

# Stress Analysis Report



Analyzed File:	Assemby 3.iam
Autodesk Inventor Version:	2023 (Build 270158000, 158)
Creation Date:	7/4/2022, 6:53 PM
Study Author:	earls
Summary:	

## Static Analysis:1

### General objective and settings:

Design Objective	Single Point
Study Type	Static Analysis
Last Modification Date	7/4/2022, 6:12 PM
Model State	[Primary]
Design View	Default
Positional	[Primary]
Detect and Eliminate Rigid Body Modes	No
Separate Stresses Across Contact Surfaces	No
Motion Loads Analysis	No

## iProperties

### Summary

Author	earls
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### Project

Part Number	Assemby 3
Designer	earls
Cost	\$0.00
Date Created	6/30/2022

### Status

Design Status	WorkInProgress
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## Physical

Mass	2.04222 kg
Area	521050 mm <sup>2</sup>
Volume	756378 mm <sup>3</sup>
Center of Gravity	x=-5.11334 mm y=-5.76516 mm z=26.0107 mm

Note: Physical values could be different from Physical values used by FEA reported below.

## Mesh settings:

Avg. Element Size (fraction of model diameter)	0.1
Min. Element Size (fraction of avg. size)	0.2
Grading Factor	1.5
Max. Turn Angle	60 deg
Create Curved Mesh Elements	No
Use part based measure for Assembly mesh	Yes

## Material(s)

Name	Aluminum 6061	
General	Mass Density	2.7 g/cm <sup>3</sup>
	Yield Strength	275 MPa
	Ultimate Tensile Strength	310 MPa
Stress	Young's Modulus	68.9 GPa
	Poisson's Ratio	0.33 ul
	Shear Modulus	25.9023 GPa
Part Name(s)	Bottom plate 2.5mm.ipt Servo arm.ipt Test flange.ipt Servo.ipt Part2.ipt Rod qty-6.ipt Part1.ipt Moving platform.ipt	

