



**UGS
CONNECTION**



AMERICAS 2007

PLM  WORLD



UGS
Transforming the
process of innovation

*“Automating Solid Edge for
Custom Manufacturing”*

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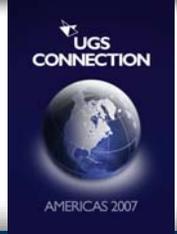
- ▶ A leading manufacturer of custom designed air-handling units.
- ▶ Clientele include schools, hospitals, military and other government agencies...



...as well as industrial applications for oil & gas, pharmaceuticals and pulp & paper.



Solid Edge Implementation...



...why ?

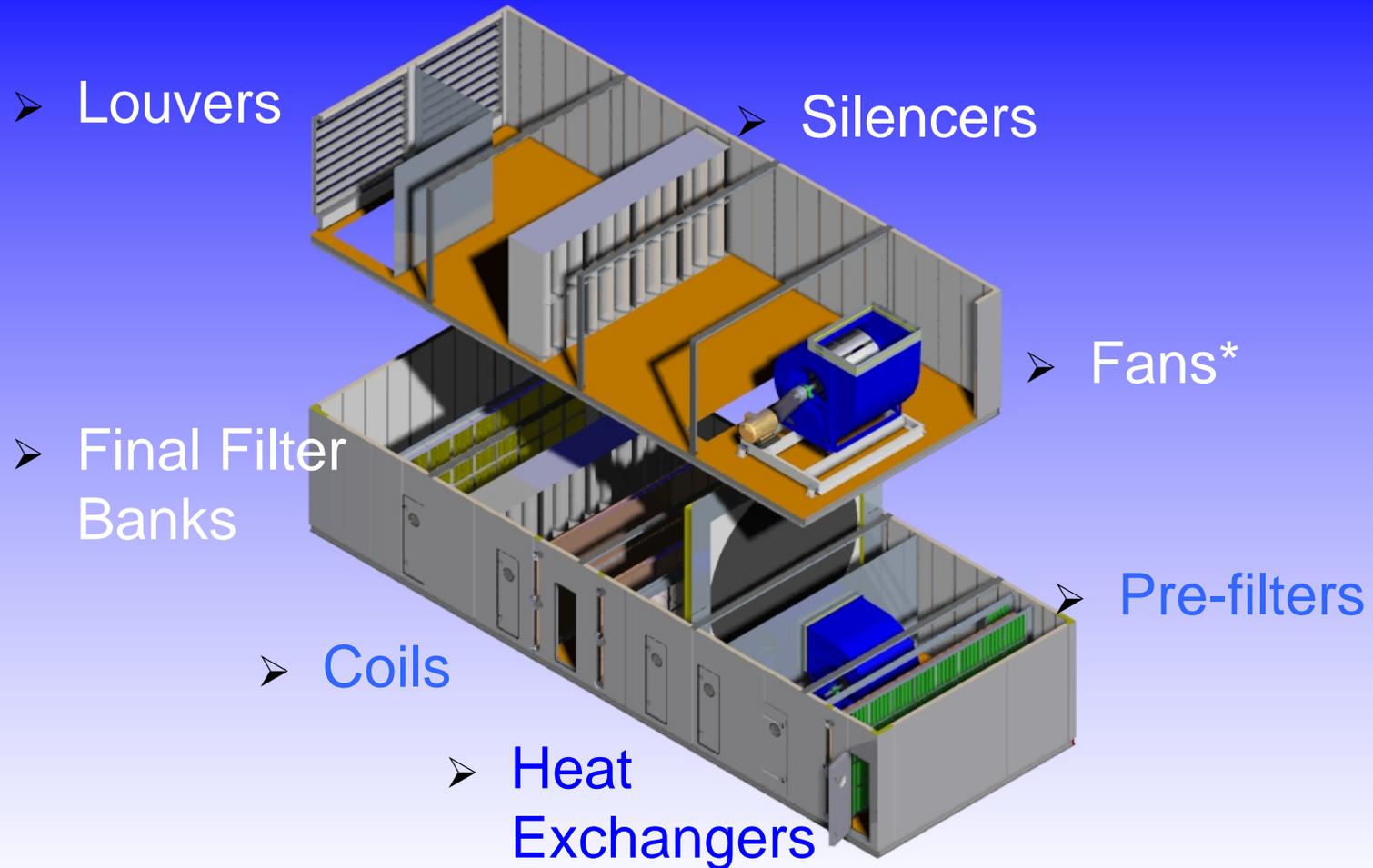
- Decrease design and documentation errors by eliminating multiple translations from one document to another and codifying design rules.
- Reduce production 'snags' by catching errors before production begins.
- Improved clarity means less questions and guess work from manufacturing staff.
- Automated 'cut list' and B.O.M. generation.

...the challenges !

- Scott Springfield is a small manufacturing company.
- Competitive marketplace.
- Solid Modeling and API knowledge was low.
- We are a 'CUSTOM' manufacturer...

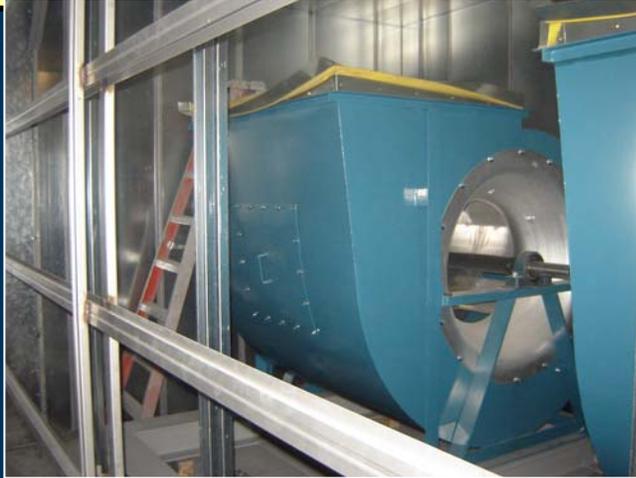
Solid Edge Implementation...

...where to begin ?



Fan / Isolation Base Configurator

“CONFIGURATOR” – Software that interprets user inputs, applies known design rules and then outputs documents ready to be used for sales, engineering or production.



