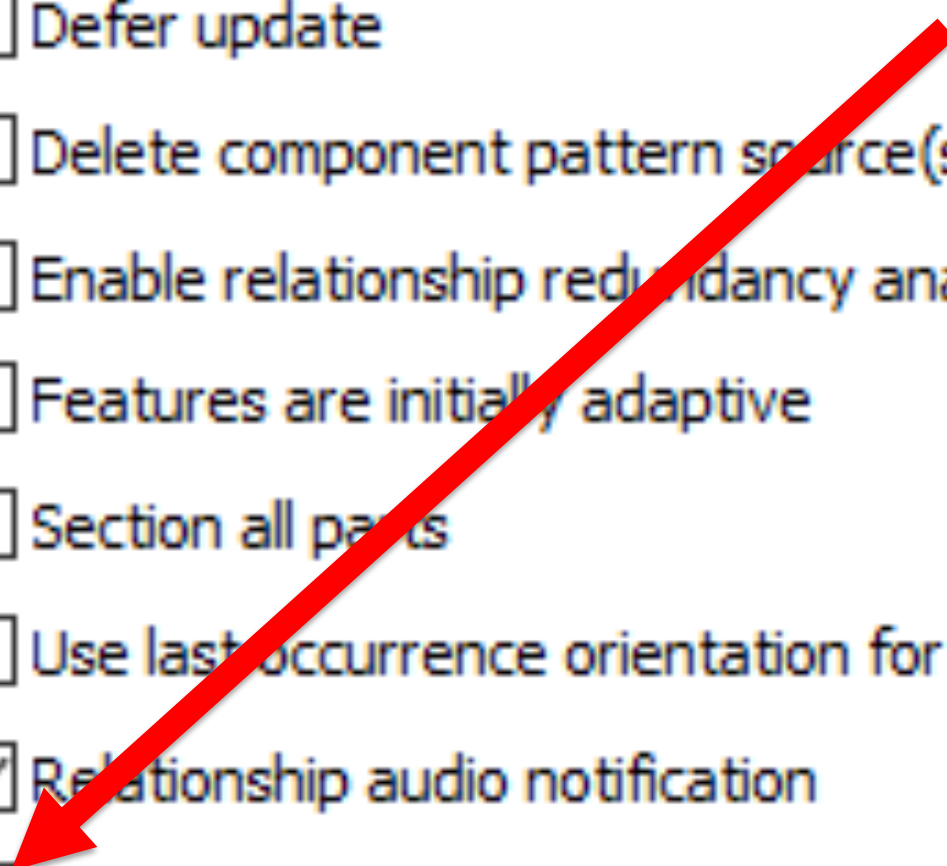
- Mate:4 (Cylinder:1,Armbracket-Base:1)
- Mate:5 (Cylinder:1,Armbracket-Base:1) (0.2)
- Mate:6 (Lower Arm-N:1,Armbracket-Base:1)
- Mate:8 (Lower Arm-N:1,Armbracket-Base:1)
- Mate:9 (Cylinder:1,Lower Arm-N:1)
- Mate:10 (Middle Arm-N:1,Lower Arm-N:1)
- Mate:12 (Middle Arm-N:1,Lower Arm-N:1)
- Mate:17 (Top Arm-N:1,Middle Arm-N:1)
- Mate:18 (Top Arm-N:1,Middle Arm-N:1)
- Insert:1 (Cylinder:2,Lower Arm-N:1)
- Insert:2 (Cylinder:3,Middle Arm-N:1)
- Mate:22 (Cylinder:3,Top Arm-N:1)
- Mate:24 (Cylinder:2,Middle Arm-N:1)



Application Options

- | | | | | | | | |
|----------|--------|------|----------|----------|----------------|---------|---------|
| General | Save | File | Colors | Display | Hardware | Prompts | Drawing |
| Notebook | Sketch | Part | iFeature | Assembly | Content Center | | |

- Defer update
- Delete component pattern source(s)
- Enable relationship redundancy analysis
- Features are initially adaptive
- Section all parts
- Use last occurrence orientation for component placement
- Relationship audio notification
- Display component names after relationship names



	C:\Reliable Assemblies\Workspace\Components\Armbraacket-Base.iam	Armbraacket-Base.iam	Armbraacket-Base	Joe M	Arminfästning	Armbraacket
	C:\Reliable Assemblies\Workspace\Components\3136 1149 25.iam	3136 1149 25.iam	3136 1149 25	Joe M	Arminfästning svängmotor	Armbraacket
	C:\Reliable Assemblies\Workspace\Components\3136 1149 26.ipt	3136 1149 26.ipt	3136 1149 26	Joe M	Bottenplåt	
	C:\Reliable Assemblies\Workspace\Components\3136 1149 28.ipt	3136 1149 28.ipt	3136 1149 28	Joe M	Sidoplåt vänster	
	C:\Reliable Assemblies\Workspace\Components\3136 1149 27.ipt	3136 1149 27.ipt	3136 1149 27	Joe M	Sidoplåt höger	
	C:\Reliable Assemblies\Workspace\Components\3136 1149 29.ipt	3136 1149 29.ipt	3136 1149 29	Joe M	Förstyvning	Plate
	C:\Reliable Assemblies\Workspace\Components\3136 7044 74.ipt	3136 7044 74.ipt	3136 7044 74	Joe M	Axel	Shaft
	C:\Reliable Assemblies\Workspace\Components\3136 7044 91.ipt	3136 7044 91.ipt	3136 7044 91	Joe M	Axel	Shaft
	C:\Reliable Assemblies\Workspace\Components\3136 7044 79.ipt	3136 7044 79.ipt	3136 7044 79	Joe M	Kona	Washer
	C:\Reliable Assemblies\Workspace\Components\0301 2344 00.ipt	0301 2344 00.ipt	0301 2344 00	Joe M	Bricka	Washer
	C:\Reliable Assemblies\Workspace\Components\3136 7057 14.ipt	3136 7057 14.ipt	3136 7057 14	Joe M	Skruv	Screw
	C:\Reliable Assemblies\Workspace\Components\Lower Arm-N.iam	Lower Arm-N.iam	Lower Arm-N	Uffe Bak		
	C:\Reliable Assemblies\Workspace\Components\3136 7044 74.ipt	3136 7044 74.ipt	3136 7044 74	Joe M	Axel	Shaft
	C:\Reliable Assemblies\Workspace\Components\3136 7044 79.ipt	3136 7044 79.ipt	3136 7044 79	Joe M	Kona	Washer
	C:\Reliable Assemblies\Workspace\Components\3136 7057 14.ipt	3136 7057 14.ipt	3136 7057 14	Joe M	Skruv	Screw
	C:\Reliable Assemblies\Workspace\Components\0147 1323 03.ipt	0147 1323 03.ipt	0147 1323 03	Joe M	Skruv	Screw
	C:\Reliable Assemblies\Workspace\Components\3136 1144 16-N.iam	3136 1144 16-N.iam	3136 1144 16-N	Uffe Bak		
	C:\Reliable Assemblies\Workspace\Components\3136 1133 80.iam	3136 1133 80.iam	3136 1133 80	Uffe Bak		
	C:\Reliable Assemblies\Workspace\Components\3136 1094 43.ipt	3136 1094 43.ipt	3136 1094 43	Uffe Bak		
	C:\Reliable Assemblies\Workspace\Components\3136 1133 81.ipt	3136 1133 81.ipt	3136 1133 81	Uffe Bak		
	C:\Reliable Assemblies\Workspace\Components\3136 1094 58.ipt	3136 1094 58.ipt	3136 1094 58	Uffe Bak		
	C:\Reliable Assemblies\Workspace\Components\3136 1144 21.ipt	3136 1144 21.ipt	3136 1144 21	Joe M	Kuts	
	C:\Reliable Assemblies\Workspace\Components\0500 4500 24.ipt	0500 4500 24.ipt	0500 4500 24	Joe M	Flänslager	Flanged bearing
	C:\Reliable Assemblies\Workspace\Components\Middle Arm-N.iam	Middle Arm-N.iam	Middle Arm-N	Uffe Bak		
	C:\Reliable Assemblies\Workspace\Components\3136 1133 82.iam	3136 1133 82.iam	3136 1133 82	Uffe Bak		
	C:\Reliable Assemblies\Workspace\Components\3136 1094 48.ipt	3136 1094 48.ipt	3136 1094 48	Uffe Bak		
	C:\Reliable Assemblies\Workspace\Components\3136 1094 44.ipt	3136 1094 44.ipt	3136 1094 44	Uffe Bak		

File Naming

Consider

- ✓ Drawings and Assemblies
Project/Product based
- ✓ Parts Project/Product based
- ✓ Parts 'Standard'
- ✓ Parts Supplier
- ✓ 'Output' files .pdf .dwf .dwg

Avoid

- ✗ 252 Character Limit
- ✗ State (WIP, Review, Released)
- ✗ Revision
- ✗ Date
- ✗ Calculated values
- ✗ Metadata

Parameter Naming

1. Case Sensitive
2. Start with a letter
3. Can Include Numbers
4. Cannot Contain spaces
5. Can contain '_' and ':'

Examples

OverallWidth

Overall_Width

OAwidth

OA:Width

3136 1094 48.ipt iProperties

General Summary Project Status Custom Save Physical

Solids: The Part [Update]

Material: Steel, Mild [Clipboard]

Density: 7.860 g/cm³ Requested Accuracy: Low

General Properties

Center of Gravity

Mass: 12.627 kg (Relative) X: -0.000 mm (Relative)

Area: 646263.230 mm² Y: -0.007 mm (Relative)

Volume: 1606541.151 mm³ Z: 547.047 mm (Relative)

3136 1094 48.ipt Document Settings

Standard Units Sketch Modeling Bill of Materials Default Tolerance

Default BOM Structure: Normal

Unit Quantity: 1.094 m

Base Quantity: Length (1094 mm)

Base Unit: m

Parameters

Parameter Name	Consumed by	Unit/Type	Equation	Nominal Value	Tol.	Model Value	Key	Export Param	Comment
+ Model Parameters									
- Reference Parameters									
d25		mm	80.000 mm	80.000000	Yellow	80.000000	<input type="checkbox"/>	<input type="checkbox"/>	
- User Parameters									
Length	3	mm	1094 mm	1094.000000	Yellow	1094.000000	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Overall length
Width	0	mm	80 mm	80.000000	Yellow	80.000000	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Overall width
Depth		mm	80 mm	80.000000	Yellow	80.000000	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Overall depth
Wall_Thickness	2	mm	5 mm	5.000000	Blue	5.000000	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Wall Thickness