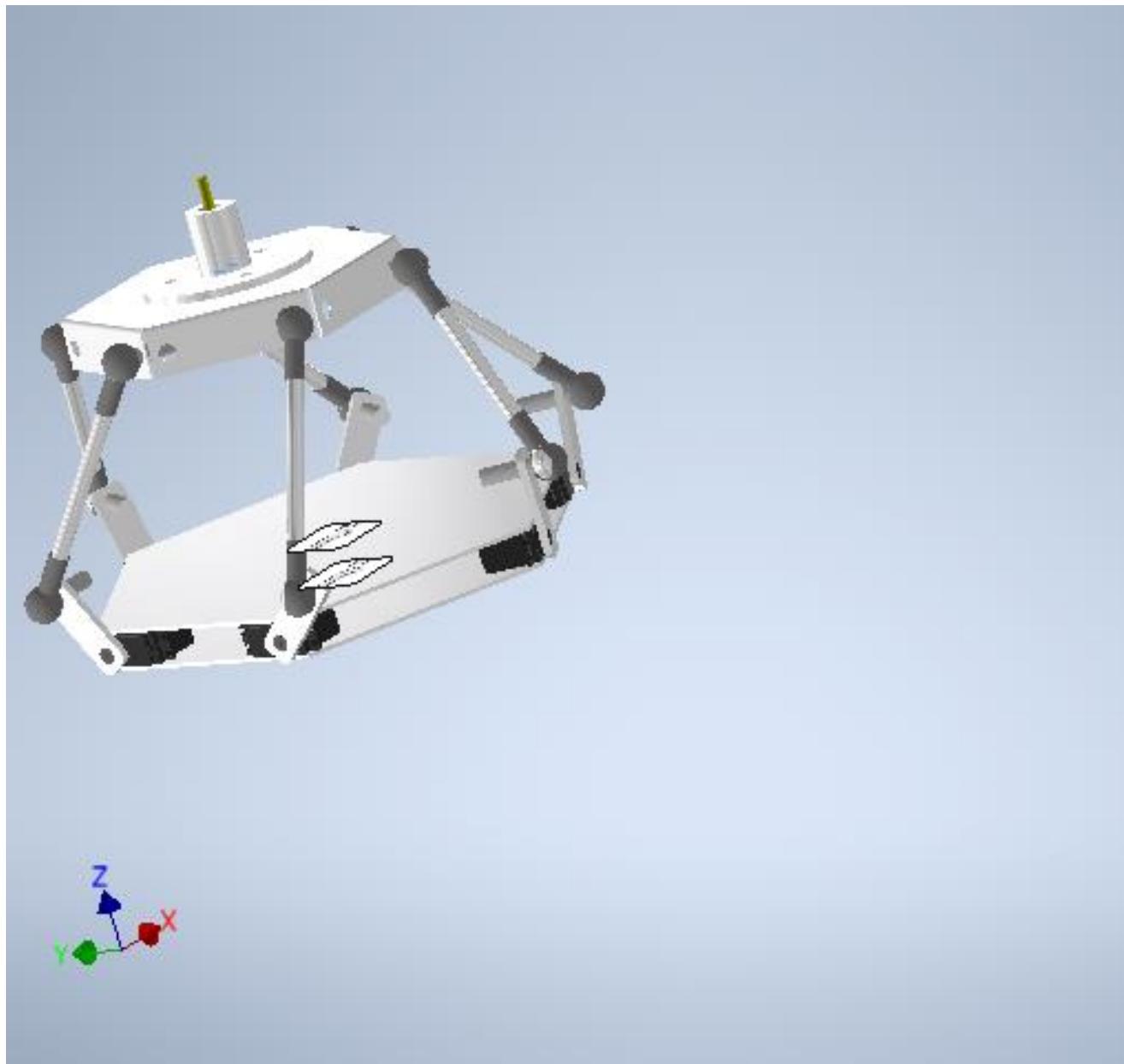
## Operating conditions

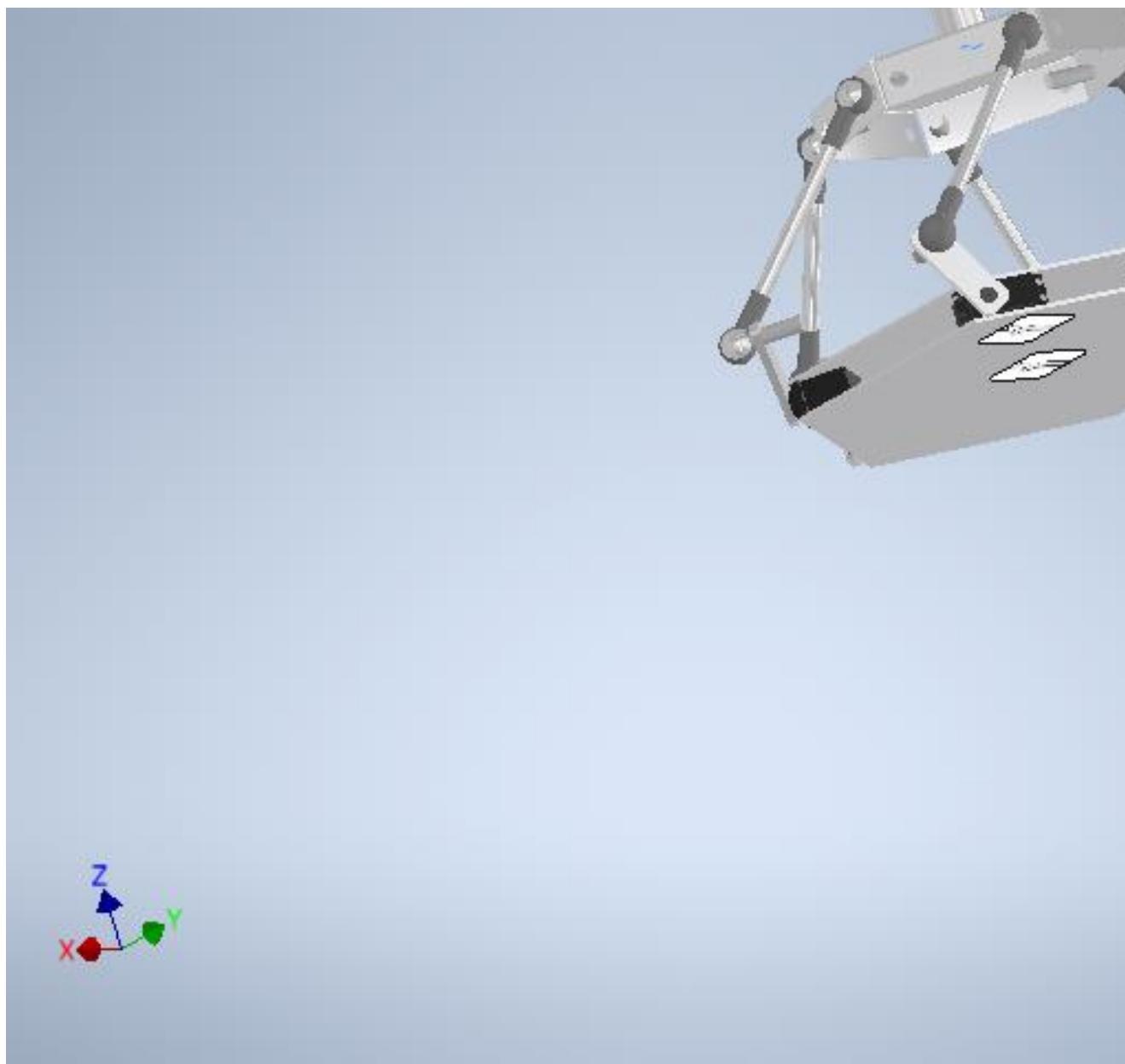
### Force:1

Load Type	Force
Magnitude	20.000 N
Vector X	-1.205 N

Vector Y	-0.287 N
Vector Z	-19.962 N

**Selected Face(s)**

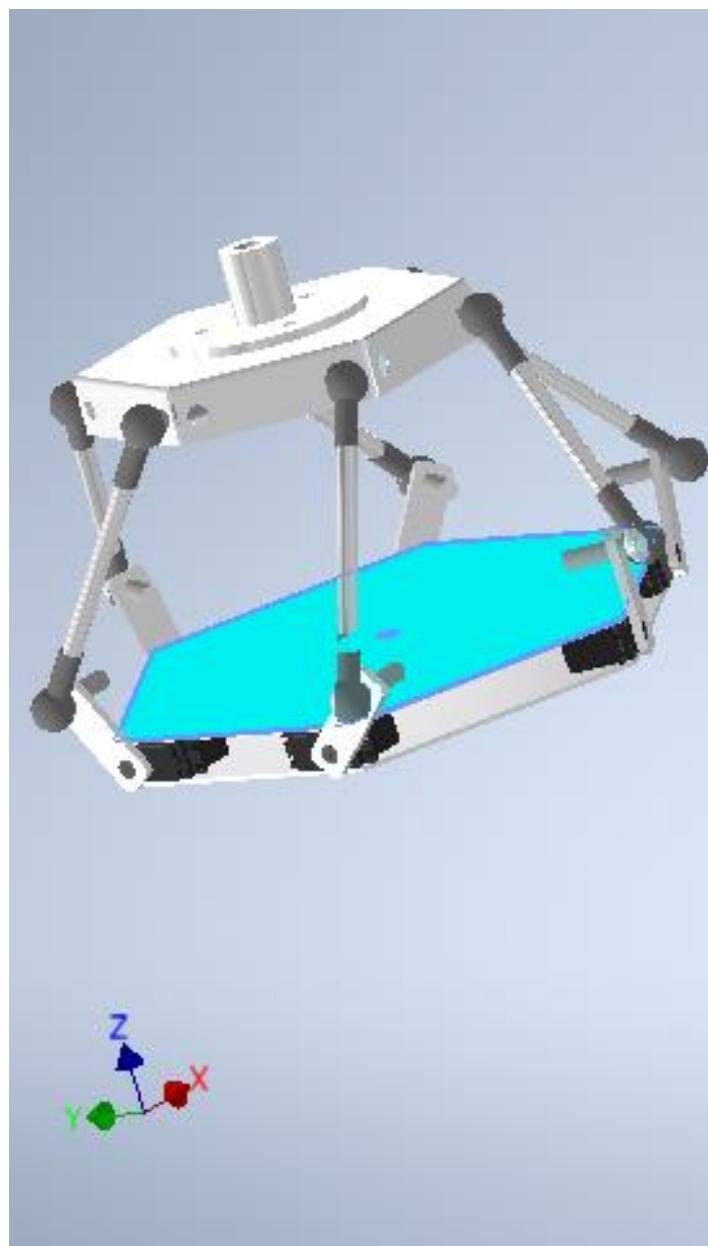


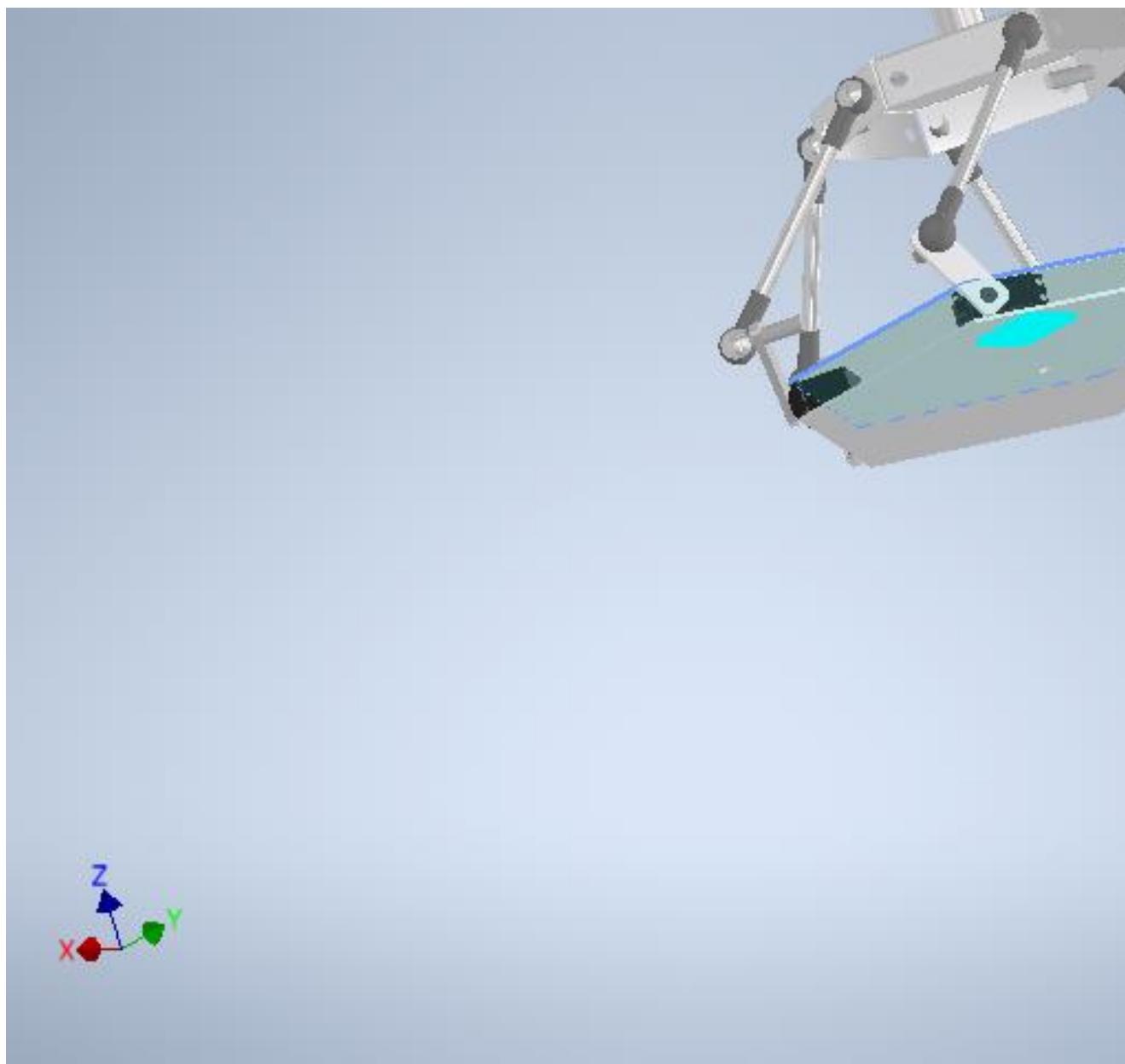


**Fixed Constraint:1**

Constraint Type	Fixed Constraint
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**Selected Face(s)**

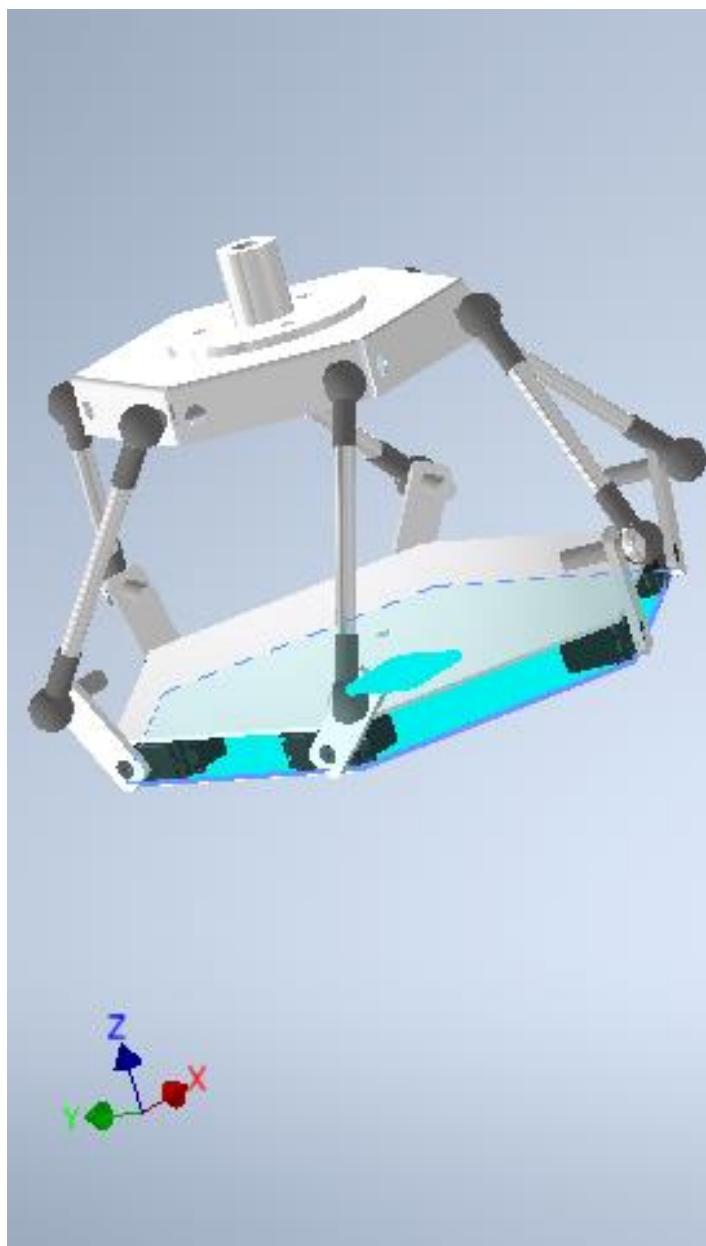


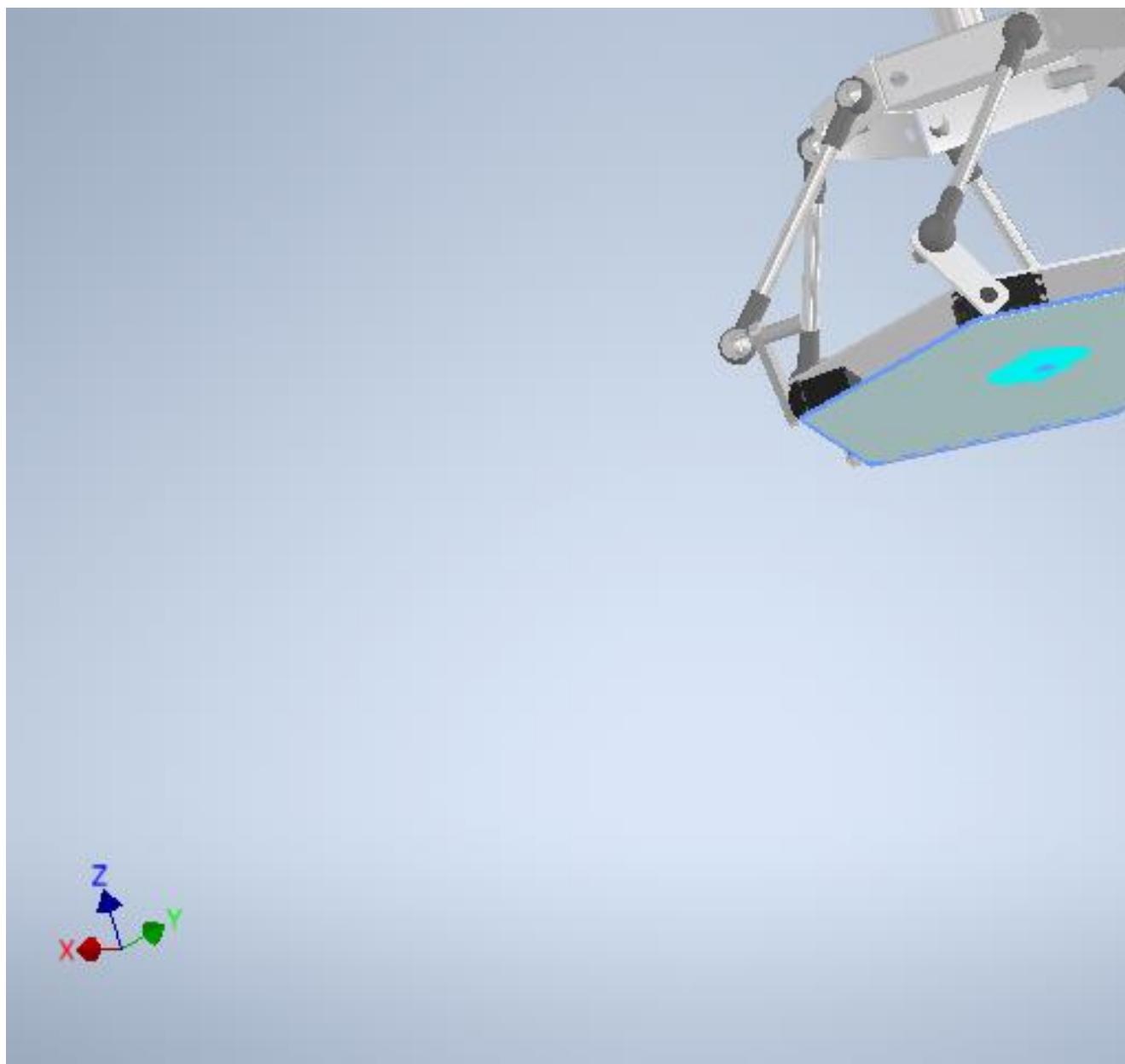


## Fixed Constraint:2

### Constraint Type Fixed Constraint

## Selected Face(s)





### Contacts (Bonded)

Name	Part Name(s)
Bonded:1	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1
Bonded:2	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Servo arm:5
Bonded:3	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Servo arm:2
Bonded:4	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Servo arm:6