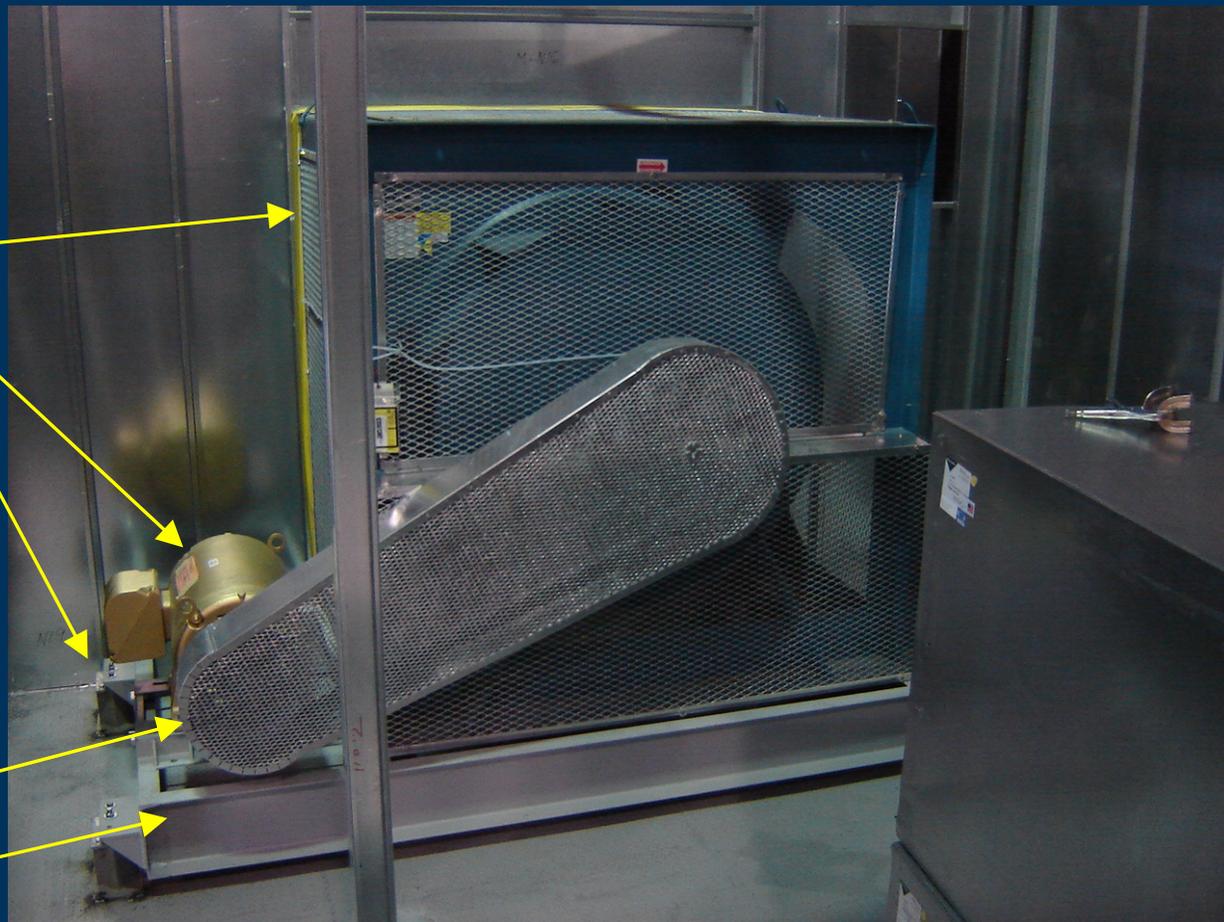
Fan / Isolation Base Configurator

Purchased Parts

- Fan
- Motor
- Isolators

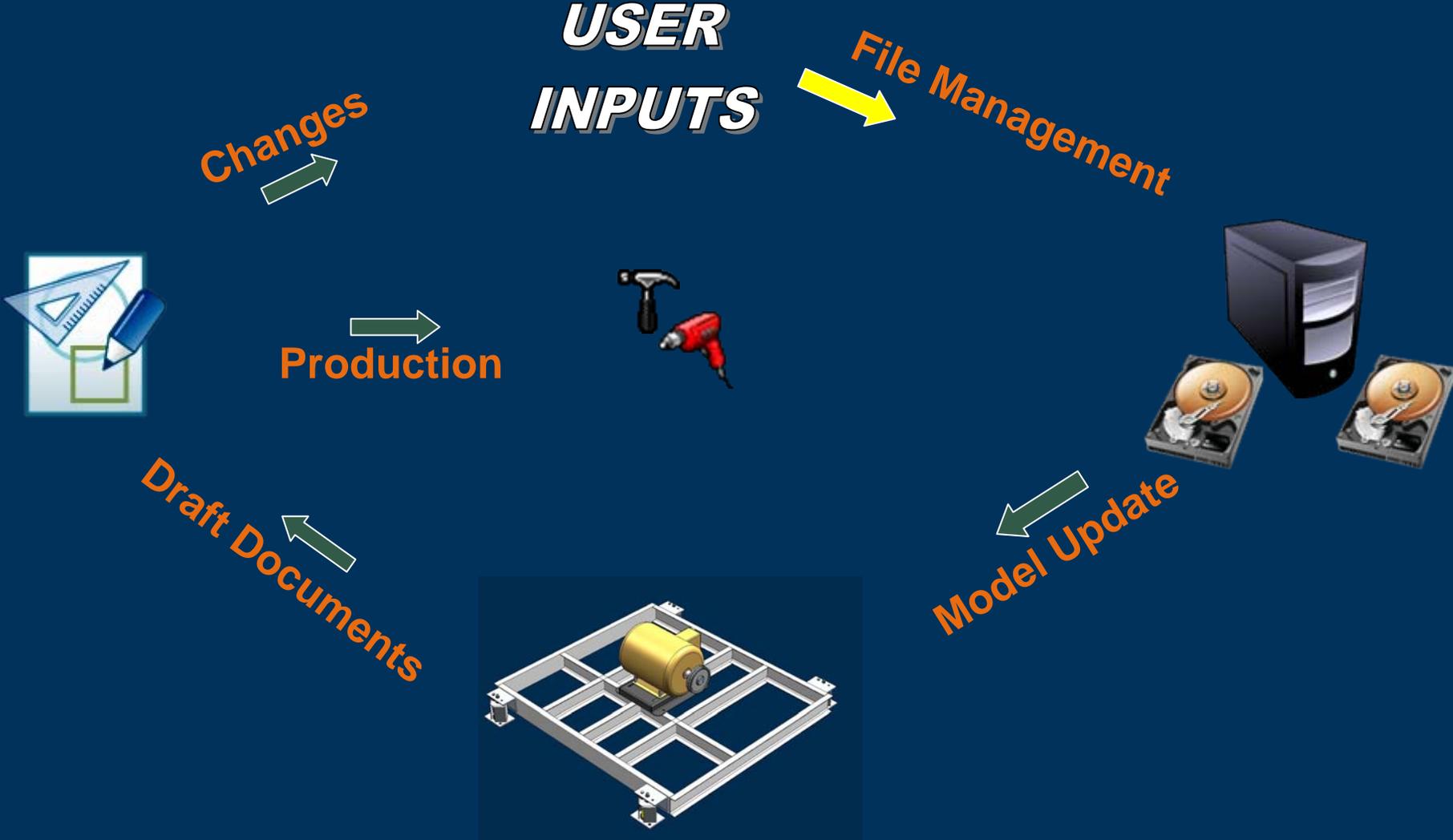
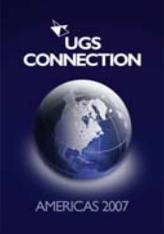
Fabricated Parts

- Beltguard
- Structural Base



Configurator Stages

1) File Management



➤ File Management (Server)