Update Purge Unused

Done

Immediate Update

3136 1094 48.ipt iProperties

General Summary Project Status Custom Save Physical

Name: [Add]

Type: Text [Delete]

Value: []

Name	Value	Type
Depth	80.000 mm	Text
Length	1094.000 mm	Text
Wall_Thickness	5.000 mm	Text
Width	80.000 mm	Text

Show Clear

X

Model Data Structured Parts Only

Item	BOM Structure	Part Number	Material	Appearance	Length	Width	Depth	Mass	Base QTY	Item QTY	QTY	Description
01	Normal	0500 4500 24	Copper	Metal-Cop...				0.103 kg	Each	10	10	Flanged bearing
02	Normal	3136 7048 80	Copper	Metal-Cop...				0.069 kg	Each	12	12	Flanged bearing
03	Normal	3136 7009 59	Generic	Generic				0.002 kg	Each	3	3	Lock ring
04	Normal	3136 7009 52	Nylon 6/6	Nylon 6				0.037 kg	Each	3	3	Piston
05	Normal	3136 7009 55	Nylon 6/6	Nylon 6				0.002 kg	Each	3	3	Wiper
06	Normal	0147 1323 03	Steel, Mild	Semi-Polis...				0.014 kg	Each	2	2	Screw
07	Normal	0301 2344 00	Steel, Mild	Semi-Polis...				0.005 kg	Each	1	1	Washer
08	Normal	0544 1100 09	Steel, Mild	Semi-Polis...				0.006 kg	Each	6	6	Greasing nipple
09	Normal	3136 1074 64	Steel, Mild	Steel				0.850 kg	Each	3	3	Top nut
10	Normal	3136 1094 43	Steel, Mild	Brokk-Gul	655.000 mm	80.000 mm	80.000 mm	7.562 kg	655 mm	1	655.000 mm	
11	Normal	3136 1094 44	Steel, Mild	Brokk-Gul				3.057 kg	Each	2	2	
12	Normal	3136 1094 48	Steel, Mild	Brokk-Gul	1094.000 mm	80.000 mm	80.000 mm	12.627 kg	1094 mm	2	2188.000 mm	
13	Normal	3136 1094 55	Steel, Mild	Brokk-Gul	730.000 mm	80.000 mm	80.000 mm	8.234 kg	730 mm	3	2190.000 mm	
14	Normal	3136 1094 56	Steel, Mild	Brokk-Gul				3.311 kg	Each	1	1	
15	Normal	3136 1094 58	Steel, Mild	Brokk-Gul				0.116 kg	Each	3	3	
16	Normal	3136 1117 73	Steel, Mild	Steel				0.502 kg	Each	3	3	Piston
17	Normal	3136 1133 81	Steel, Mild	Brokk-Gul				1.631 kg	Each	4	4	
18	Normal	3136 1133 82	Steel, Mild	Brokk-Gul				2.690 kg	Each	2	2	

WORK

Modelling checklist

Use this checklist to ensure that you are approving your design in a methodical manner.

Planning

- What parameters will drive your model?
- In which orientation will you create your model?
- Where would you like the origin (0,0,0) to end up when your model is finished?
- How will you name your features and bodies?

Modelling

- Create Named Parameters
 - Use formulas to add design intent
 - Add a comment to describe what the parameter does
 - Use Multi-Value parameters where possible
 - Rename other important parameters as you go
- Create Layout Sketches
 - Define the overall size of the design
 - Define key datum points or lines
- Create Datums
 - Create UCS, Work features or Extruded surfaces to host feature sketches.
- Flex!*
- Create Feature Sketches
 - Feature sketches only reference the layout or datum's, not each other and not other features.
 - Add text notes on sketches to communicate design intent.
- Create Features which add volume
 - Extrude, Revolve, Thicken, Rib, Coil, Sweep, Loft.
- Flex!*
- Create features which modify existing features
 - Draft, Shell, Thread.
- Flex!*
- Create features which remove volume.
 - Trim, Hole, Emboss, Delete face.
- Flex!*
- Create Pattern features
 - Mirror, Pattern.
- Flex!*
- Create edge consuming features
 - Chamfer, Fillet (Concave before Convex, Big before small).
- Flex!*
- Direct edits
- Rename features as you go

Joints **V** Constraints



Joint



Constrain

Remove all DOF

Features

Great for assembly

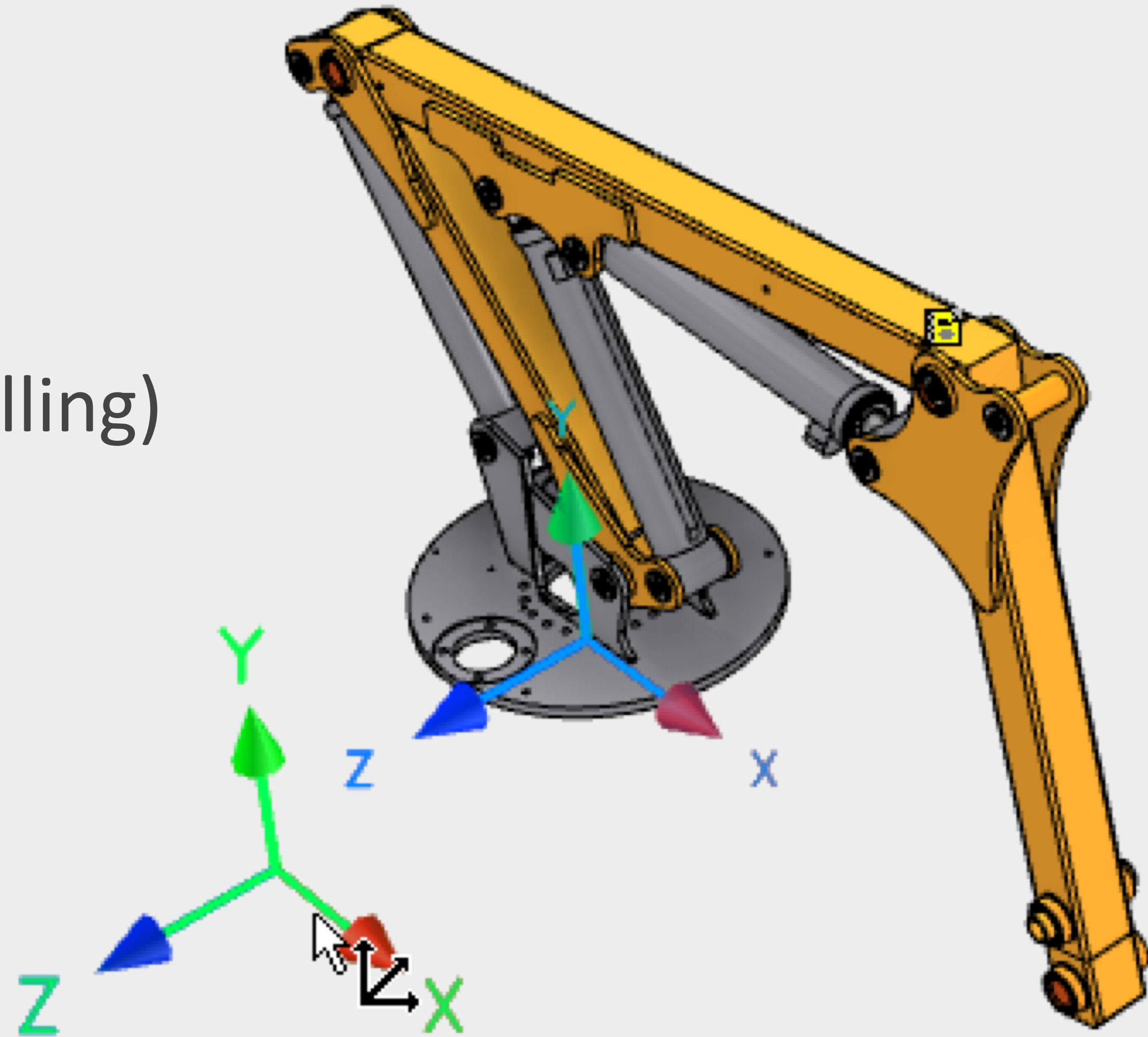
Remove one DOF at a time

Faces (& Work Features)

Great for complex motion

Joints \vee Constraints \vee ?

- Ground & Occurrence properties
- UCS constraints
- Derive (Skeletal or Multibody modelling)
- iLogic



Place Create Free Move Free Rotate Joint Constrain Show Show Sick Hide All Pattern Mirror Copy Bill of Materials Parameters Degree of Freedom Analysis Plane Axis Point UCS Shrinkwrap Shrinkwrap Substitute