Bonded:5	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Servo arm:4
Bonded:6	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Servo arm:3
Bonded:7	Moving platform:1 Part2:11
Bonded:8	Moving platform:1 Part2:7
Bonded:9	Moving platform:1 Part2:3
Bonded:10	Moving platform:1 Part2:9
Bonded:11	Moving platform:1 Part2:1
Bonded:12	Moving platform:1 Part2:6
Bonded:13	Part1:12 Rod qty-6:6
Bonded:14	Part1:1 Rod qty-6:1
Bonded:15	Part1:2 Rod qty-6:1
Bonded:16	Part1:8 Rod qty-6:4
Bonded:17	Part1:7 Rod qty-6:4
Bonded:18	Part1:5 Rod qty-6:3
Bonded:19	Part1:6 Rod qty-6:3
Bonded:20	Part1:9 Rod qty-6:5
Bonded:21	Part1:10 Rod qty-6:5
Bonded:22	Part1:11 Rod qty-6:6
Bonded:23	Part1:9 Rod qty-6:5
Bonded:24	Part1:8 Rod qty-6:4
Bonded:25	Part1:7 Rod qty-6:4
Bonded:26	Part1:6 Rod qty-6:3

Bonded:27	Part1:5 Rod qty-6:3
Bonded:28	Part1:12 Rod qty-6:6
Bonded:29	Part1:10 Rod qty-6:5
Bonded:30	Part1:2 Rod qty-6:1
Bonded:31	Part1:11 Rod qty-6:6
Bonded:32	Part1:1 Rod qty-6:1
Bonded:33	Moving platform:1 Test flange:1
Bonded:34	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:3
Bonded:35	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:6
Bonded:36	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:4
Bonded:37	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:7
Bonded:38	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:5
Bonded:39	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:2
Bonded:40	Stewart Assembly:1/Servo arm:3 Part2:2
Bonded:41	Stewart Assembly:1/Servo arm:4 Part2:12
Bonded:42	Stewart Assembly:1/Servo arm:5 Part2:8
Bonded:43	Stewart Assembly:1/Servo arm:6 Part2:10
Bonded:44	Stewart Assembly:1/Servo arm:2 Part2:5
Bonded:45	Stewart Assembly:1/Servo arm:1 Part2:4
Bonded:46	Stewart Assembly:1/Servo arm:3 Part1:1
Bonded:47	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Servo arm:4
Bonded:48	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1

Bonded:49	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Servo arm:2
Bonded:50	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Servo arm:6
Bonded:51	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Servo arm:5
Bonded:52	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Servo arm:3
Bonded:53	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1
Bonded:54	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Servo arm:5
Bonded:55	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Servo arm:3
Bonded:56	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Servo arm:4
Bonded:57	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1
Bonded:58	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Servo arm:2
Bonded:59	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Servo arm:6
Bonded:60	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:61	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:62	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:63	Rod qty-6:2 Part1:3
Bonded:64	Rod qty-6:2 Part1:4
Bonded:65	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:66	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:67	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Bottom plate 2.5mm:2

## Results

### Reaction Force and Moment on Constraints

Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Component (X,Y,Z)	Magnitude	Component (X,Y,Z)

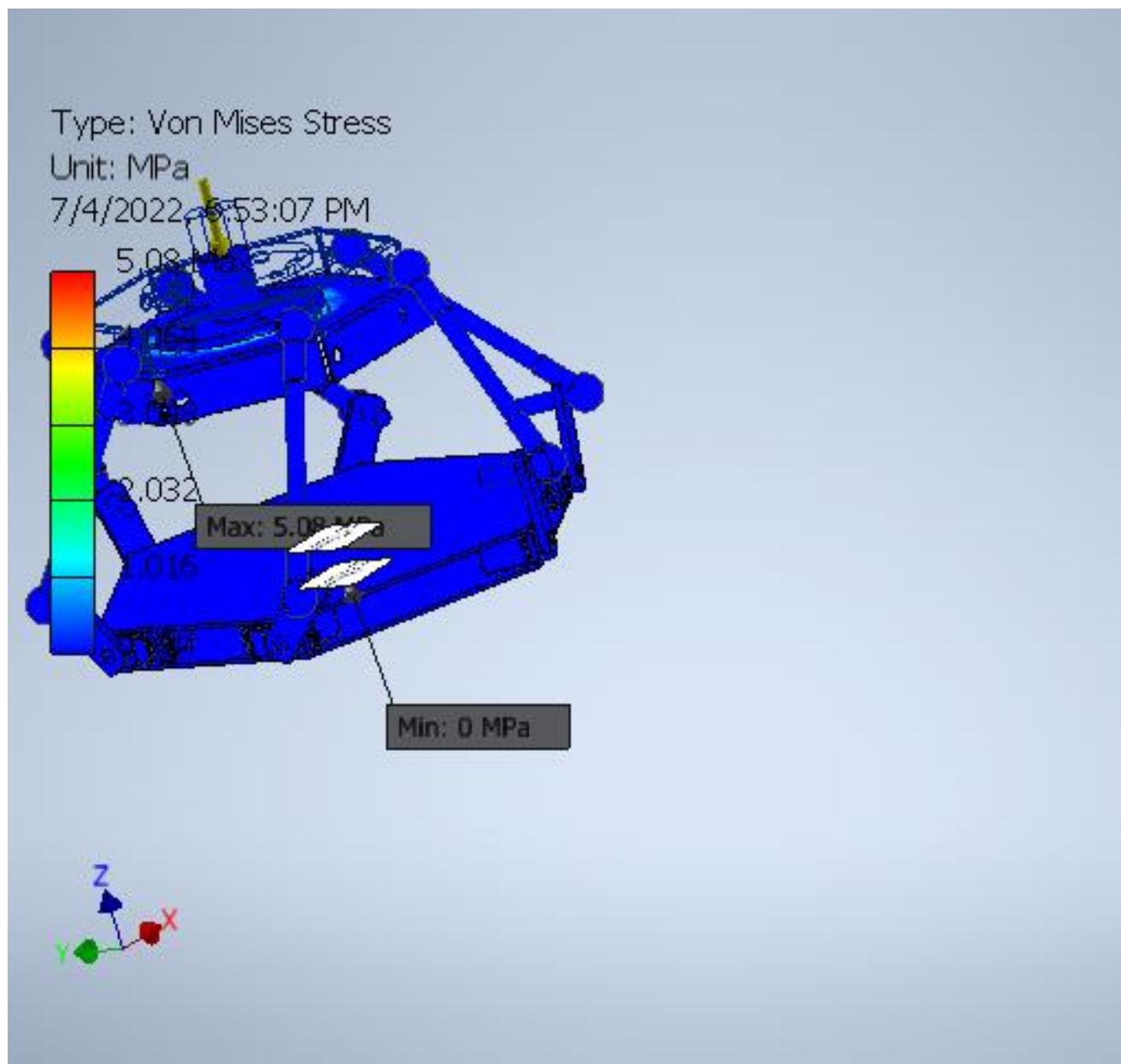
Fixed Constraint:1	0.0153746 N	0.00525595 N	0.00220246 N m	0.000217753 N m
		0.0142399 N		0.000313358 N m
		-0.00244549 N		0.00216915 N m
Fixed Constraint:2	0.0051646 N	-0.00231277 N	0.000663287 N m	0.0000509424 N m
		-0.00390277 N		0.000425016 N m
		-0.00246832 N		-0.000506672 N m

## Result Summary

Name	Minimum	Maximum
Volume	756379 mm <sup>3</sup>	
Mass	2.04222 kg	
Von Mises Stress	0 MPa	5.07957 MPa
1st Principal Stress	-0.912666 MPa	4.94717 MPa
3rd Principal Stress	-2.90498 MPa	0.684427 MPa
Displacement	0 mm	12.4904 mm
Safety Factor	15 ul	15 ul
Stress XX	-2.42034 MPa	3.09606 MPa
Stress XY	-2.25265 MPa	1.9206 MPa
Stress XZ	-1.97605 MPa	2.05501 MPa
Stress YY	-2.78161 MPa	3.60469 MPa
Stress YZ	-1.53613 MPa	1.63416 MPa
Stress ZZ	-1.62077 MPa	2.82324 MPa
X Displacement	-0.765093 mm	0.016595 mm
Y Displacement	-0.193711 mm	0.0160965 mm
Z Displacement	-12.4663 mm	0.0161289 mm
Equivalent Strain	0 ul	0.0000659585 ul
1st Principal Strain	-0.000000653023 ul	0.0000663663 ul
3rd Principal Strain	-0.0000473887 ul	0.000000837321 ul
Strain XX	-0.0000298823 ul	0.0000395742 ul
Strain XY	-0.0000434836 ul	0.0000370739 ul
Strain XZ	-0.0000381444 ul	0.0000396686 ul
Strain YY	-0.0000357781 ul	0.0000444316 ul
Strain YZ	-0.0000296523 ul	0.0000315447 ul
Strain ZZ	-0.0000189259 ul	0.0000349978 ul
Contact Pressure	0 MPa	5.39535 MPa
Contact Pressure X	-3.52998 MPa	3.90544 MPa
Contact Pressure Y	-3.76239 MPa	4.9582 MPa
Contact Pressure Z	-1.94385 MPa	1.78567 MPa

## Figures

### Von Mises Stress



Type: Von Mises Stress

Unit: MPa

7/4/2022, 6:53:07 PM

5.08 Max

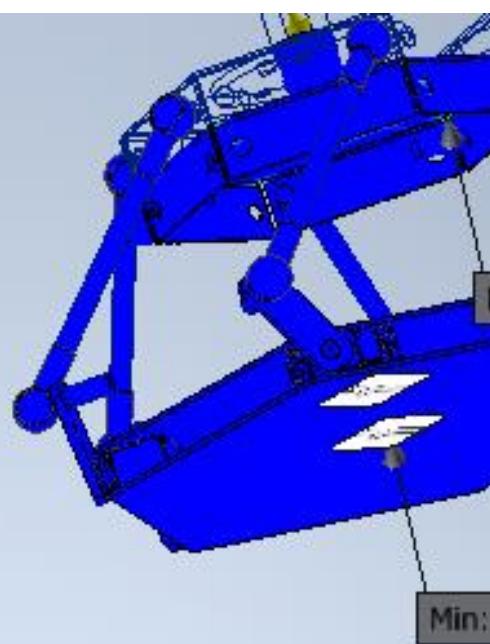
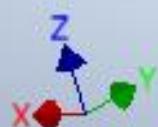
4.064