Dedicated Server

Solid Edge
Master Drive



Solid Edge
Project Drive



Copy using the
Revision Manager API

- static parts / purchased parts
 - *ie. spring isolators*

- master models
 - *ie. fan, beltguard, base frame & motor assemblies*

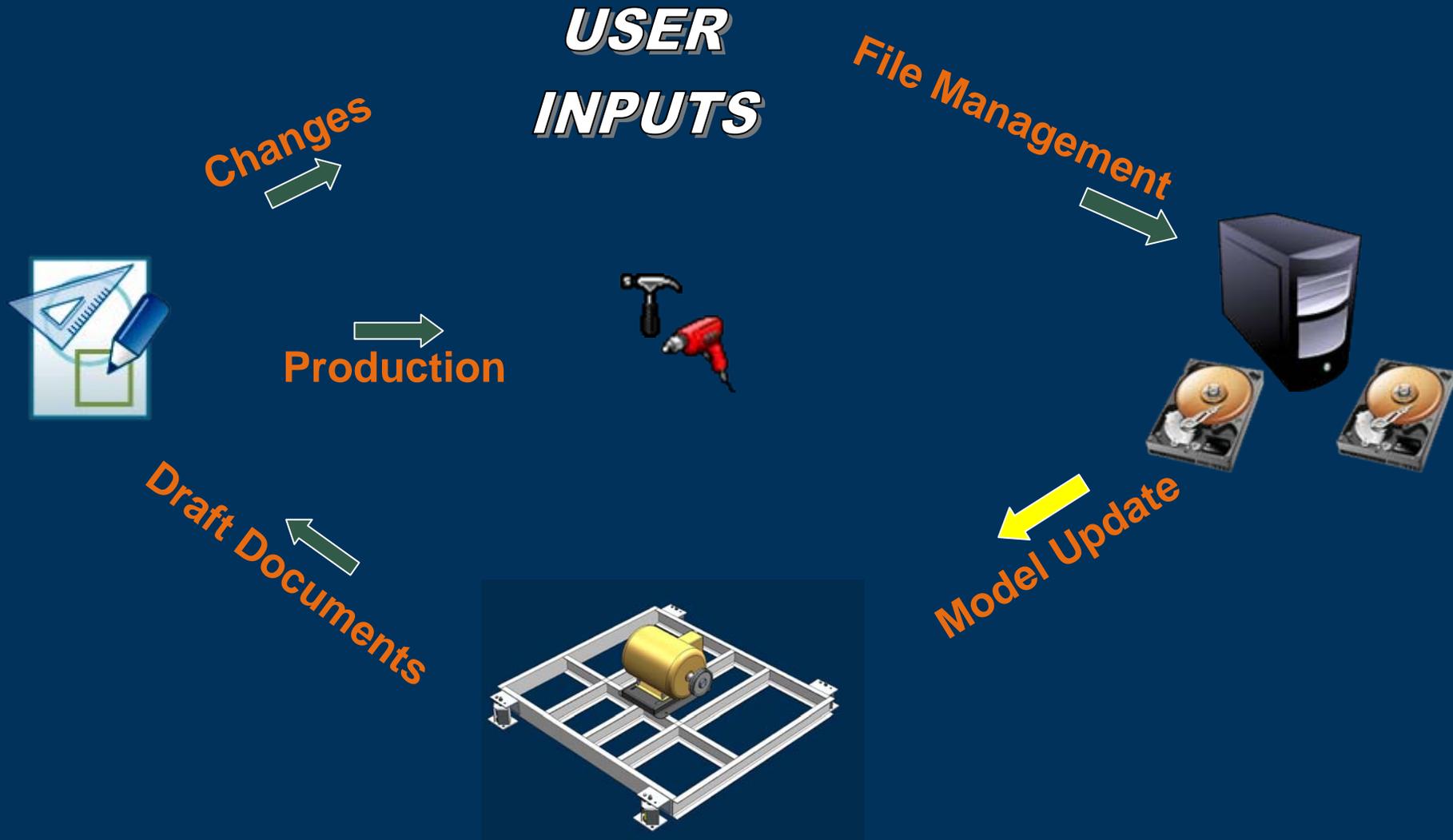
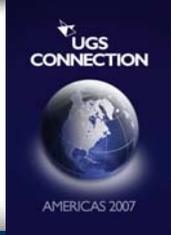
- drawing templates (.dft)

Copied to a unique project directory with an appended project number.

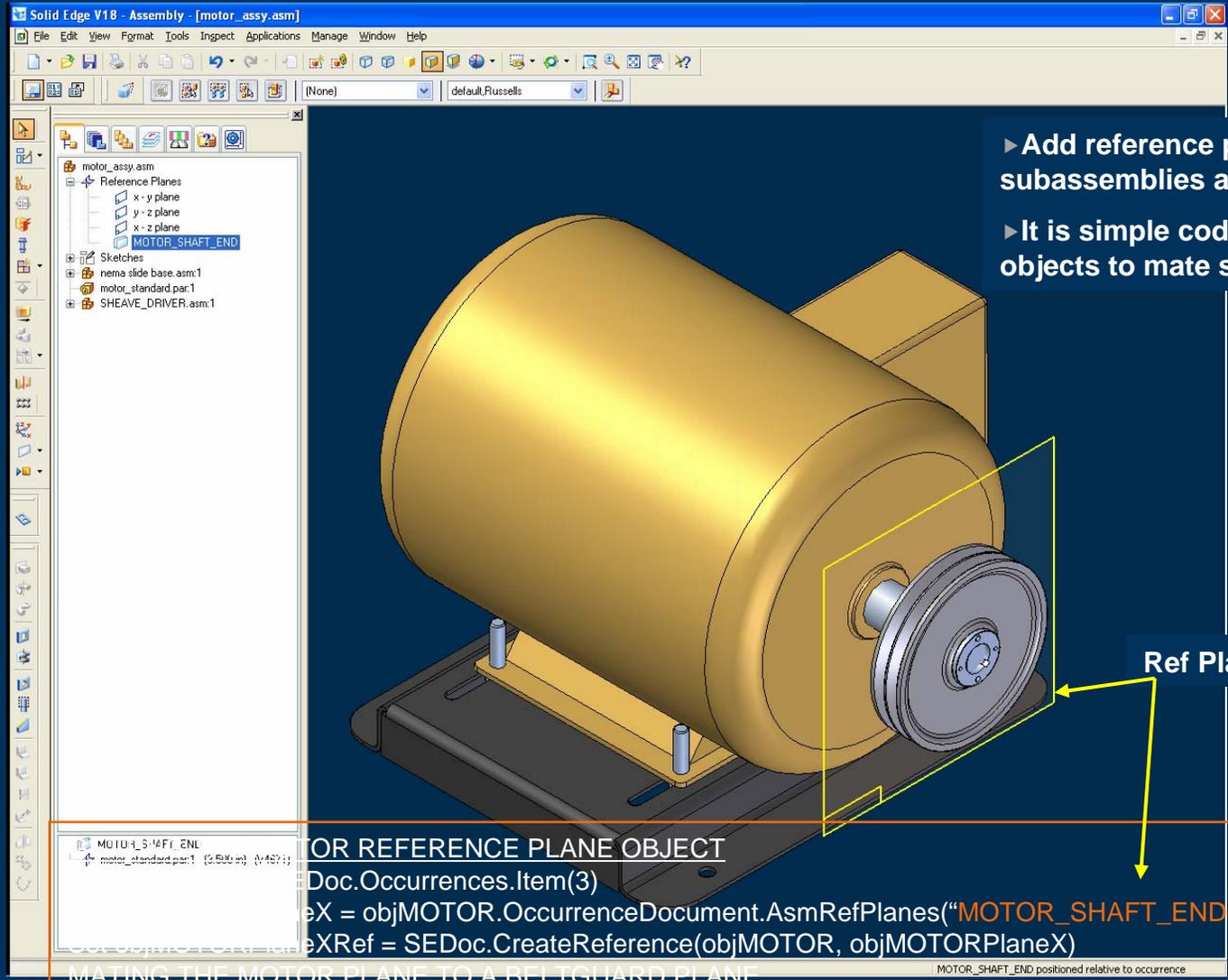
(FAN_ASMBLY_01234_M1_RFA.asm)