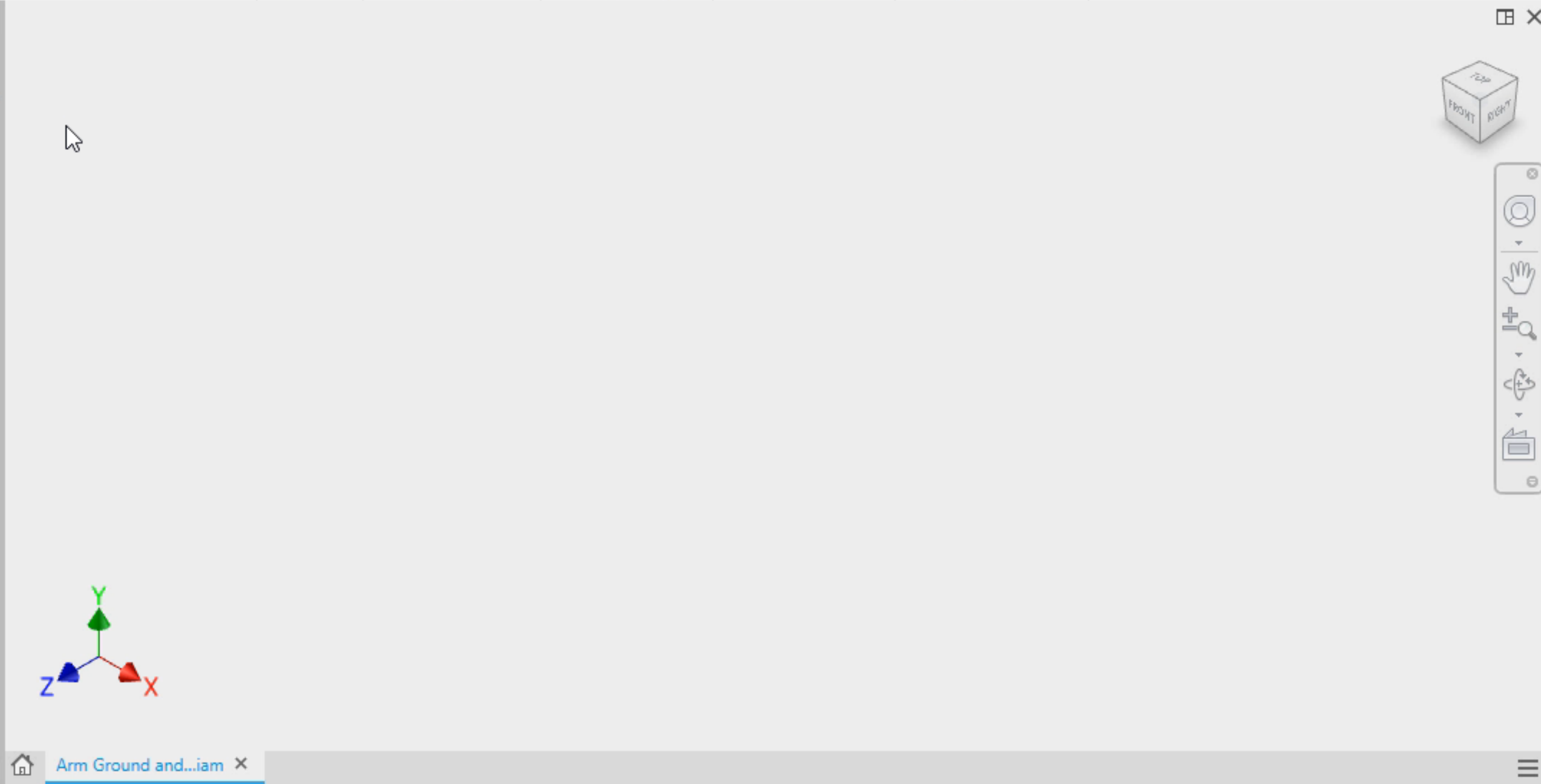
Component Position Relationships Pattern Manage Productivity Work Features Simplification

Model x +

Assembly | Modeling

Arm Ground and Occurance Pr

- Relationships
- Representations
- Origin



Material Appearance Arm System... Search Help & Commands... PaulMunford

Place Create Free Move Free Rotate Joint Constrain Show Show Slick Hide All Pattern Mirror Copy Bill of Materials Parameters Degree of Freedom Analysis Plane Axis Point UCS Shrinkwrap Shrinkwrap Substitute

Model x +

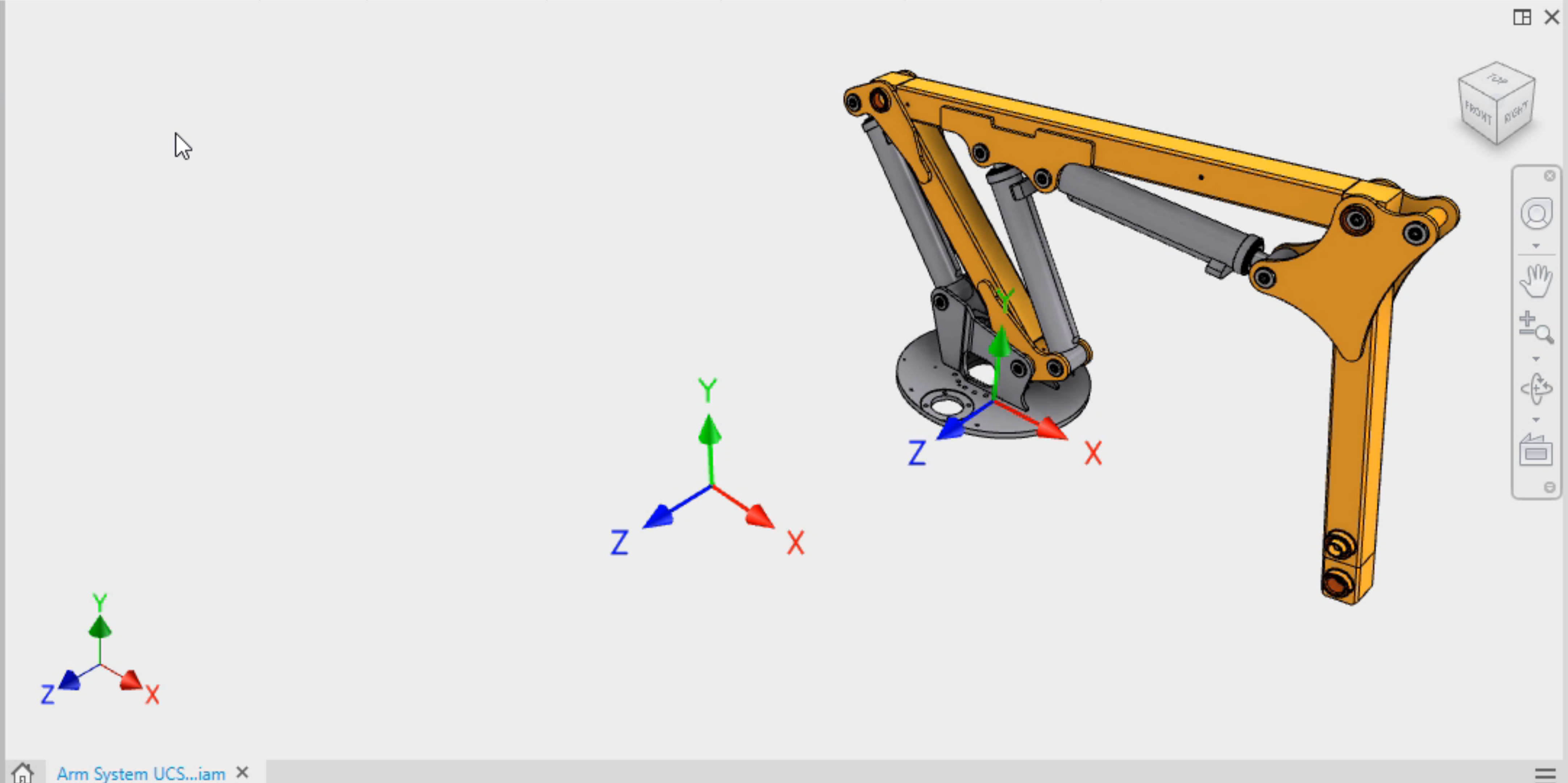
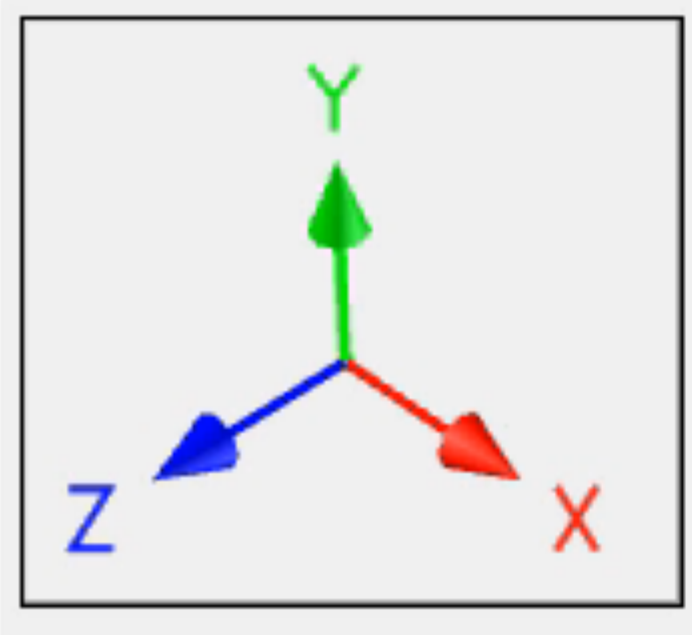
Assembly | Modeling

Arm System UCS Constraints.i

- Relationships
- Representations
- Origin
- Arm Position
- Arm System UCS Origin: 1

iLogic x +

Rules Forms Global Forms



Feature Relationships

- Adaptivity
- Linking Parameters
- Derive (Skeletal or Multibody modelling)
- iLogic

Model X +

Assembly | Modeling

- Arm System.iam
 - Relationships
 - Representations
 - Origin
 - Armbracket-Base
 - Lower Arm-N:1
 - Middle Arm-N:1
 - Top Arm-N:1
 - Cylinder:1
 - Cylinder:2
 - Cylinder:3
 - 3136 7057** (Adaptive)
 - Origin
 - Work Plane1 (2)
 - Sketch1
 - Work Plane2
 - Flush:1 (Top)
 - Flush:2 (Top)

Undo Isolate

Substitute

Free Move V

Free Rotate G

Representation...