3.048

2.032

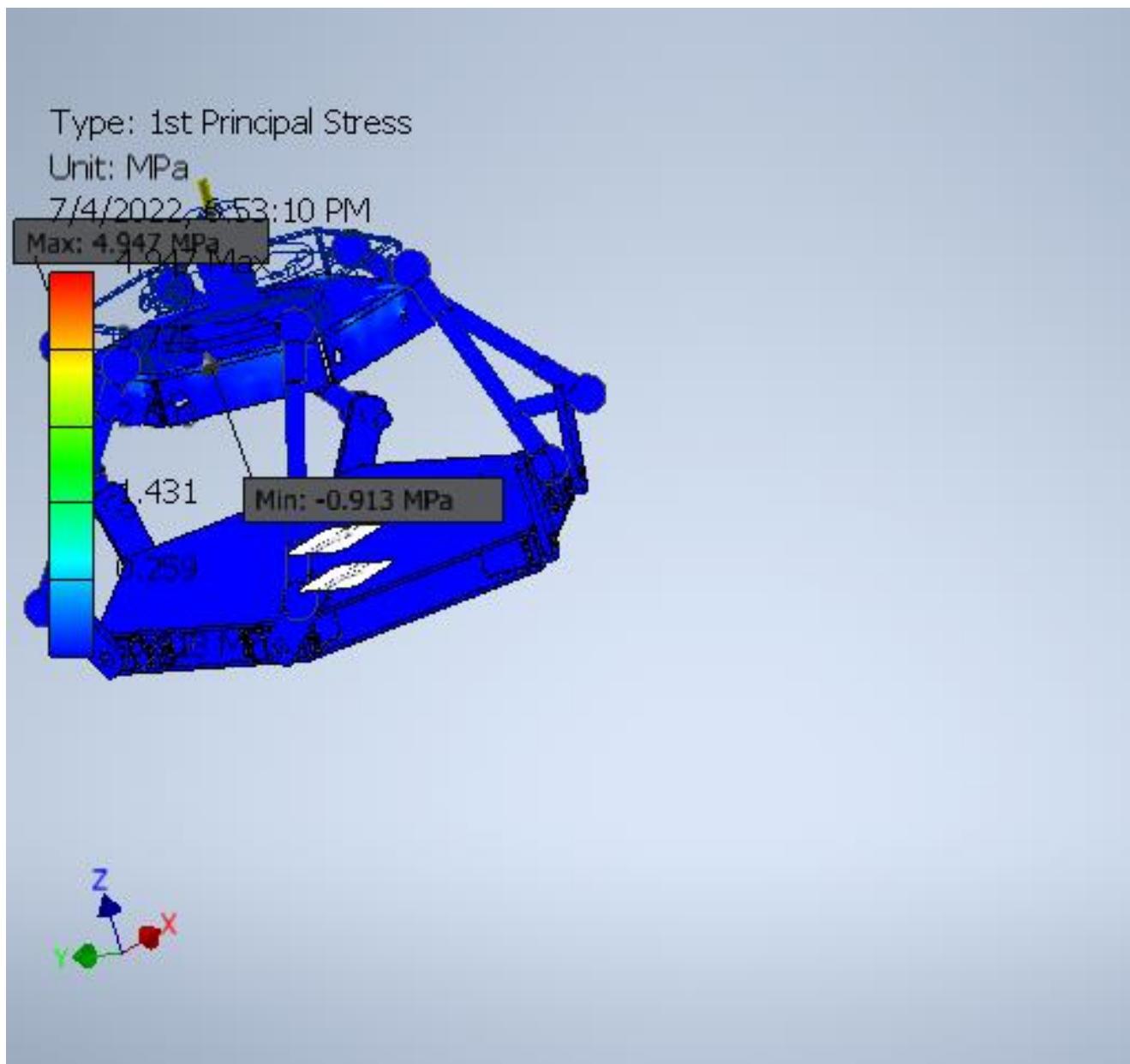
1.016

0 Min



Min:

**1st Principal Stress**



Type: 1st Principal Stress

Unit: MPa

7/4/2022, 6:53:10 PM

4.947 Max

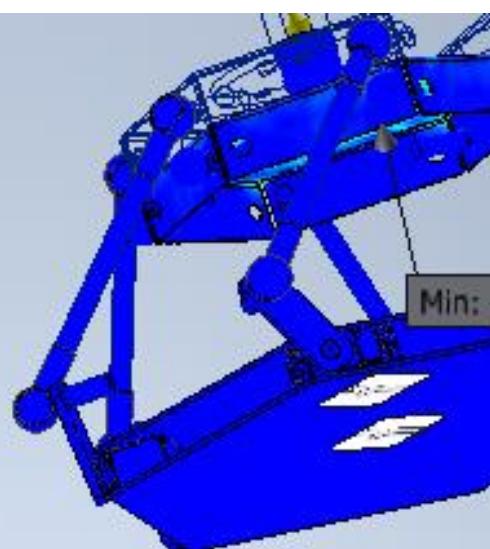
3.775

2.603

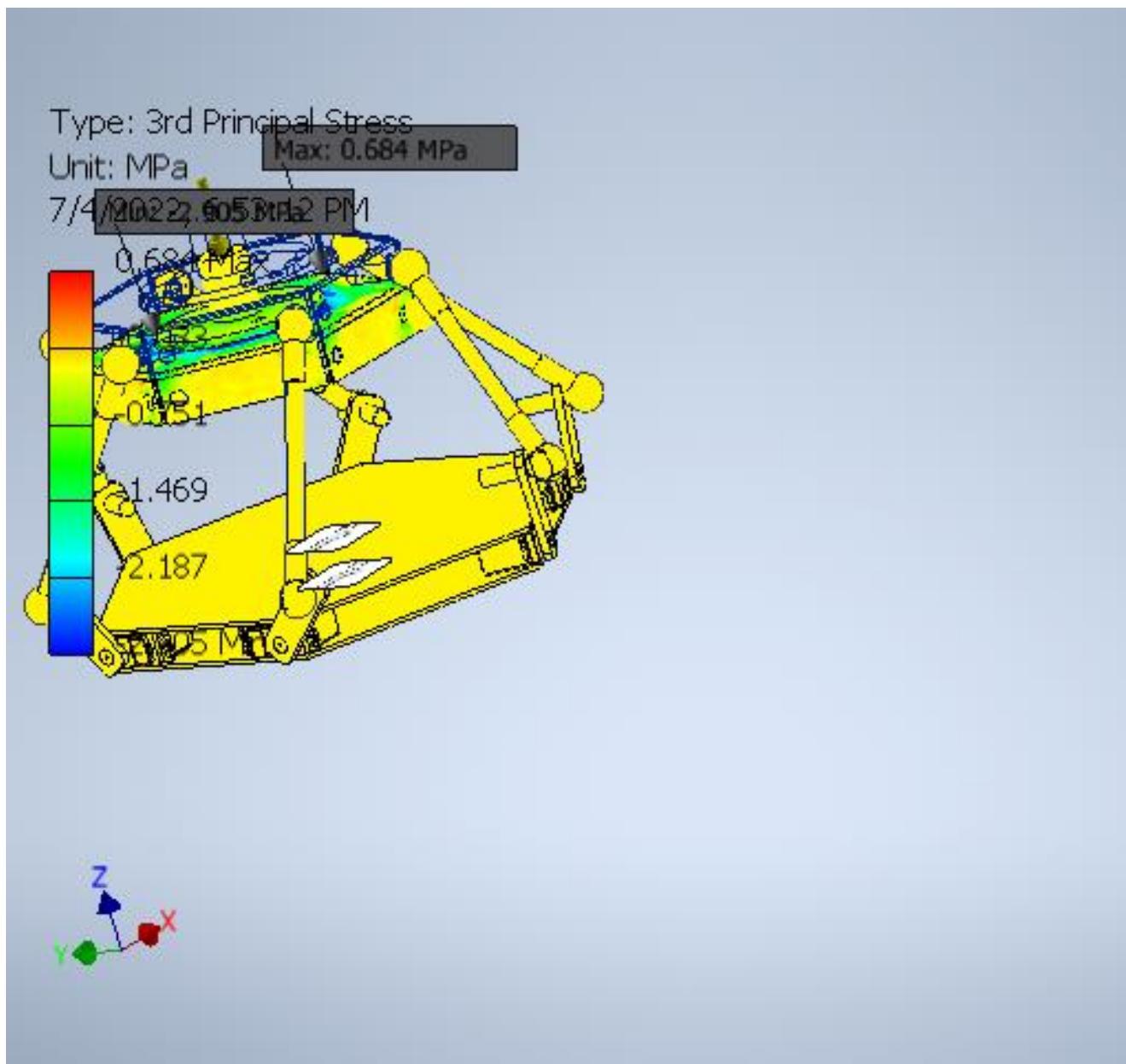
1.431

0.259

-0.913 Min



**3rd Principal Stress**



Type: 3rd Principal Stress

Unit: MPa

7/4/2022, 6:53:12 PM

0.684 Max

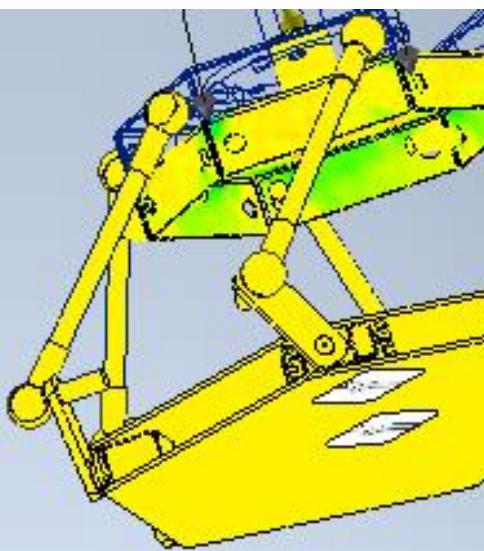
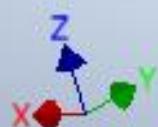
-0.033