Configurator Stages

2) Model Update



➤ Update Model (Use of planes)



- ▶ Add reference planes to key points of subassemblies and name them descriptively.
- ▶ It is simple coding to use reference plane objects to mate subassemblies.

Ref Plane: "MOTOR_SHAFT_END"

```

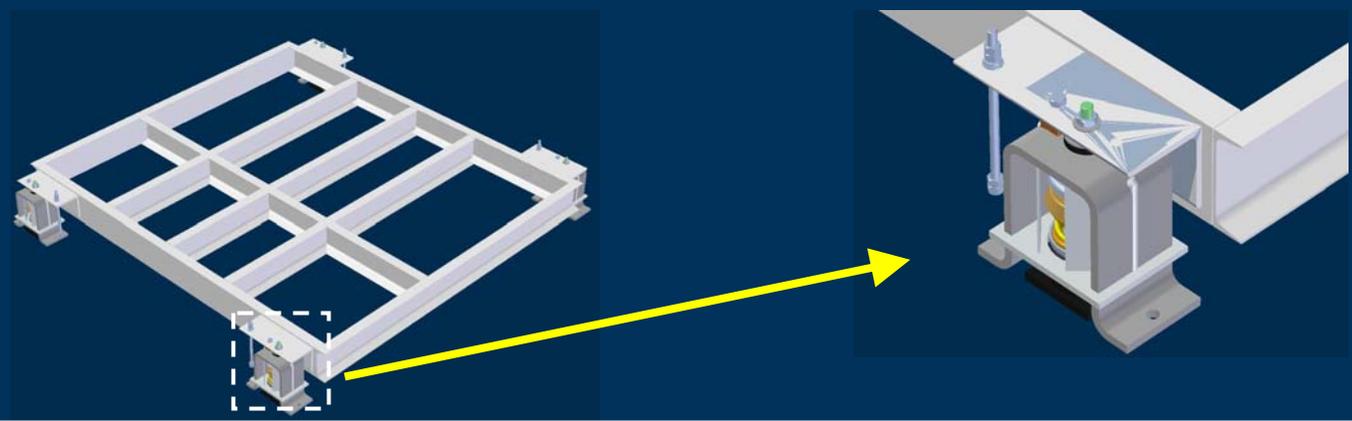
MOTOR REFERENCE PLANE OBJECT
objMOTORPlaneX = SEDoc.Occurrences.Item(3).Occurrences.Item(1).Occurrences.Item(3)
objMOTORPlaneX = objMOTOR.Occurrence.Document.AsmRefPlanes("MOTOR_SHAFT_END")
objMOTORPlaneXRef = SEDoc.CreateReference(objMOTOR, objMOTORPlaneX)
  
```

```

MATING THE MOTOR PLANE TO A BELTGUARD PLANE
Set objPlanar1 = SEDoc.Relations3d.AddPlanar(objGUARDPlaneXRef, objMOTORPlaneXRef, True, XYZPts1, XYZPts2)
  
```

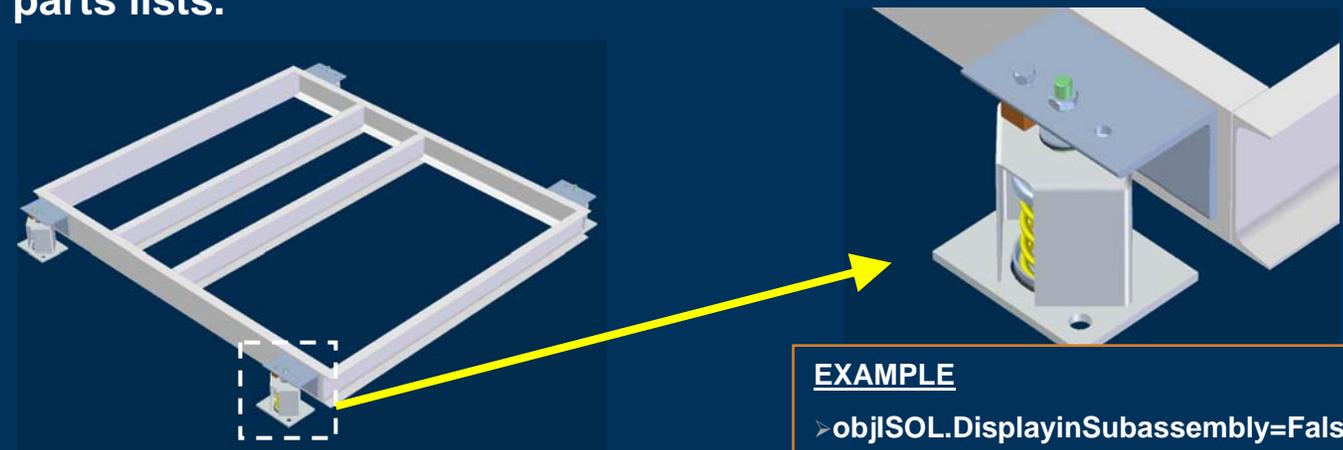
➤ Update Model (Multiple components)

▶ Multiple components are contained within a subassembly, not all are required for any one situation but makes for easier customization...



Before

▶ ...after some simple code, only required parts are included in the model, draft document and parts lists.