Component

Show Relationships

Measure M

Create Note

BOM Structure

Visibility Alt+V

iMate Glyph Visibility

Grounded

Adaptive

Enabled WS

Transparent Alt+T

Contact Set

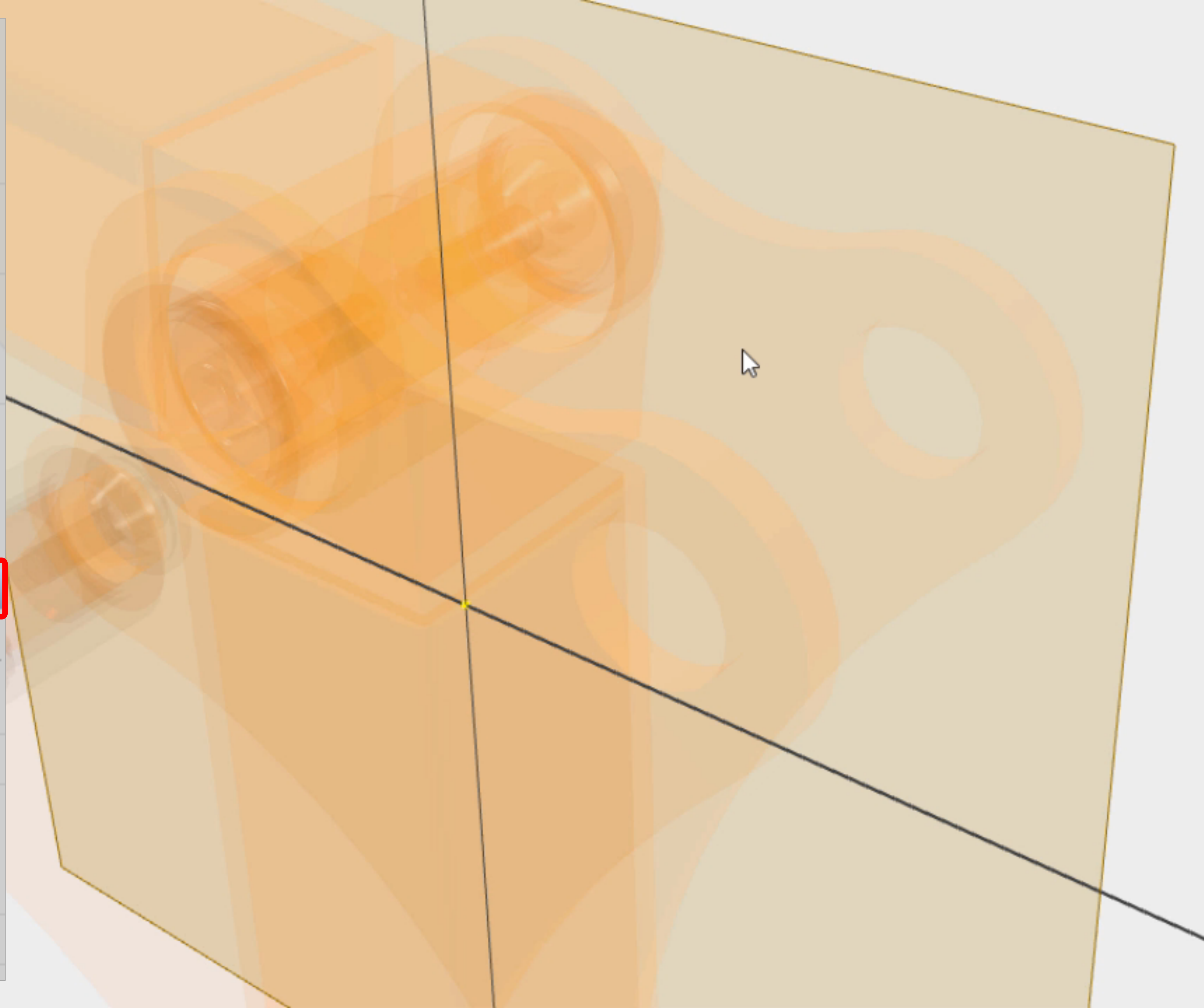
Suppress

Expand All Children

Collapse All Children

Find in Window END

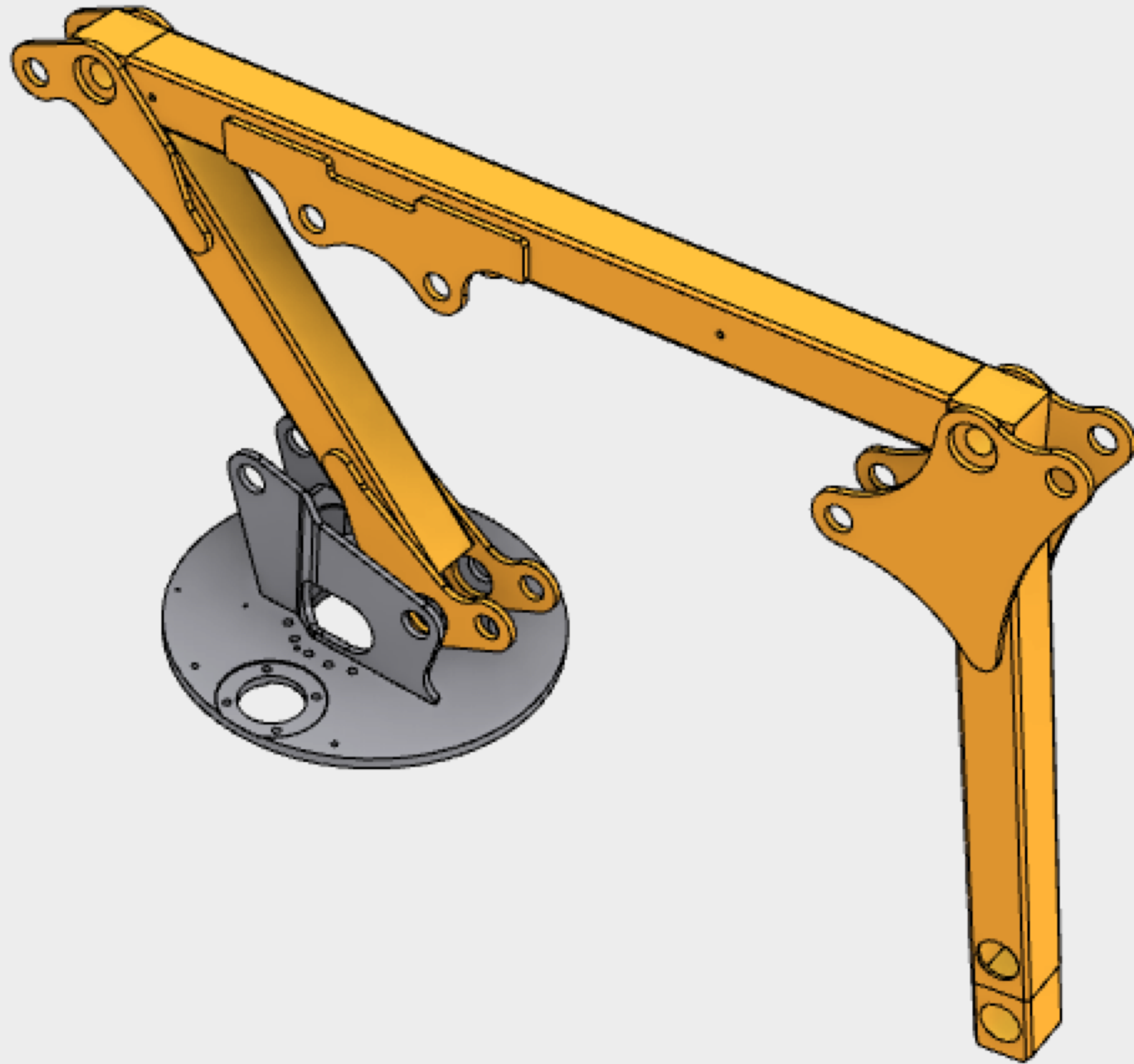
Factory





Model X + 🔍 ☰

Arm System Multibody.ipt


- └ Solid Bodies(21)
 - + AB Base
 - + AB Left
 - + AB Right
 - + AB Center
 - + Arm Rear
 - + ARB Right
 - + ARB Left
 - + ART Right
 - + ART Left
 - + ARB Cap Top
 - + ARB Cap Base
 - + Arm Top
 - + ART Cap Top
 - + ART Cap Base
 - + ART Flange Left
 - + ART Flange Right
 - + ARM Front



  Layout

Make Part Make Components

Make Components : Selection

 Remove from selection

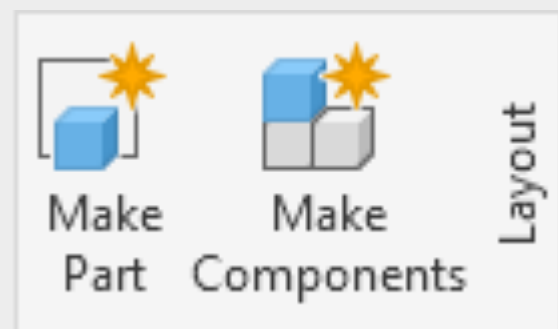
Insert components in target assembly

Target assembly name Template

Arm System Multibody.iam Standard.iam

Target assembly location

C:\Reliable Assemblies\Workspace



Make Components : Selection

Remove from selection

- AB Base
- AB Left
- AB Right
- AB Center
- Arm Rear
- ARB Right
- ARB Left
- ART Right
- ART Left
- ARB Cap Top
- ARB Cap Base
- Arm Top