-0.751

-1.469

-2.187

-2.905 Min

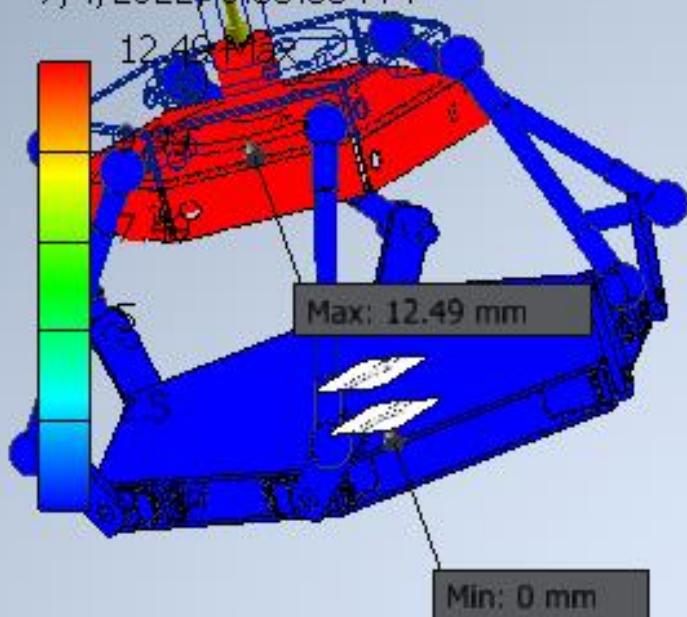


**Displacement**

Type: Displacement

Unit: mm

7/4/2022 6:53:35 PM



Type: Displacement  
Unit: mm  
7/4/2022, 6:53:35 PM

12.49 Max

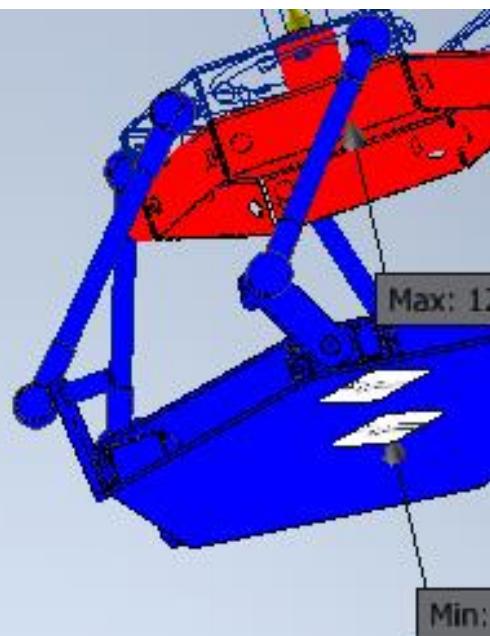
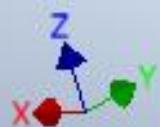
9.99

7.49

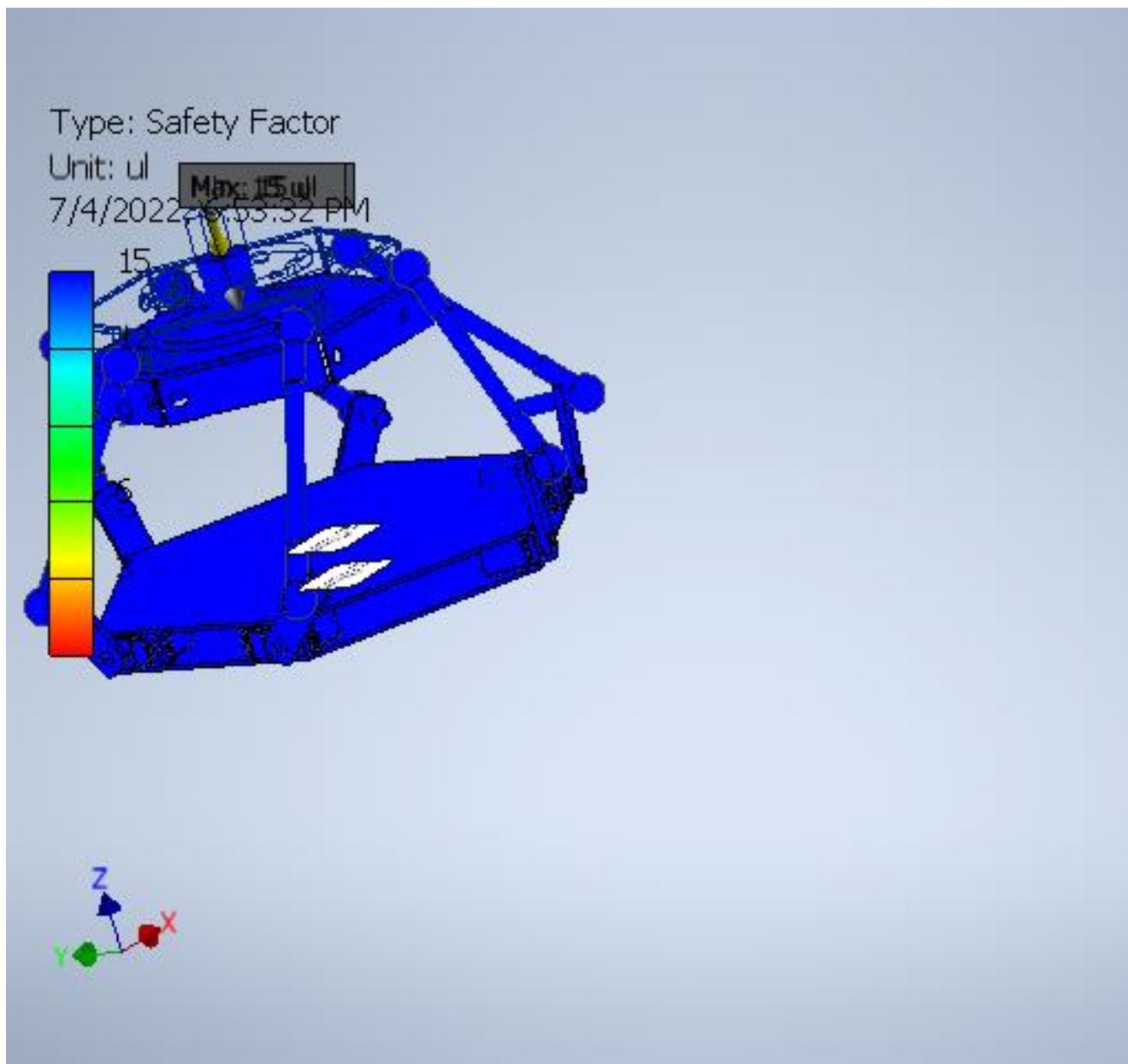
5

2.5

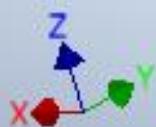
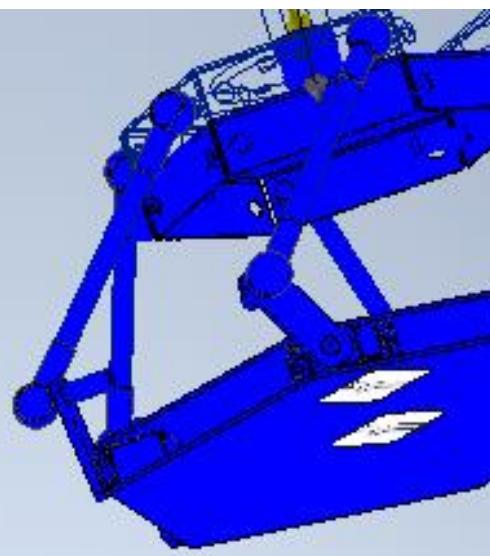
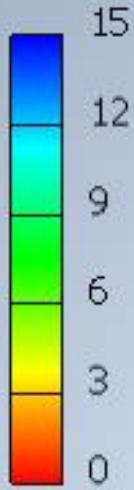
0 Min