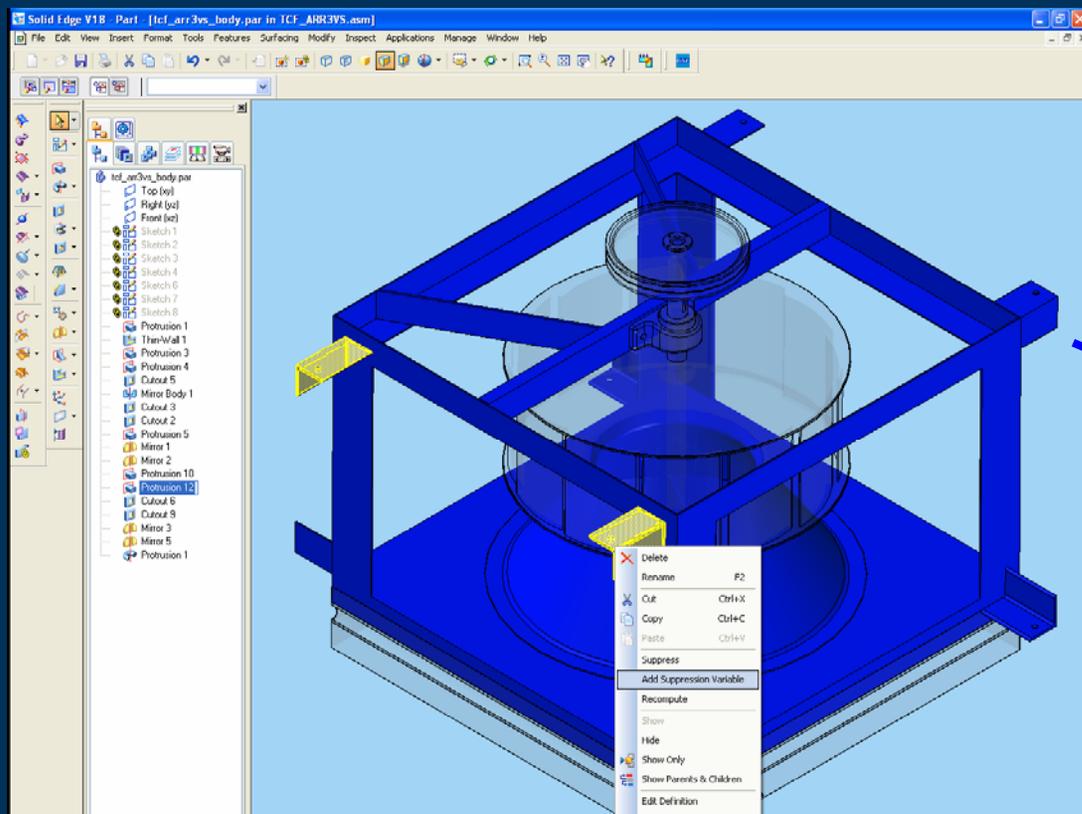


After

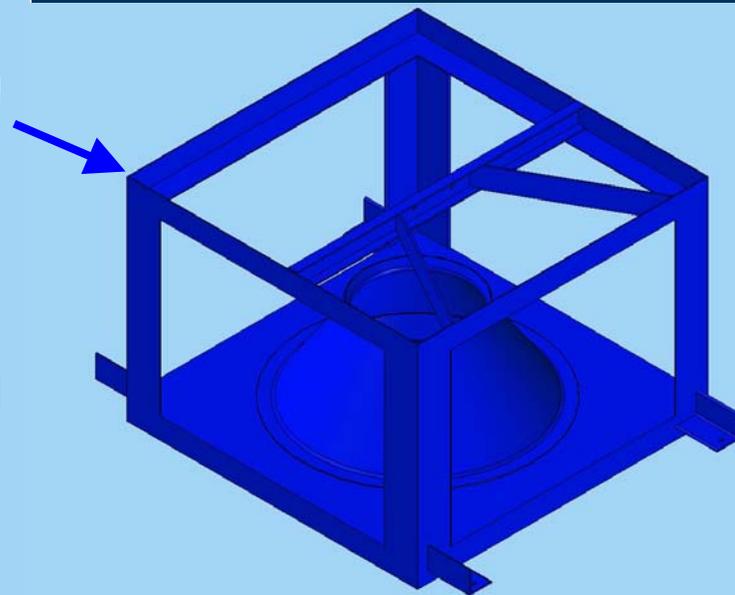
```
EXAMPLE  
➤ objISOL.DisplayInSubassembly=False  
➤ objISOL.DisplayInDrawings=False
```

➤ Update Model (Feature Suppression)

- Any feature like holes or protrusions etc. may be easily turned on or off through the use of 'Feature Suppression Variables.' When this is applied, simply setting the appropriate value in the variable table to '0' or '1' turns the feature 'on' or 'off' respectively.



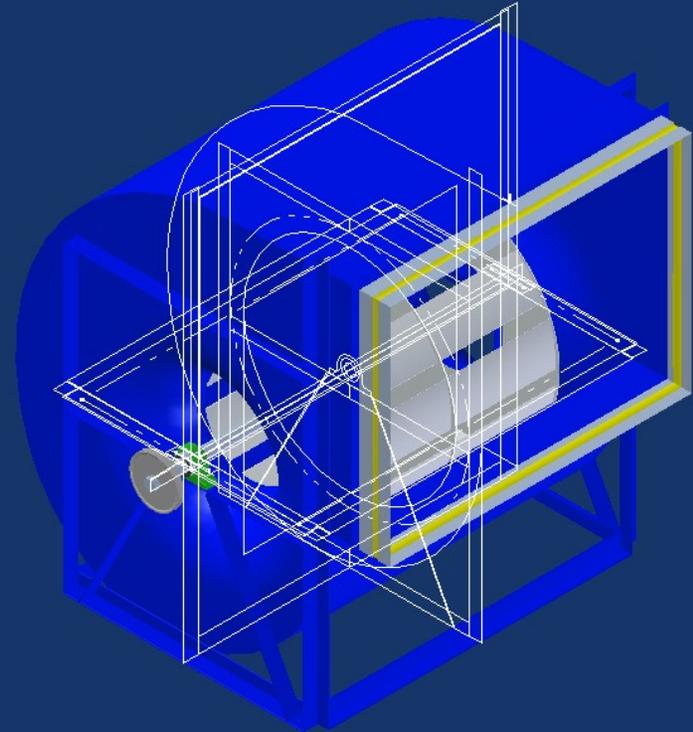
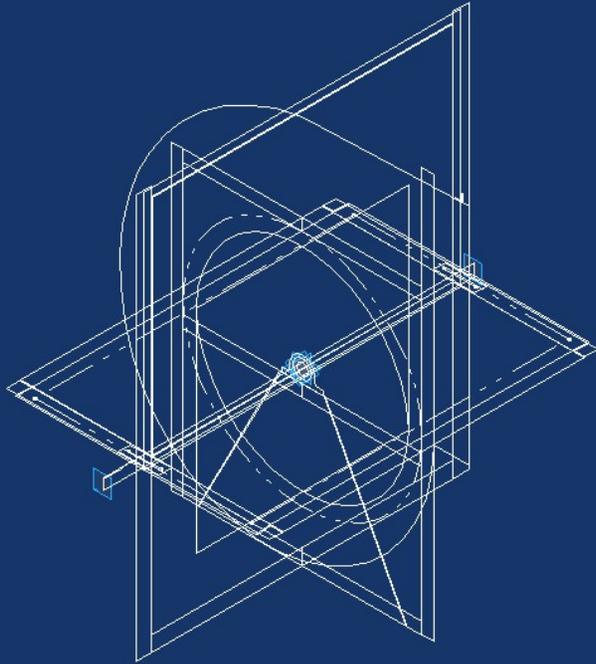
Properly configured fan frame



Example (Hides the 'Protrusion_12' feature)

➤ Call `objFAN.Occurrences.Item(1).OccurrenceDocument.Variables.Edit("Extruded_Protrusion_12_Suppress", Str(1))`