Insert components in target assembly

Target assembly name: Arm System Multibody.iam

Template: Standard.iam

Target assembly location: C:\Reliable Assemblies\Workspace

Default BOM structure: Normal

Next>> Cancel



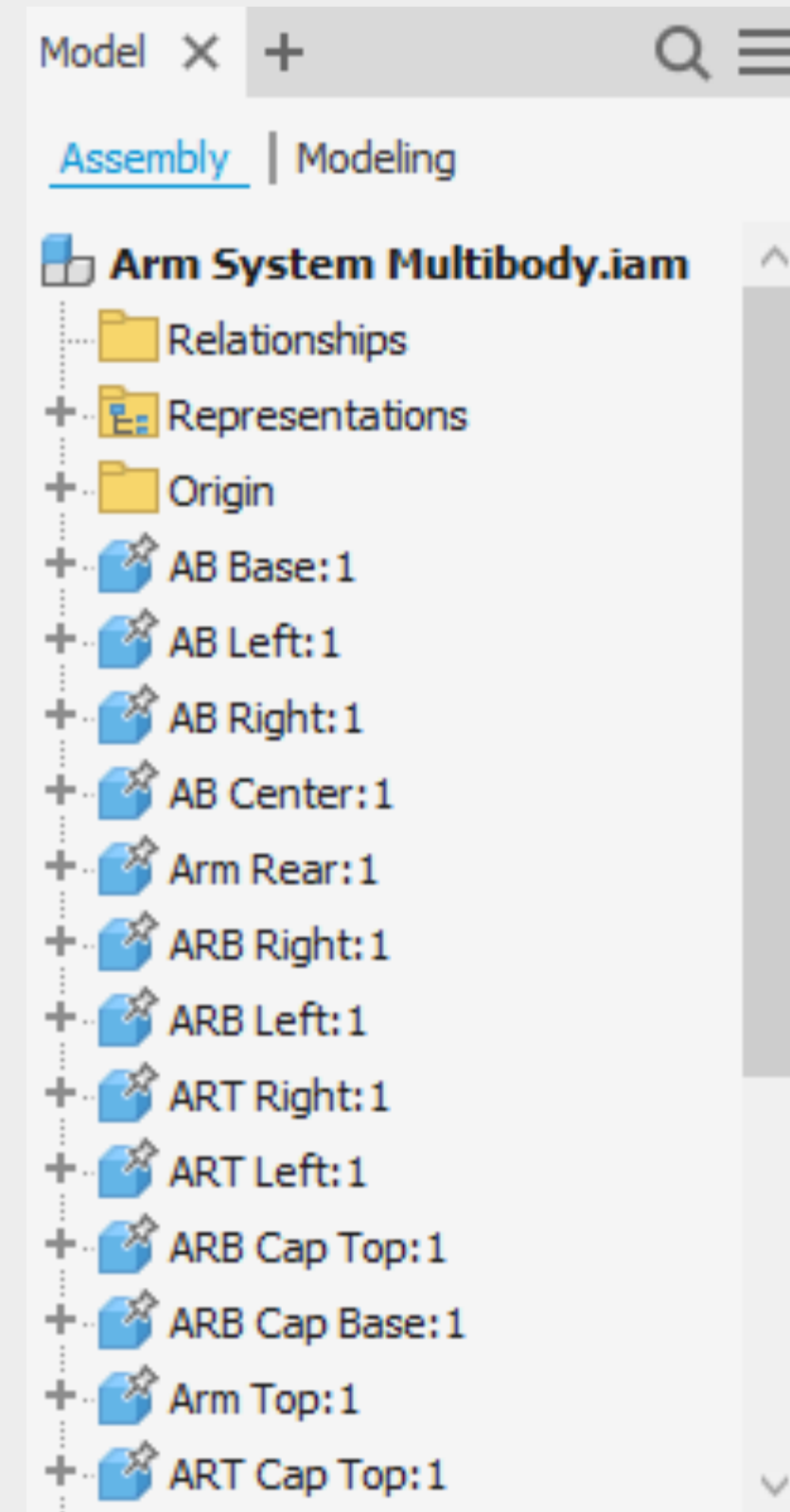
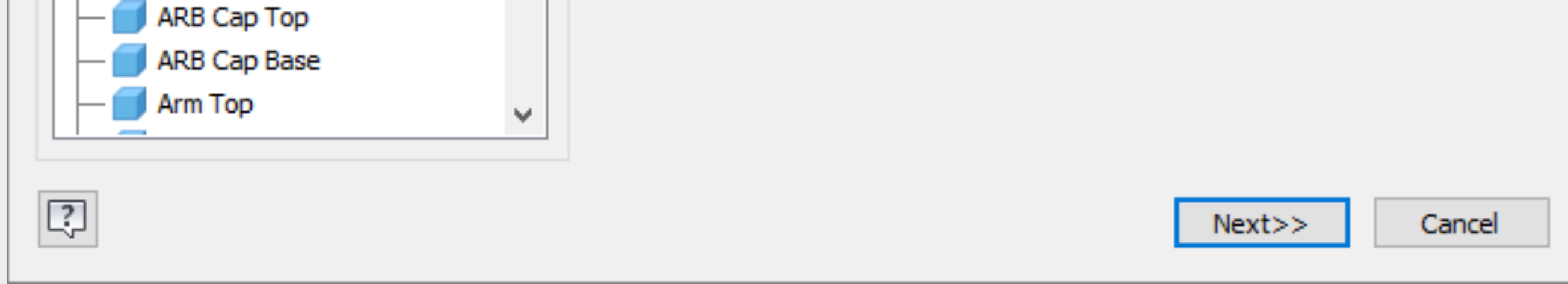
Model x +

Assembly | Modeling

Arm System Multibody.iam

- Relationships



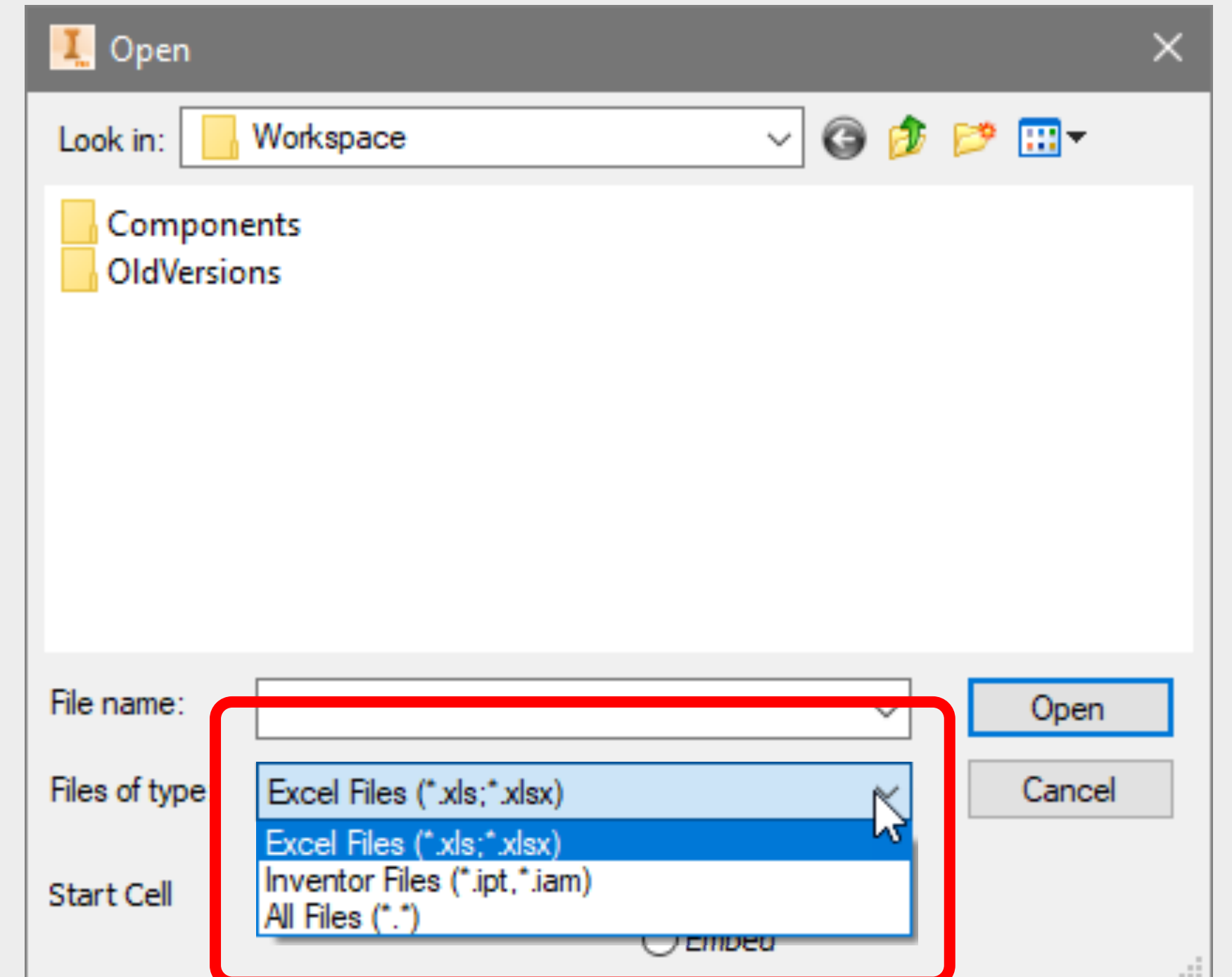


Parameters

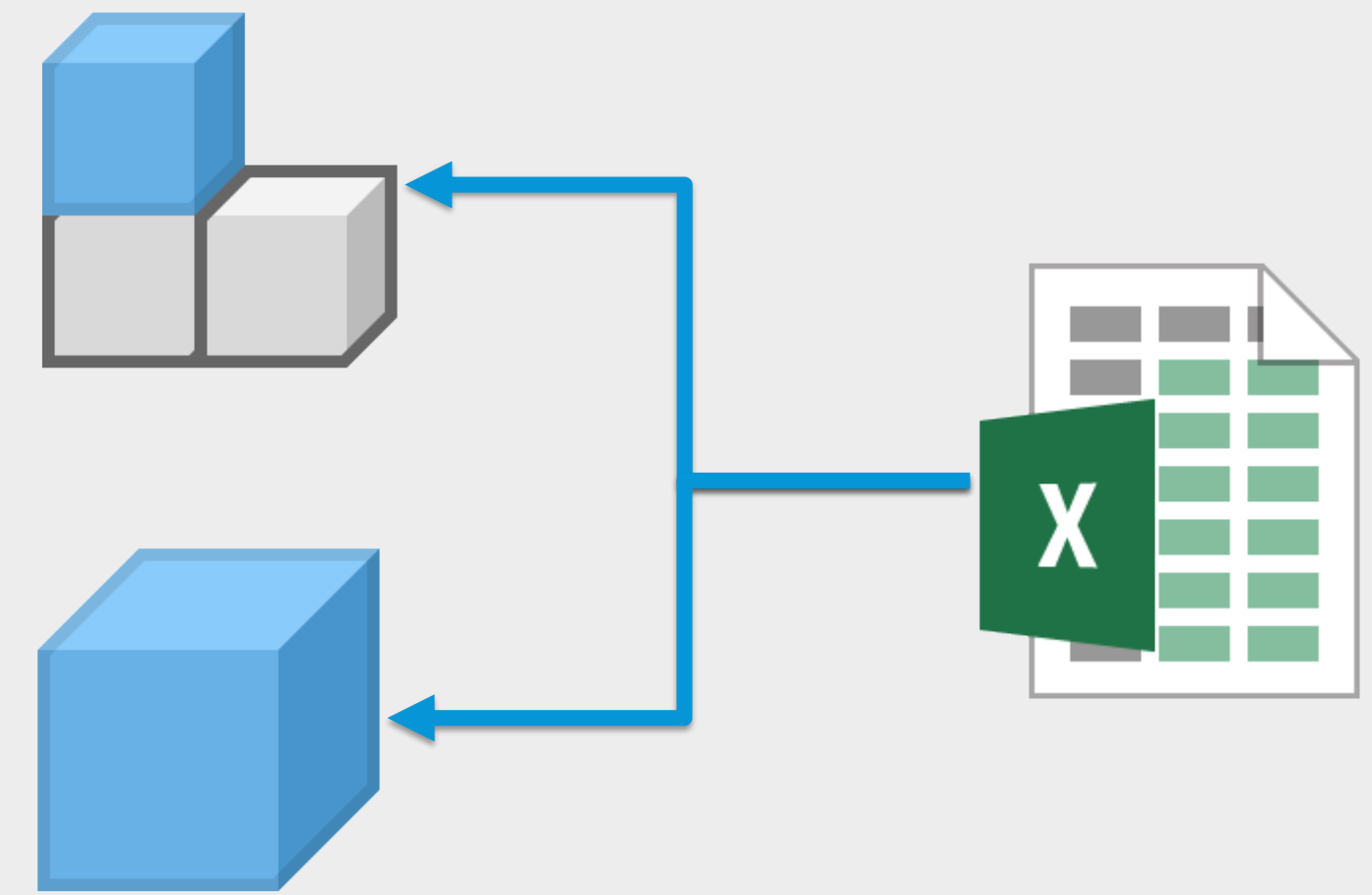
Parameter Name	Consumed t	Unit/Ty	Equation	Nominal Vali	Driving Rule	Tol.	Model Value	Key	Export Param	Comment
Model Parameters										
d0	Rigid:1	mm	0.000 in	0.000000		●	0.000000	<input type="checkbox"/>	<input type="checkbox"/>	
d1	Rigid:2	mm	0.000 in	0.000000		●	0.000000	<input type="checkbox"/>	<input type="checkbox"/>	
d2	Rigid:3	mm	0.000 in	0.000000		●	0.000000	<input type="checkbox"/>	<input type="checkbox"/>	
User Parameters										
HorizontalDista...		mm	2330 mm	2330.00...		●	2330.000000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Distance Between Columns
VerticalDistance		mm	1270 mm	1270.00...		●	1270.000000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Distance Between Rows
Rotation		deg	127.5 deg	127.500...		●	127.500000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rotation