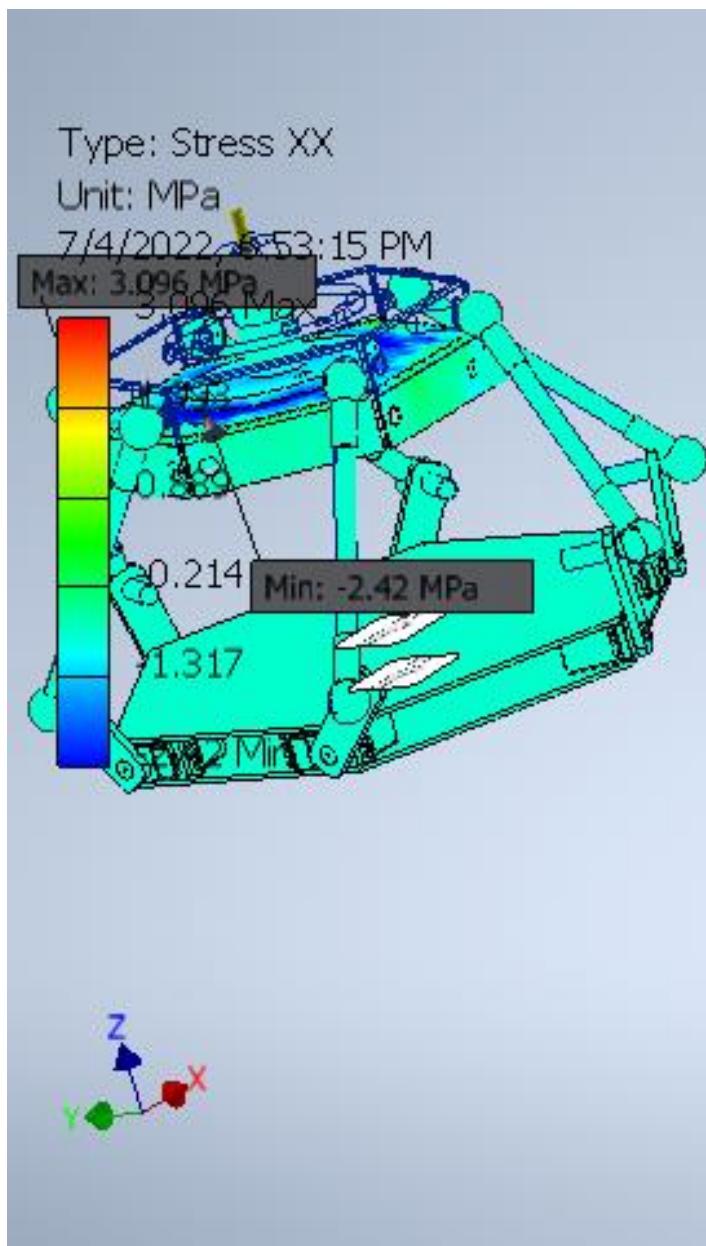
### Safety Factor



Type: Safety Factor  
Unit: ul  
7/4/2022, 6:53:32 PM



**Stress XX**



Type: Stress XX  
Unit: MPa  
7/4/2022, 6:53:15 PM

3.096 Max

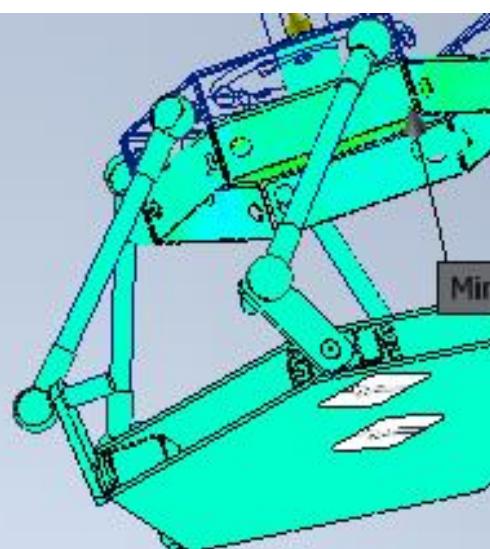
1.993

0.889

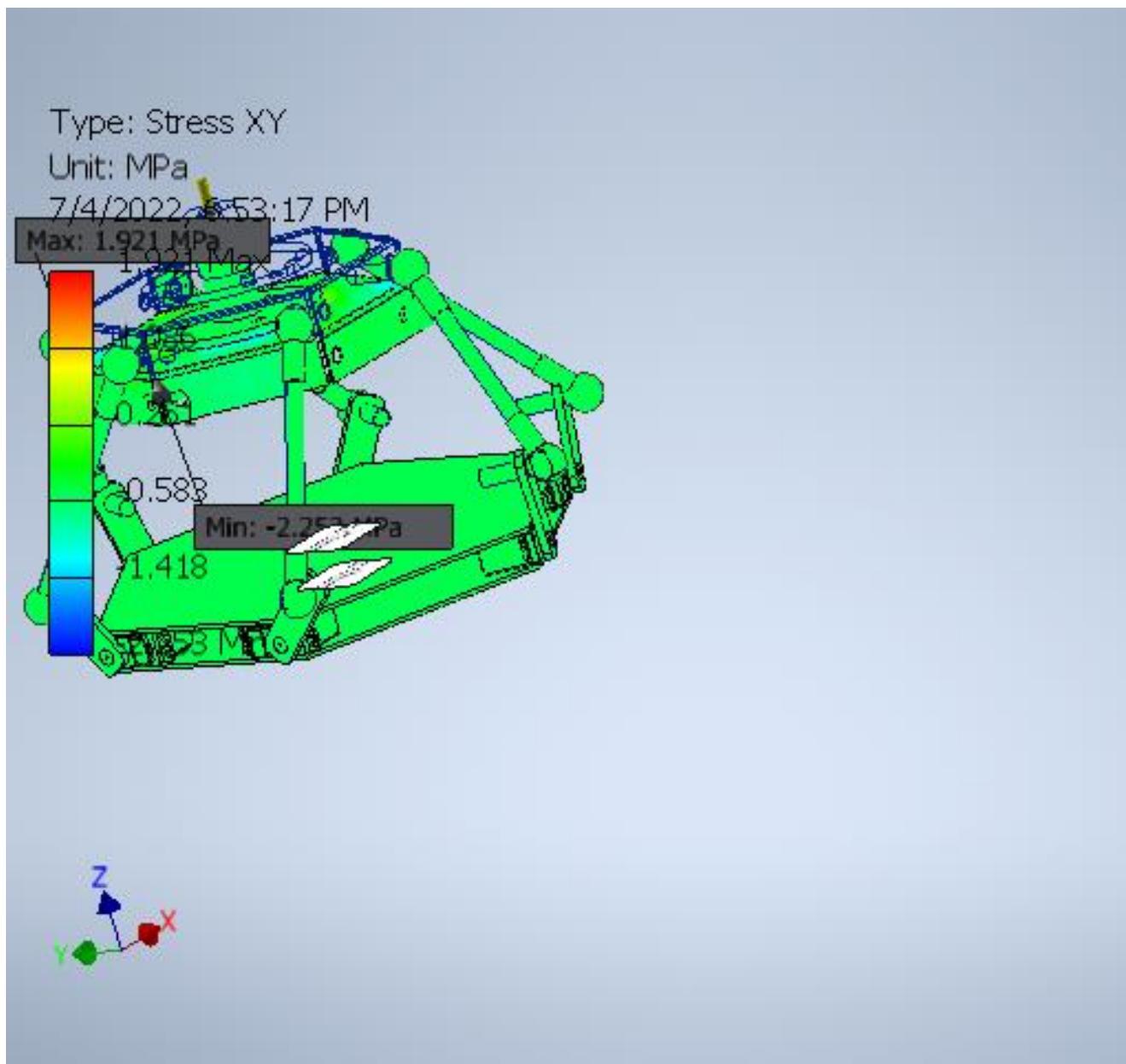
-0.214

-1.317

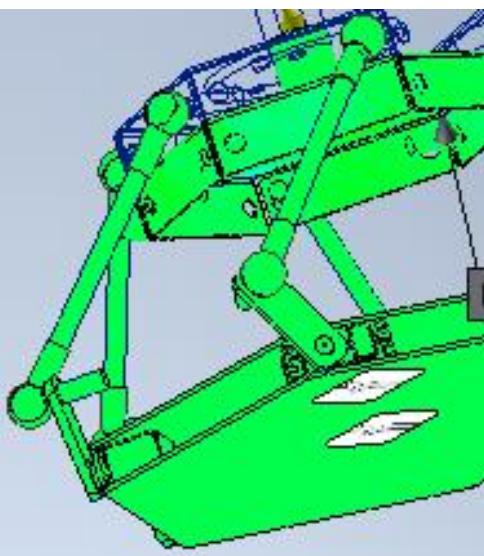
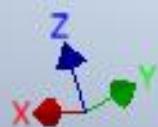
-2.42 Min



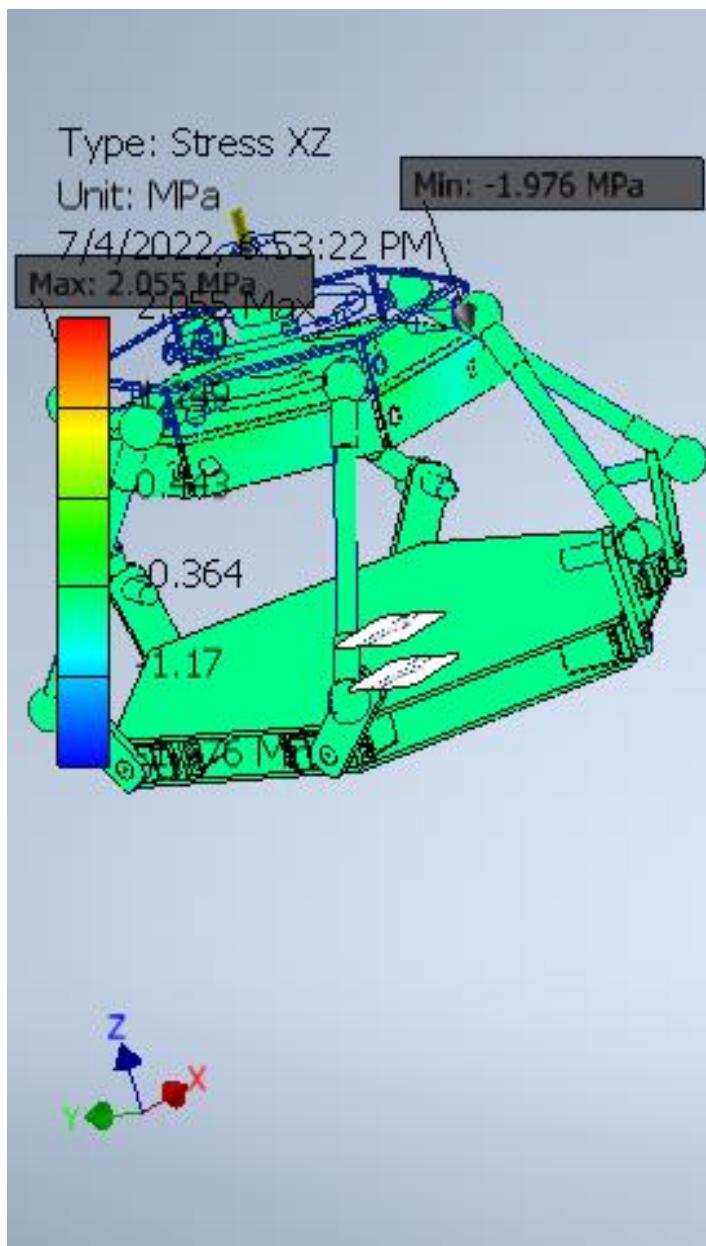
**Stress XY**



Type: Stress XY  
Unit: MPa  
7/4/2022, 6:53:17 PM  
1.921 Max  
1.086  
0.251  
-0.583  
-1.418  
-2.253 Min