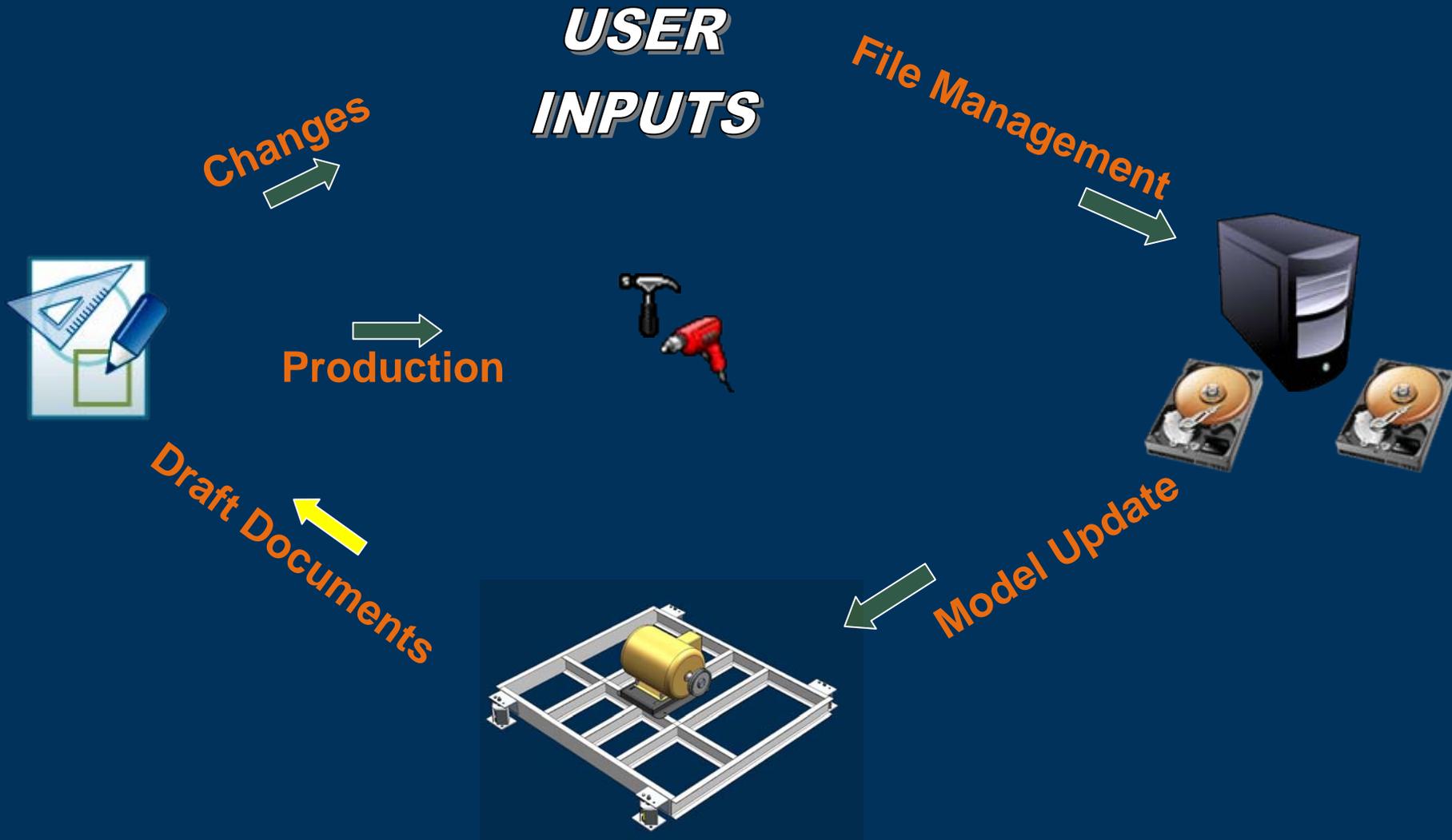
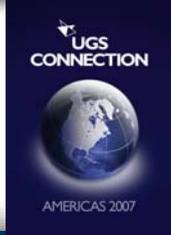
➤ Update Model (Assembly Sketches)



- ▶ Use assembly sketches (in conjunction with the “Copy Sketch” command) to drive your model geometry.
- ▶ This method is not only robust, it is also easy to code as all you need to do is feed the necessary variables into the top level assembly and update the model.