Add Numeric

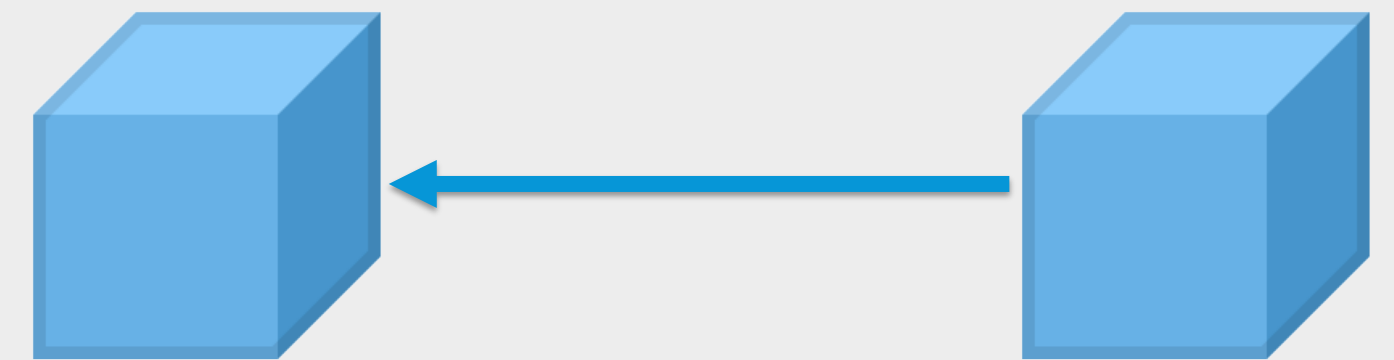
Link Immediate Update



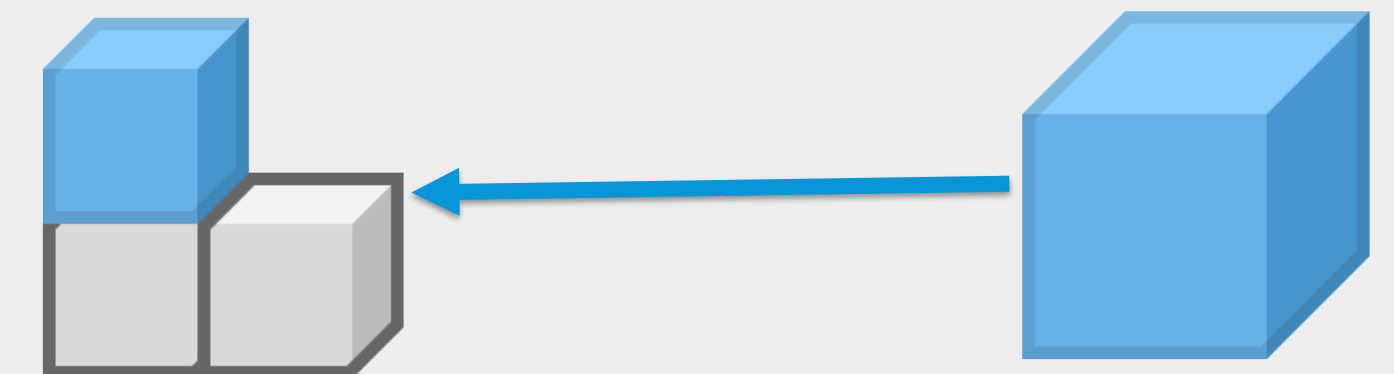
Excel to Part or Assembly



Part to Part



Part to Assembly



~~Assembly to Part~~



Place Create Free Move Free Rotate Joint Constrain Show Show Sick Hide All Pattern Mirror Copy Bill of Materials Parameters Degree of Freedom Analysis Plane Axis Point UCS Shrinkwrap Shrinkwrap Substitute

Component Position Relationships Pattern Manage Productivity Work Features Simplification

Model X +

Assembly | Modeling

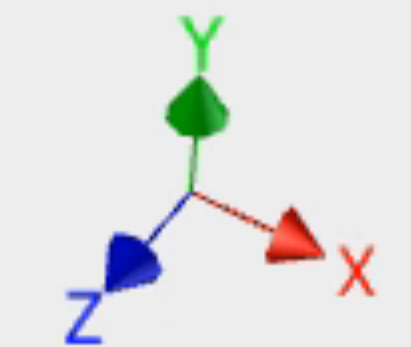
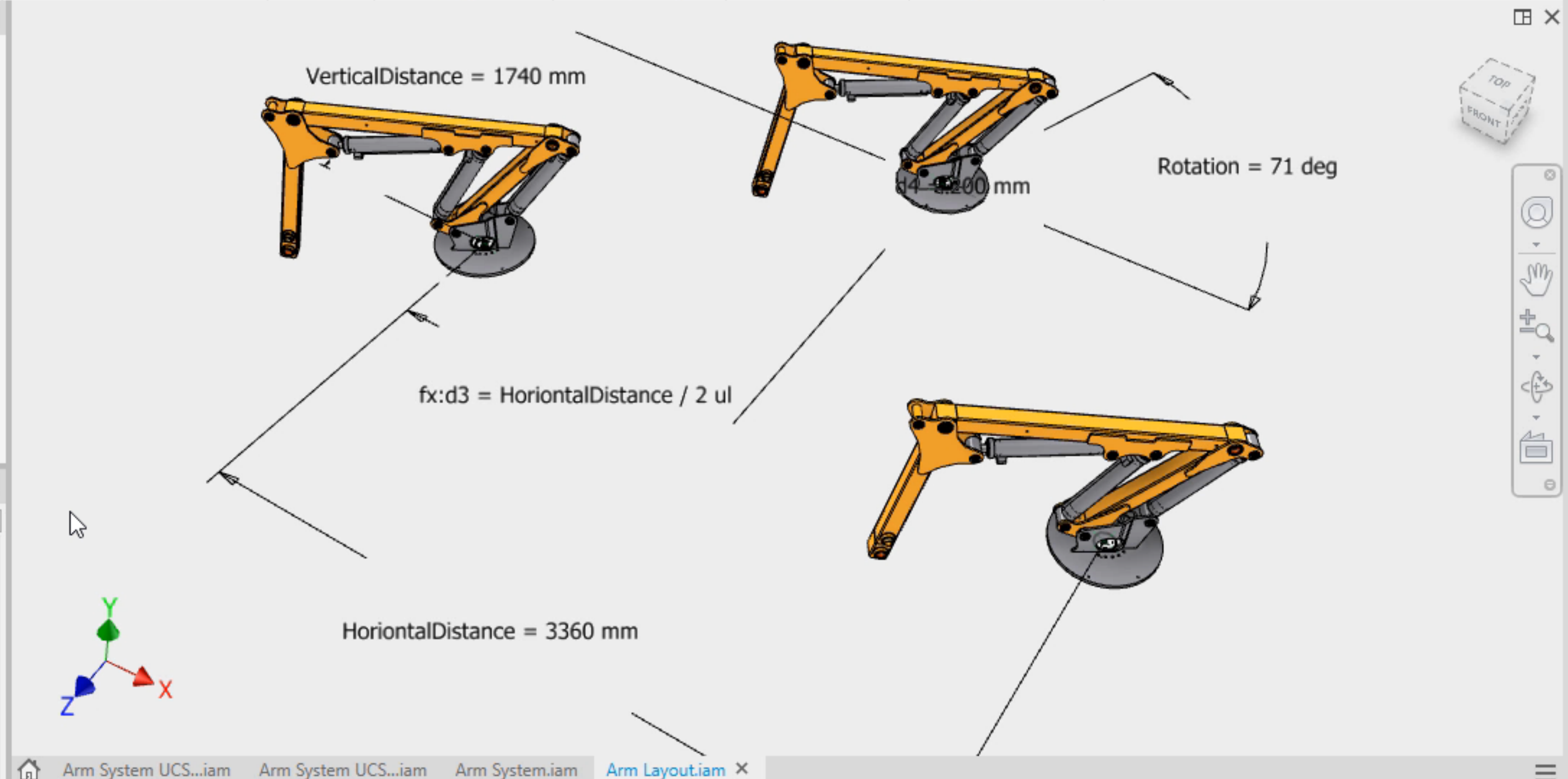
Arm Layout.iam

- Relationships
- Representations
- Origin
- Arm Layout: 1
- Arm System: 1
- Arm System: 2
- Arm System: 3

iLogic X +

Rules Forms Global Forms

- Arm Layout.iam
- Dimensions

Parameters

Parameter Name	Consumed by	Unit/Typ	Equation	Nominal Value	Tol.	Model Value	Key	Export Param	Comment
Model Parameters									
d0	Position	mm	100 mm	100.000000	●	100.000000	<input type="checkbox"/>	<input type="checkbox"/>	
HorizontalDistance	d3, Layou...	mm	2430 mm	2430.000...	●	2430.000000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Distance Between Columns
VerticalDistance	Layout Sk...	mm	1810 mm	1810.000...	●	1810.000000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Distance Between Rows
d3	Layout Sk...	mm	HorizontalDistance / 2	1215.000...	●	1215.000000	<input type="checkbox"/>	<input type="checkbox"/>	
d4	Layout Sk...	mm	200 mm	200.000000	●	200.000000	<input type="checkbox"/>	<input type="checkbox"/>	
Rotation	Layout Sk...	deg	181 deg	181.000000	●	181.000000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rotation
User Parameters									

Add Numeric | Update | Purge Unused | Reset Tolerance (+, ▲, ●, -) | << Less | Done

fx Parameters

- Import from XML
- Export to XML

Export to XML

Save in: [Folder]

- Arm System
- Libraries
- Content Center Files
- OldVersion
- Arm Layo...