**Stress XZ**



Min: -1.976 MPa

Type: Stress XZ  
Unit: MPa  
7/4/2022, 6:53:22 PM

2.055 Max

1.249

0.443

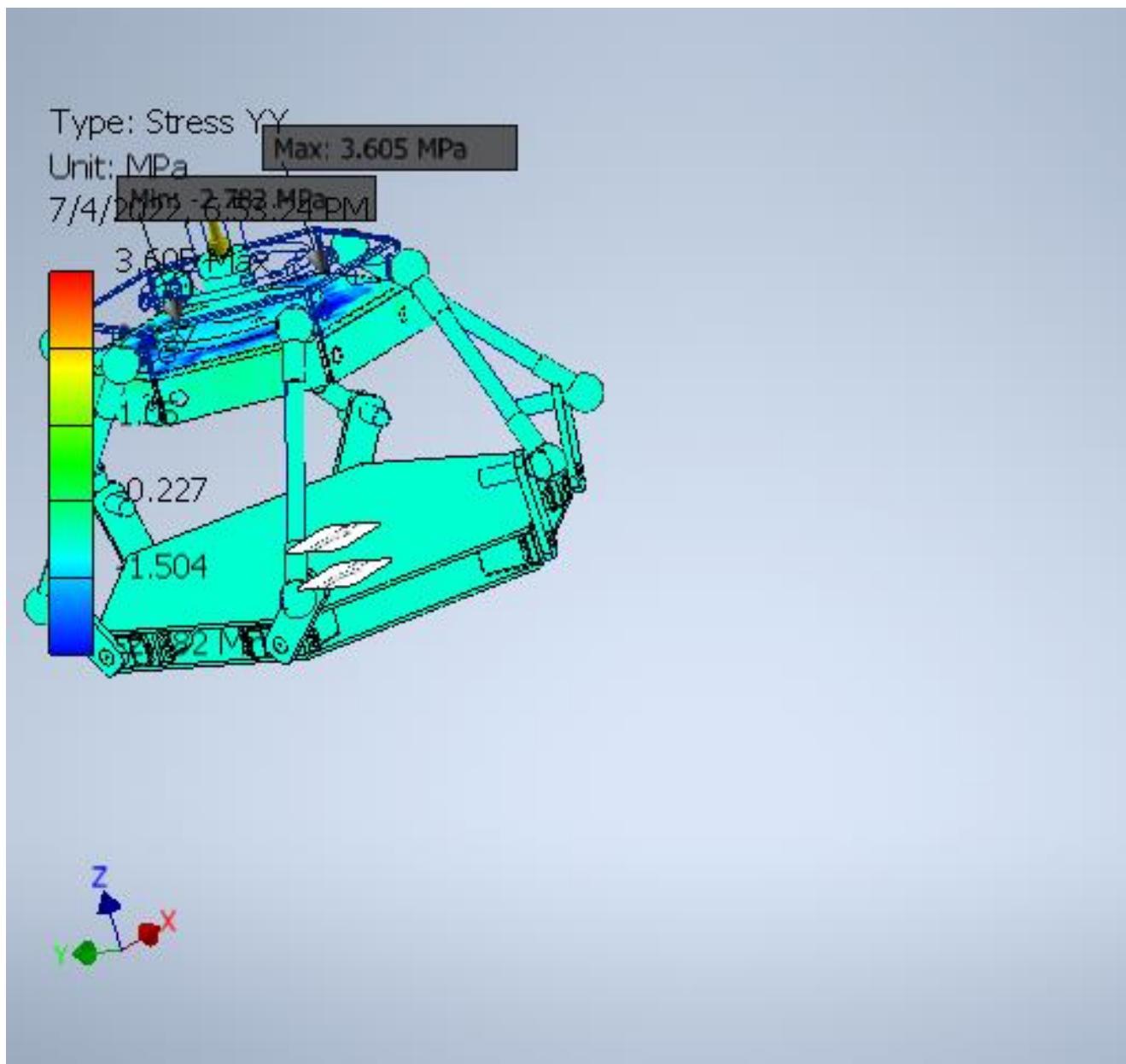
-0.364

-1.17

-1.976 Min



**Stress YY**



Type: Stress YY  
Unit: MPa  
7/4/2022, 6:53:24 PM

3.605 Max

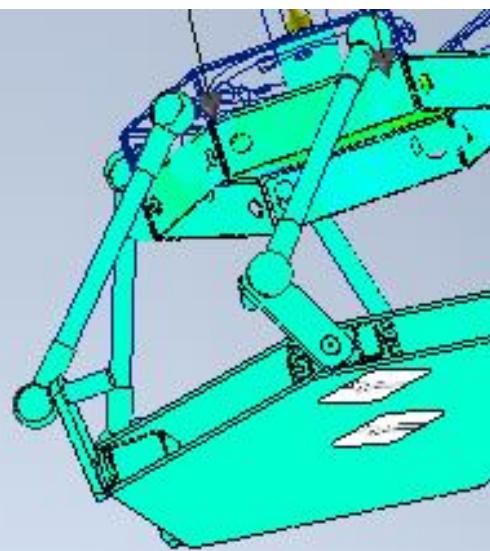
2.327

1.05

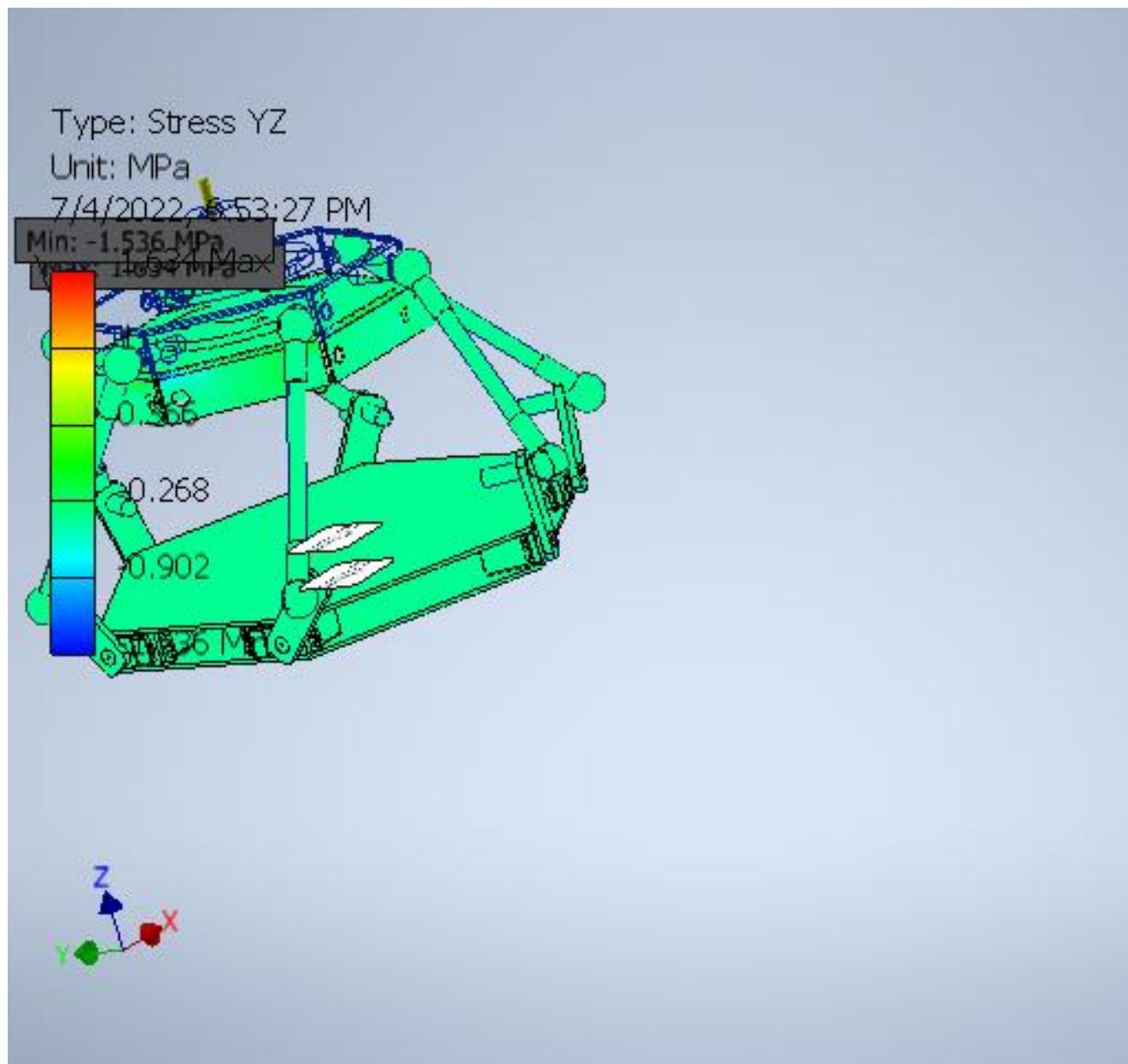
-0.227

-1.504

-2.782 Min

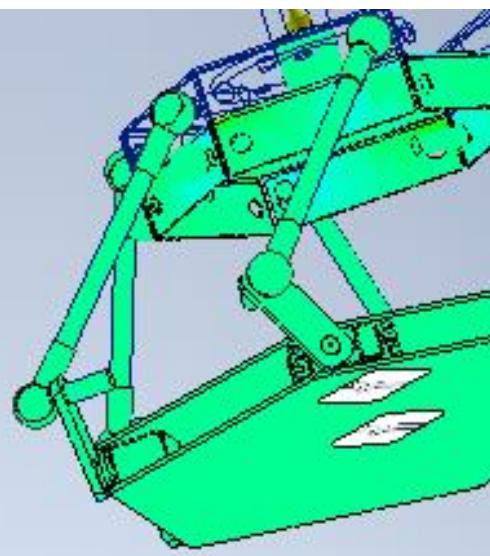
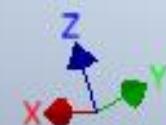
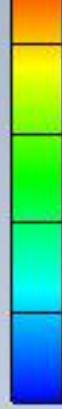