Configurator Stages

3) Draft Documents

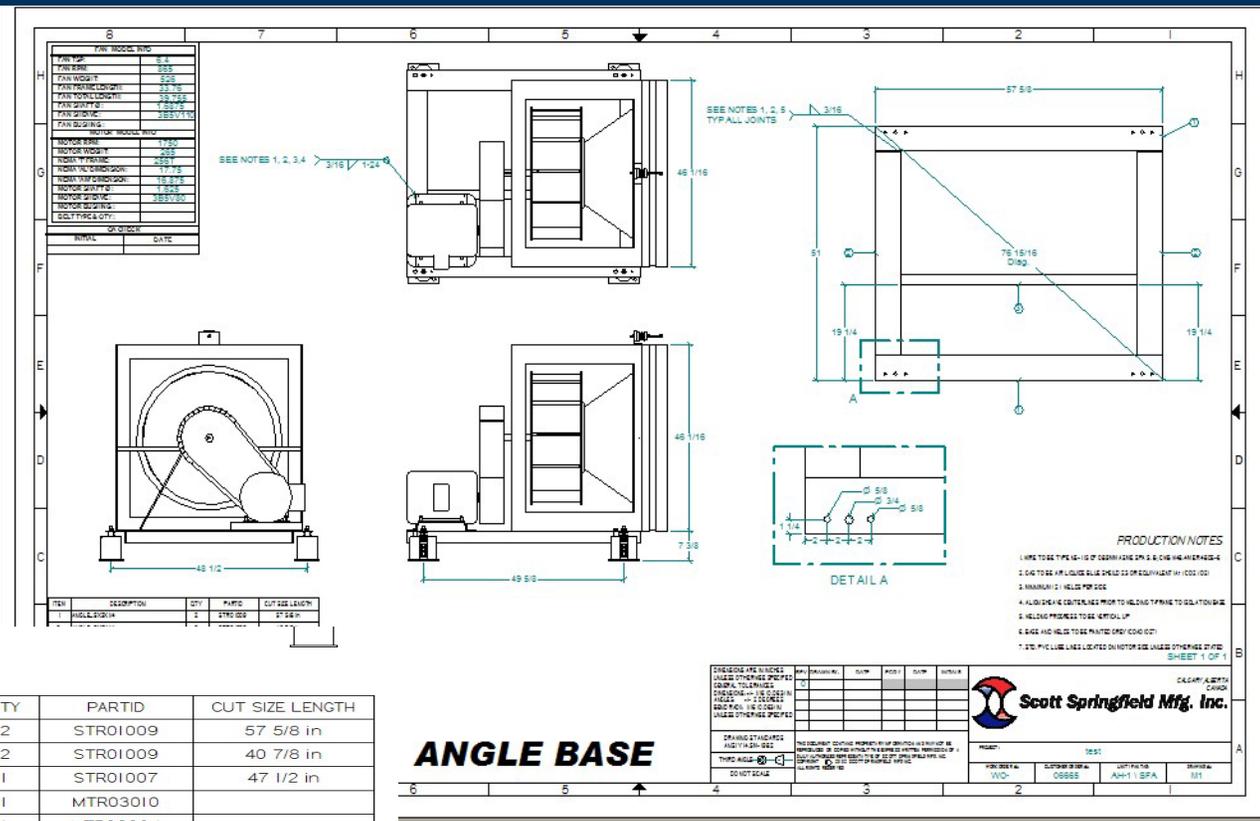


Draft Documents



Linked to the assemblies
"Custom" properties

FAN_MODEL_INFO	
FAN TSP:	6.4
FAN RPM:	526
FAN WEIGHT:	1235
FAN FRAME LENGTH:	33.76
FAN TOTAL LENGTH:	39.75
FAN SHAFT Ø:	1.6875
FAN SHEAVE:	3B5V80
FAN BUSHING:	B
MOTOR_MODEL_INFO	
MOTOR RPM:	1750
MOTOR WEIGHT:	124
NEMA 'T' FRAME:	213T
NEMA 'AL' DIMENSION:	15
NEMA 'AM' DIMENSION:	11
MOTOR SHAFT Ø:	1.375
MOTOR SHEAVE:	3B5V110
MOTOR BUSHING:	B
BELT TYPE & QTY:	3V
QA CHECK	
INITIAL	DATE



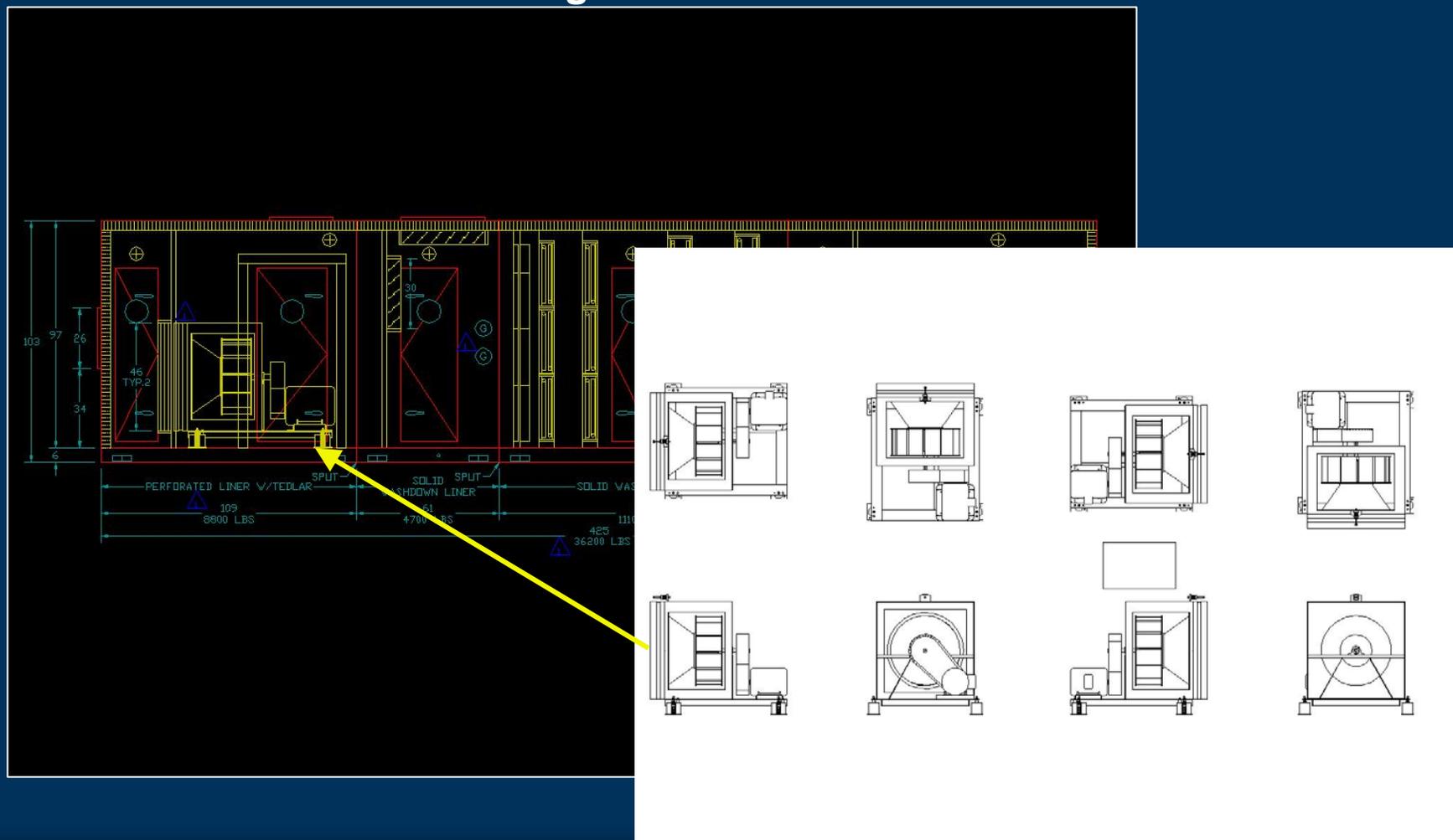
ITEM	DESCRIPTION	QTY	PARTID	CUT SIZE LENGTH
1	ANGLE_5X3X1/4	2	STRO1009	57 5/8 in
2	ANGLE_5X3X1/4	2	STRO1009	40 7/8 in
3	ANGLE_2x3x3/16	1	STRO1007	47 1/2 in
4*	NEMA_BASE_256T	1	MTR03010	
5*	ODP_1750_20	1	MTR02334	
6*	FLEX CONNECTOR (VINYL)	1	MISO1012	184.000 in
7*	SWSR_2A_400 (YELLOW)	3	ISO01184	
8*	SWSR_2A_200 (GREEN)	1	ISO01183	
9*	FDS_I_220 (BROWN)	1	ISO01083	
10*	SHEAVE(DRIVEN) 3B5V110	1		
11*	BUSHING - H	1		
12*	SHEAVE(DRIVER) 3B5V80	1		
13*	BUSHING - B	1		
14*	Twin City Plenum Size 330 Class I	1		

ANGLE BASE

Coding is used to scale and position the drawing views and the user is left to 'clean-up' the document by adding dimensions and ballooning items.