File name: []

Save as type: []

Comment

Distance Between Columns

Distance Between Rows

Rotation

<< Less

Done

fx
Parameters

fx Import from XML

fx Export to XML

Parameters

Export to XML

Save in: Components

Arm System

Libraries

Content Center Files

OldVersions

Arm Layout-params.xml

File name: Am Layout-params.xml

Save as type: XML files (*.xml)

Options...

Preview

Save

Cancel

Export XML Options

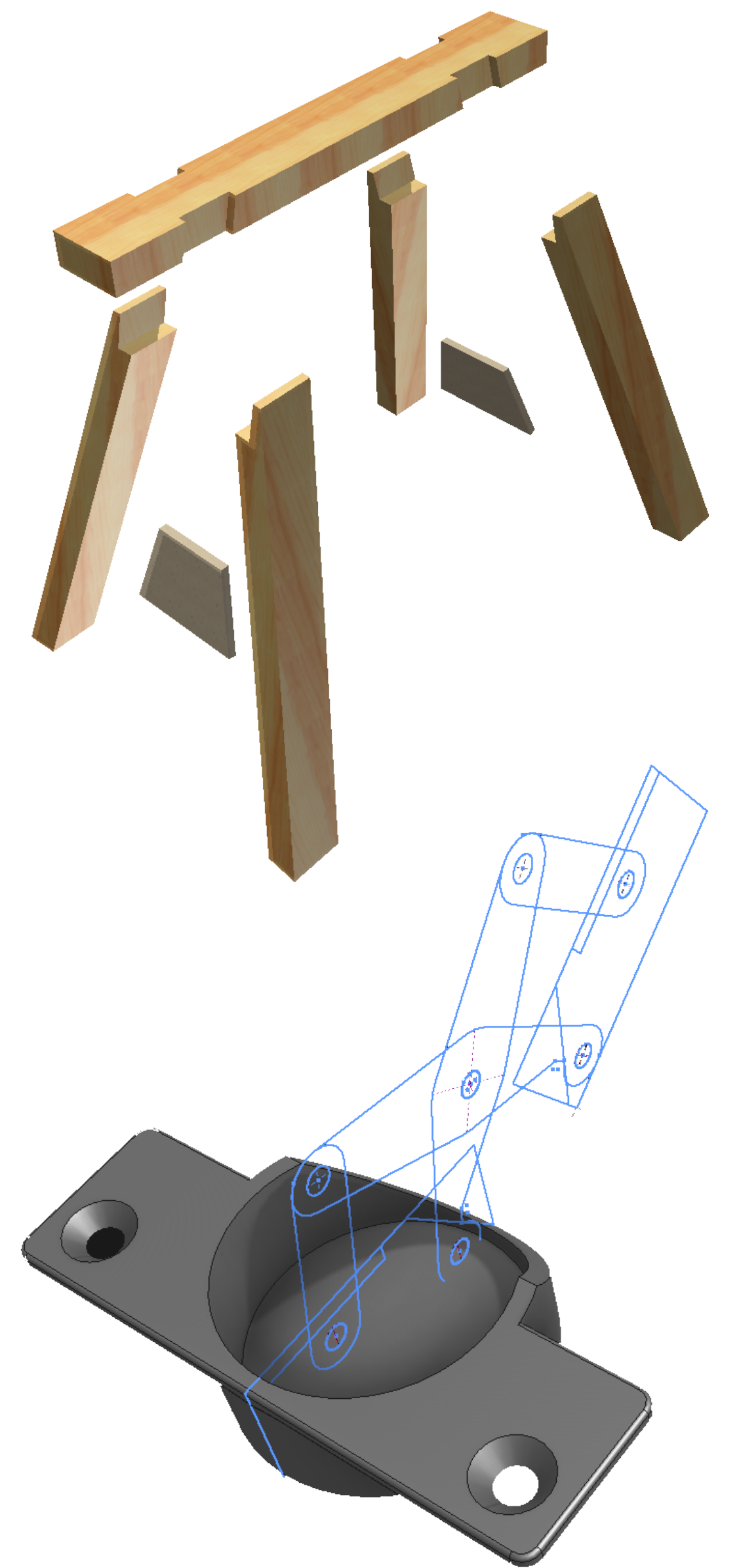
Parameter Export Options

Key Parameters Only

All Parameters

OK

Cancel



Before you start – *STOP!* Planning is key

- File names
- Parameter names
- Data
- Origin
- Base component
- Relationship strategy
- Change – Design Intent
- Document

DOCUMENT

Parameters

Parameter Name	Consumed t	Unit/Ty	Equation	Nominal Vali	Driving Rule	Tol.	Model Value	Key	Export Param	Comment
Model Parameters										
d0	Rigid:1	mm	0.000 in	0.000000		●	0.000000	<input type="checkbox"/>	<input type="checkbox"/>	
d1	Rigid:2	mm	0.000 in	0.000000		●	0.000000	<input type="checkbox"/>	<input type="checkbox"/>	
d2	Rigid:3	mm	0.000 in	0.000000		●	0.000000	<input type="checkbox"/>	<input type="checkbox"/>	
User Parameters										
HorizontalDista...		mm	2330 mm	2330.00...		●	2330.000000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Distance Between Columns
VerticalDistance		mm	1270 mm	1270.00...		●	1270.000000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Distance Between Rows
Rotation		deg	127.5 deg	127.500...		●	127.500000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rotation

Add Numeric | | | | |

Link | Immediate Update

POSITION

HorizontalDistance: 2330 mm

VerticalDistance: 1270 mm

Rotation: 127.5 deg

Distance Between Columns

Done

File Engineer's Notebook Tools View Get Started Vault Vault Collaborate

Comment View Arrow Previous Note Next Note

Select **B** *I* U Format

Insert Folder Insert Object Insert Exit

Finish Notebook

Model x +

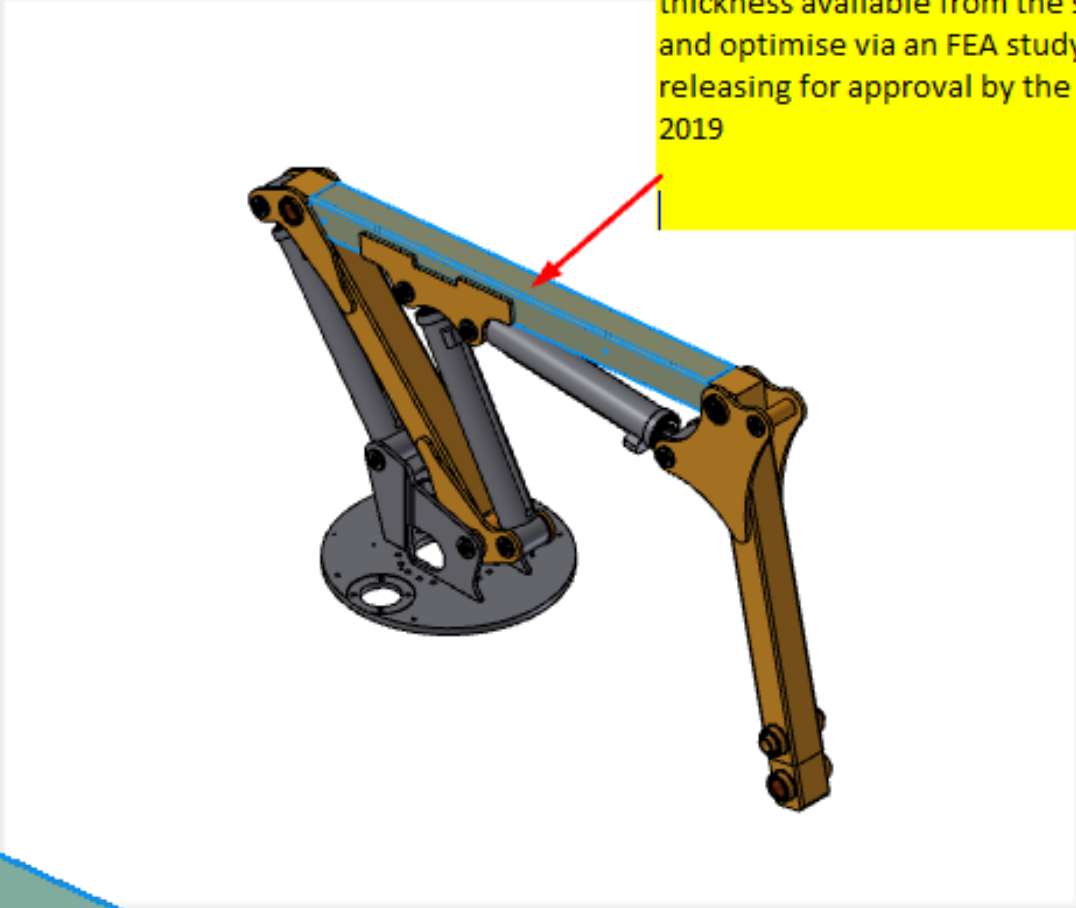
Engineer's Notebook

PM 2019.06.13

View 1

Comment 2

Paul Munford 13 June 2019
 Paul M to check the available wall thickness available from the supplier and optimise via an FEA study before releasing for approval by the 27th June 2019



Assembly | [Modeling](#)

- + Representations
- + Origin
- + Armbracket-Base:1
- + Lower Arm-N:1
- Middle Arm-N:1
 - + Relationships
 - + Representations
 - + Origin
 - + 3136 1133 82:1
 - Notes
 - PM 2019.06.13
- + Top Arm-N:1
- + Cylinder:1
- + Cylinder:2
- + Cylinder:3

Open

Measure

Constraint

Undo

Show Relationships

Find in Browser

Visibility

Edit

Repeat Part Priority

Select Other... Ctrl+A

Copy Ctrl+C

Add to New Folder

Selection

Select Parents

Isolate

Undo Isolate

Free Move V

Free Rotate G

Representation...