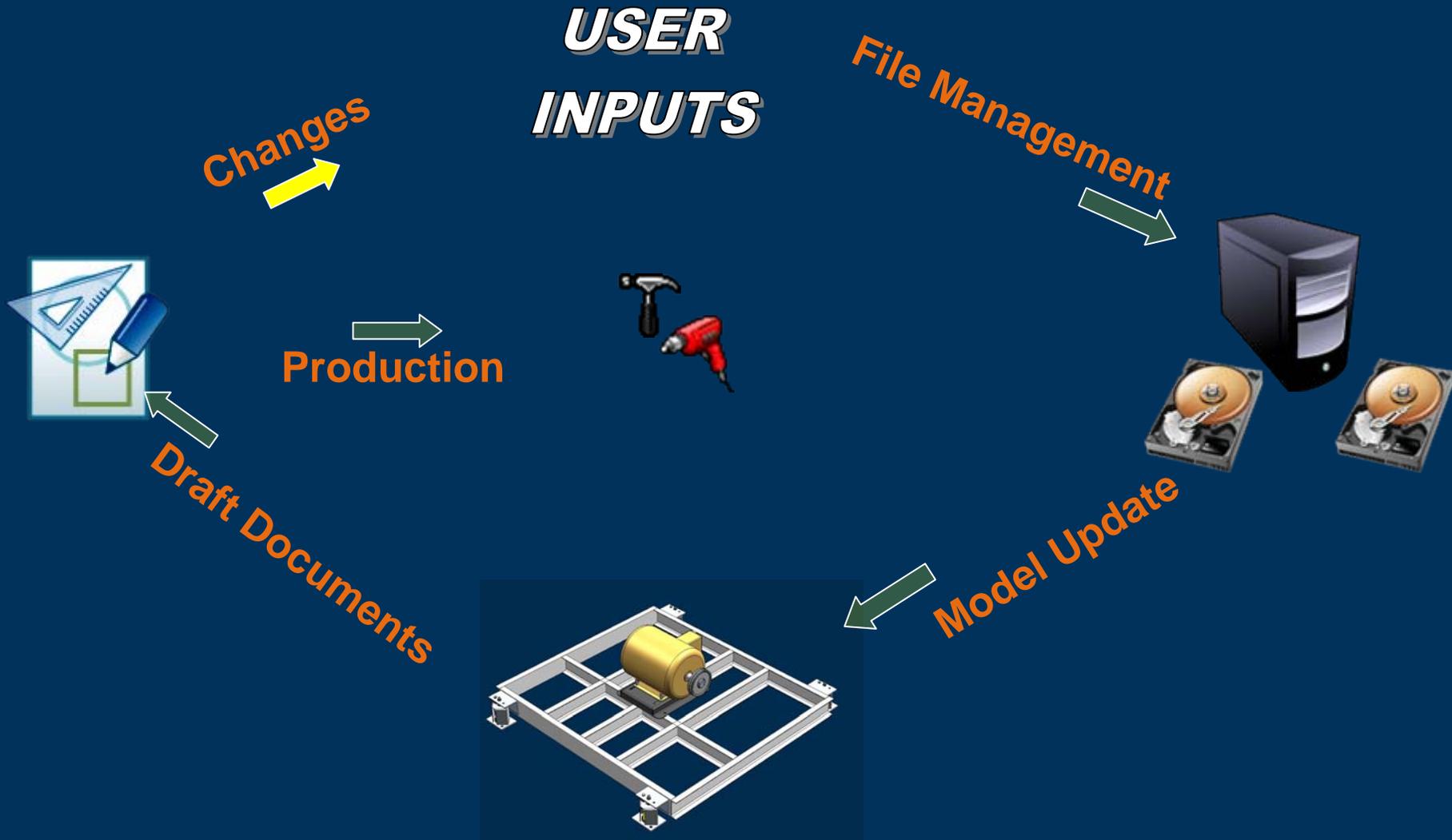
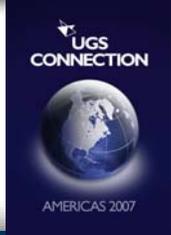
➤ Draft Documents

Automatically export multiple views at 1:1 scale to a .dwg format for use in ACAD drawings.



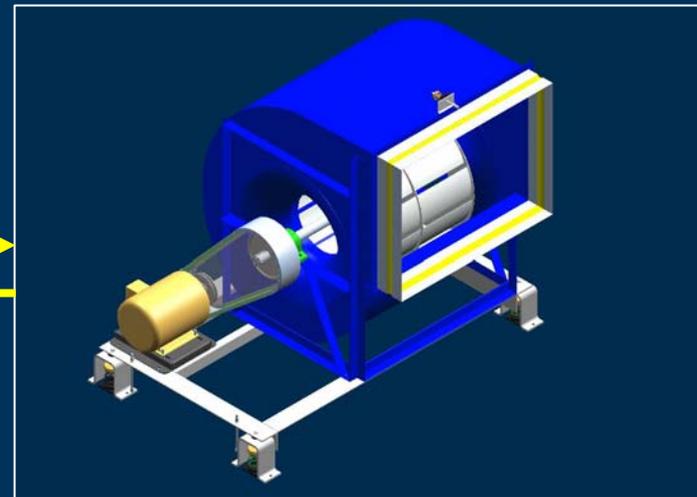
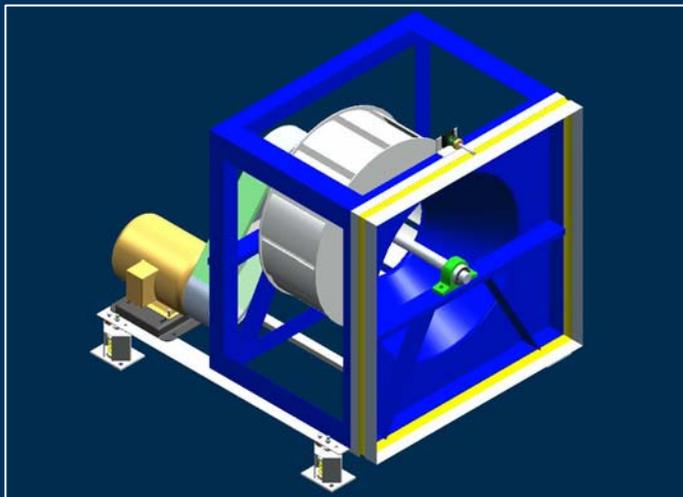
Configurator Stages

4) Changes

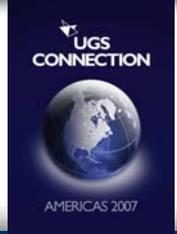


➤ Changes

- ▶ Inevitably, last minute changes to specifications demand the ability to change designs and production drawings with little time lost.
- ▶ Ensuring the model contains :
 - ✓ **subassemblies mated with there reference planes helps produce predictable results when the 'Replace' command is used.**
 - ✓ **'extra' components to facilitate changes whether they be extra parts that are hidden from view or features that have been suppressed.**
 - and**
 - ✓ **robust assembly sketches.**



Benefits



TIME SAVINGS

- **Before:** 1.0 to 1.5 man-hours per fan at 4 fans per day = 4 to 6 man-hours
- **After:** 0.25 to 0.33 man-hours per fan at 4 fans per day = 1 to 1.3 man-hours
- Improved rework time for Engineering Change Orders (ECO's)

ACCURACY

- Eliminated errors due to translation from one document to another.
- Reduce input errors as the information is only entered once.
- Design rules are embedded in the software. Rule changes are immediately implemented with a code change. (ie. no staff re-training required)

CLARITY

- Reduced drawing interpretation errors and fewer clarity issues.
- Repeatability.



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Thank you for attending !

...Questions ?