Component

Create Note

BOM Structure

Grounded

Adaptive

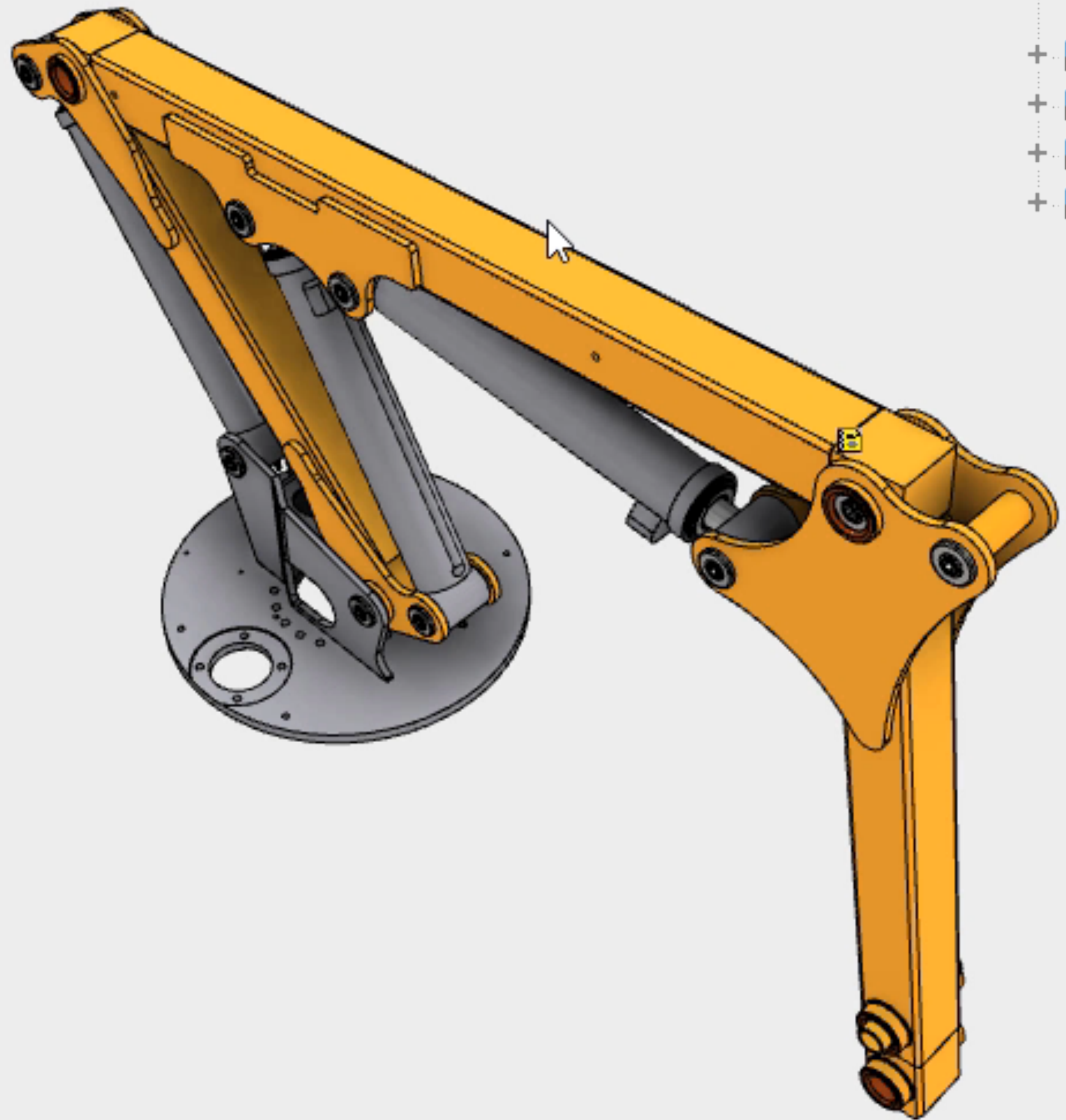
Enabled

Transparent Alt+T

Suppress

iProperties...

How To...



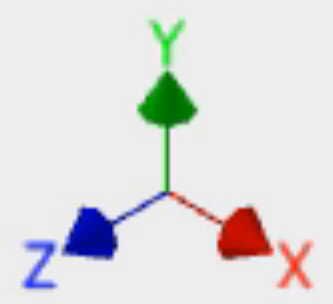
Place Create Free Move Free Rotate Joint Constrain Show Show Slick Hide All Pattern Mirror Copy Bill of Materials Parameters Degree of Freedom Analysis Plane Axis Point UCS Shrinkwrap Shrinkwrap Substitute

Component Position Relationships Pattern Manage Productivity Work Features Simplification

Model X +

Assembly | Modeling

- Arm System.iam
 - Relationships
 - Representations
 - Origin
 - Armbracket-Base: 1
 - Lower Arm-N: 1
 - Middle Arm-N: 1
 - Top Arm-N: 1
 - Cylinder: 1
 - Cylinder: 2
 - Cylinder: 3



Navigation toolbar with icons for: Rotate, Pan, Zoom In, Zoom Out, Rotate About, and Print.

Reliable Modelling Techniques for Complex Assembly Design in Autodesk Inventor

Summary

- Before you start – *Stop!* Make a plan (use the checklist from the handout).
- Standardize the Application settings and Templates.
- Take charge of your Relationships.
- *Flex.* Don't leave booby traps behind.
- Document your design intent.
- Look for ways to improve for next time.

Q&A (My Turn!)

Q: Name Paul's two criteria for a well modelled Assembly?

A: Correct Data and Easy to update.

Q: Name four places that Data can be added to a component?

A: Materials & Appearances, Parameters, Bill of materials and iProperties.

Q: List Paul's four relationship rules?

A: Minimum, Intended, Planed, Obvious.

Q: List four ways to document design intent?

A: Parameter comments, Engineer's Notebook, 3DA, iLogic form.

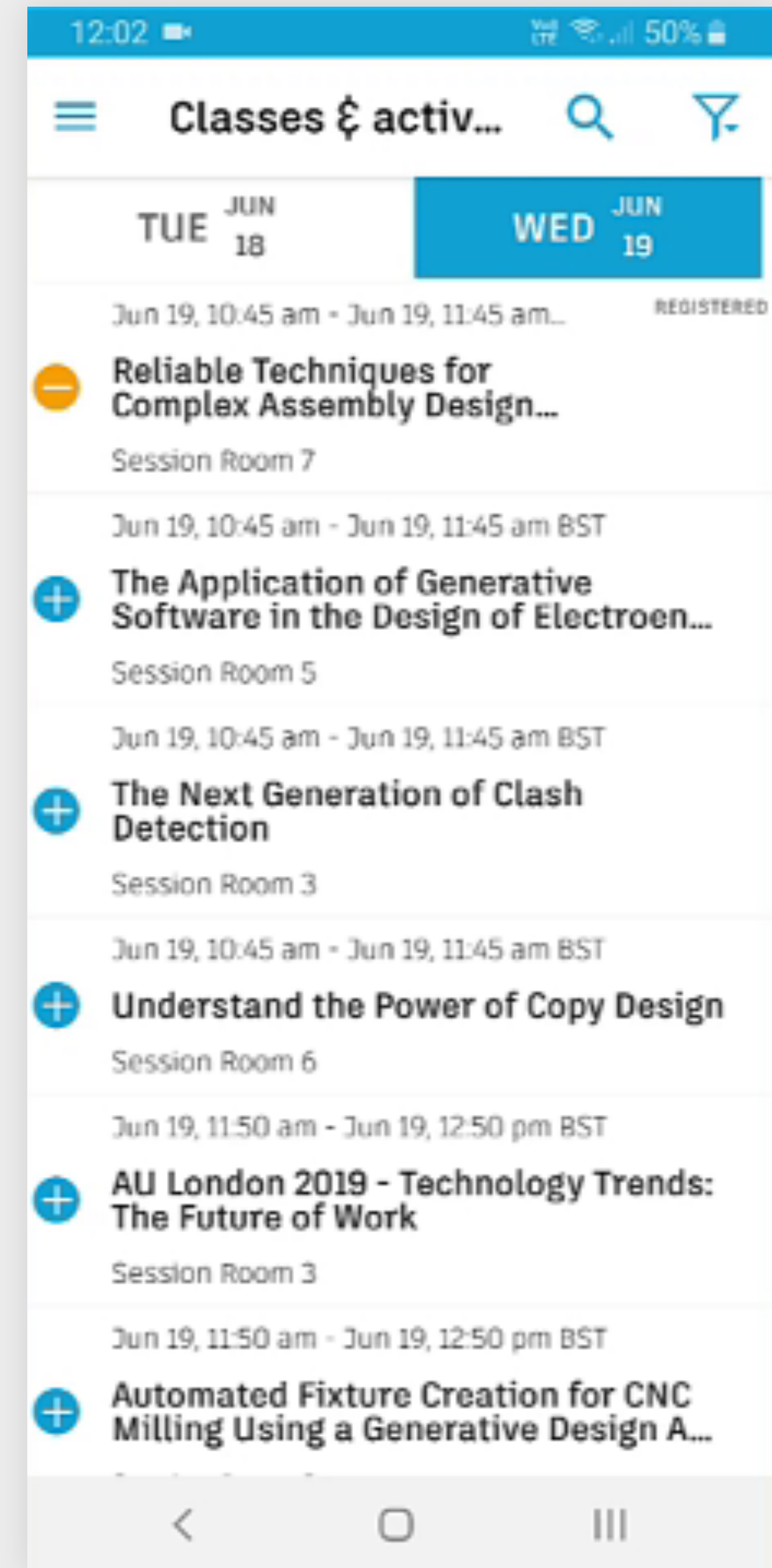
Please remember to fill out your class survey in the AU App!

Q&A

(Your Turn)



@PaulCADMunford





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