**Stress YZ**

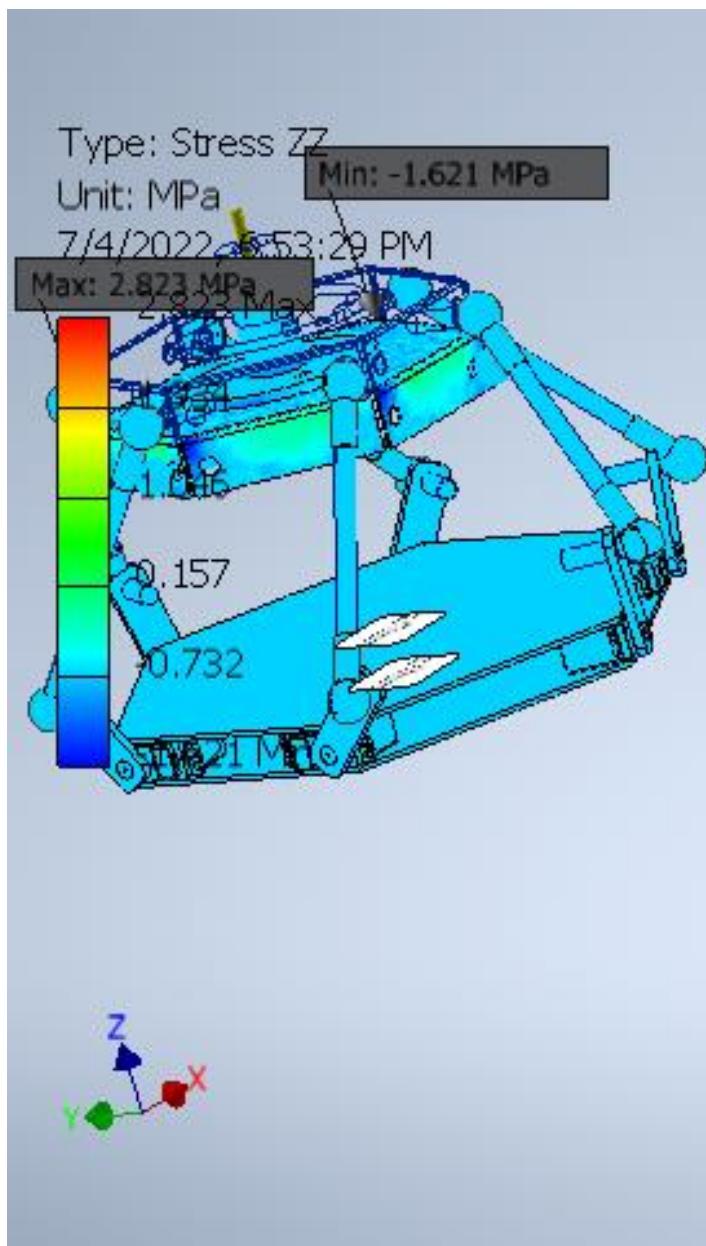


Type: Stress YZ  
Unit: MPa  
7/4/2022, 6:53:27 PM

1.634 Max



**Stress ZZ**



Type: Stress ZZ  
Unit: MPa  
7/4/2022, 6:53:29 PM

2.823 Max

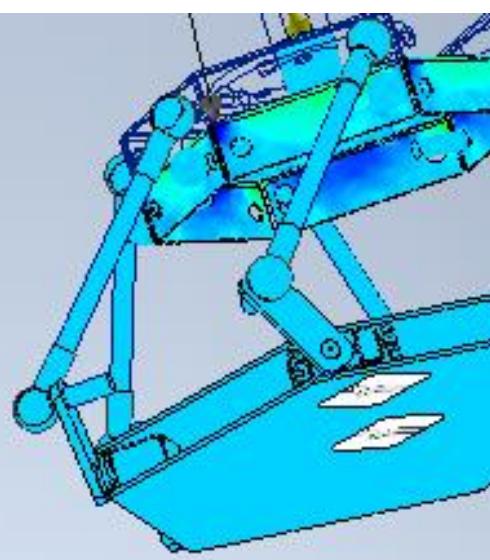
1.934

1.046

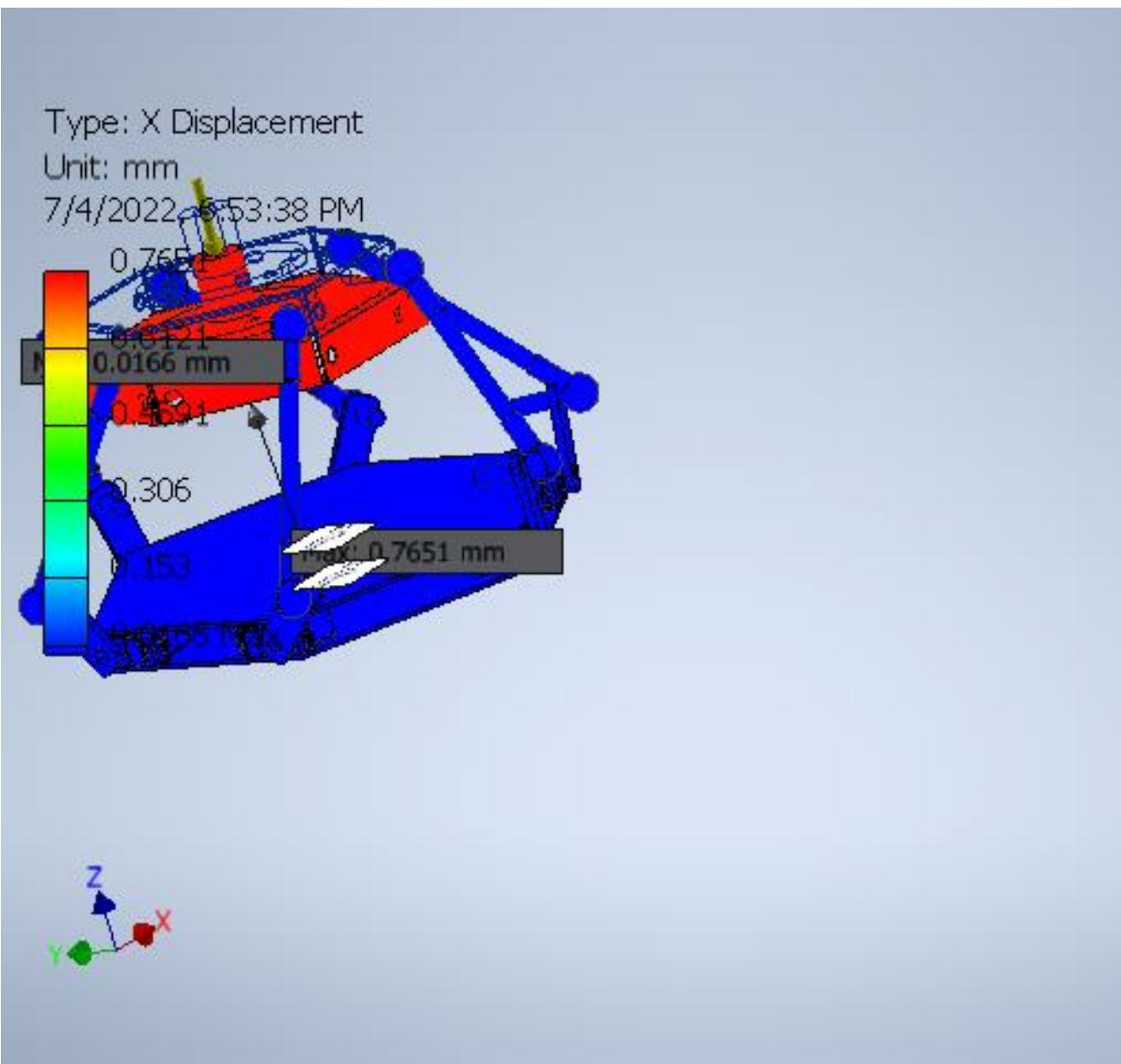
0.157

-0.732

-1.621 Min



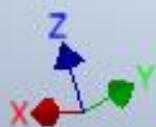
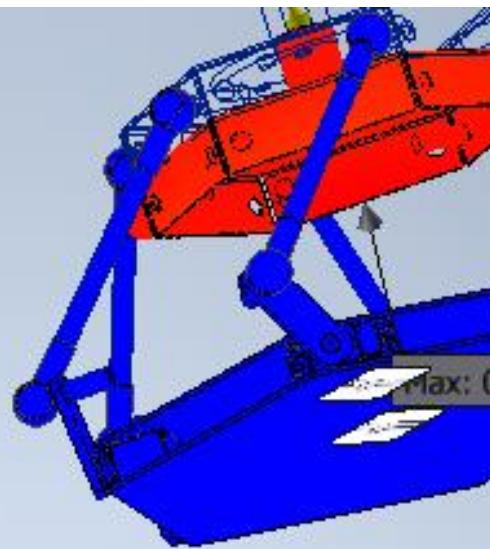
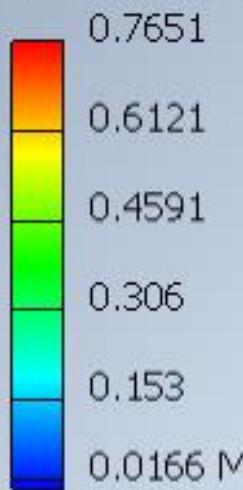
**X Displacement**



Type: X Displacement

Unit: mm

7/4/2022, 6:53:38 PM

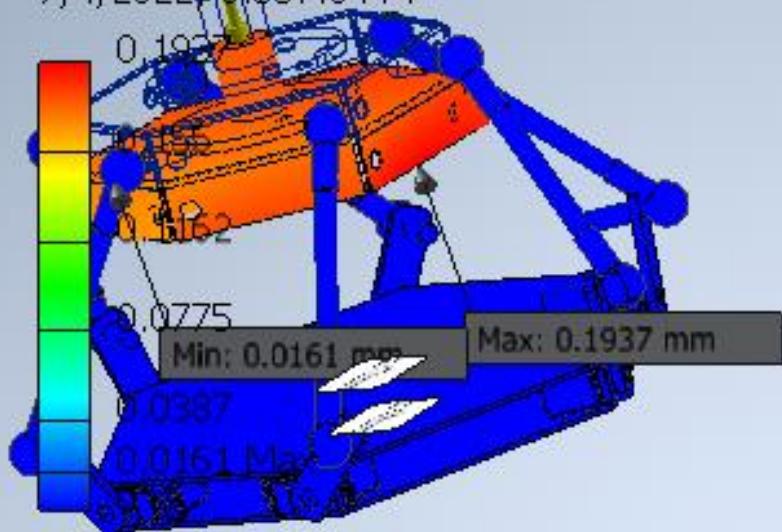


**X Displacement**

Type: Y Displacement

Unit: mm

7/4/2022 5:53:40 PM



Type: Y Displacement

Unit: mm

7/4/2022, 6:53:40 PM

0.1937

0.155

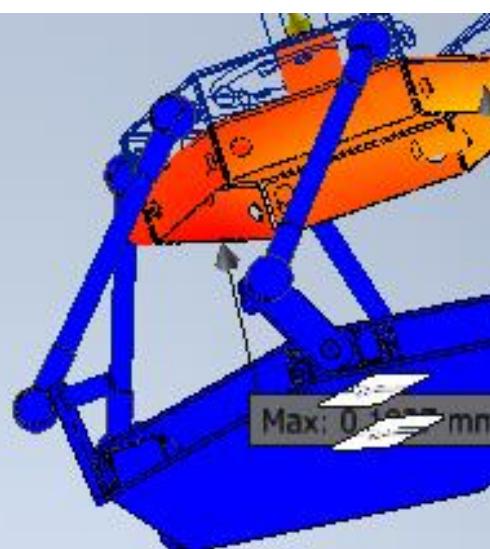
0.1162

0.0775

0.0387

0.0161 Max

0

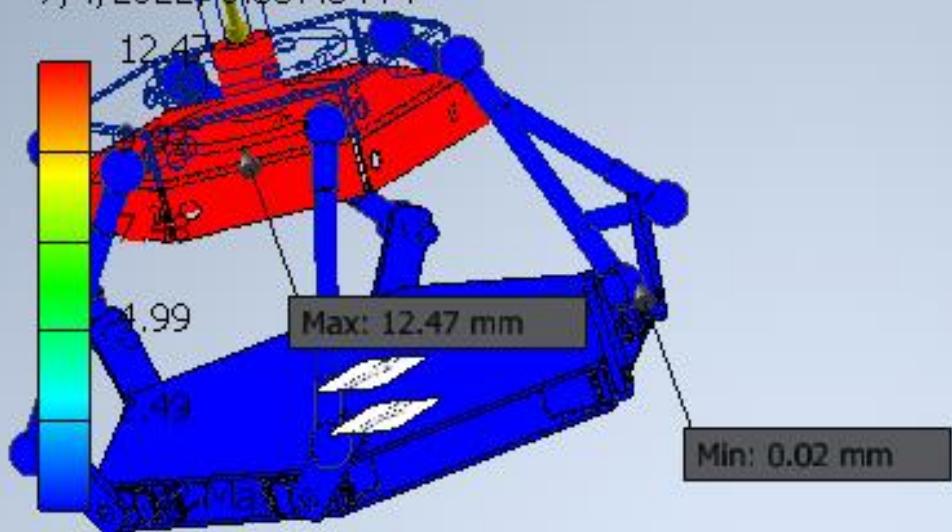


**Z Displacement**

Type: Z Displacement

Unit: mm

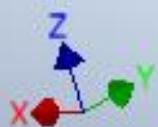
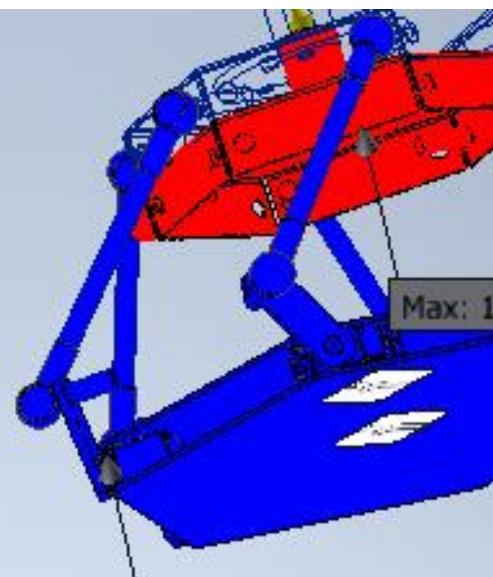
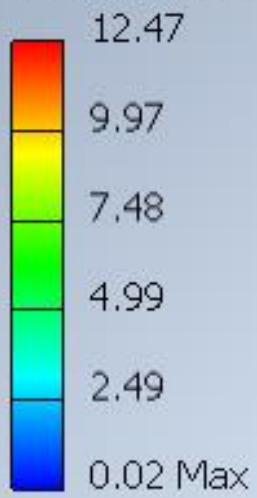
7/4/2022 5:53:43 PM



Type: Z Displacement

Unit: mm

7/4/2022, 6:53:43 PM

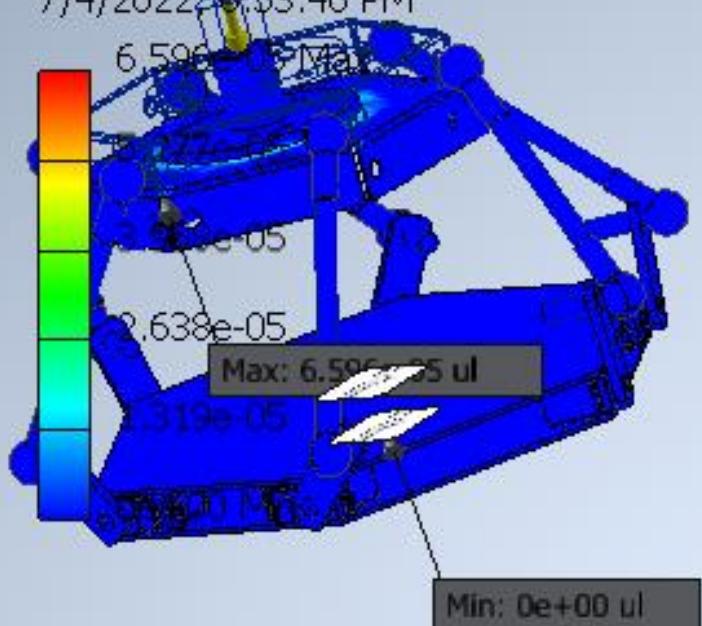


**Equivalent Strain**

Type: Equivalent Strain

Unit: ul

7/4/2022 6:53:46 PM



Type: Equivalent Strain

Unit:  $\mu\epsilon$

7/4/2022, 6:53:46 PM

6.596e-05 Max

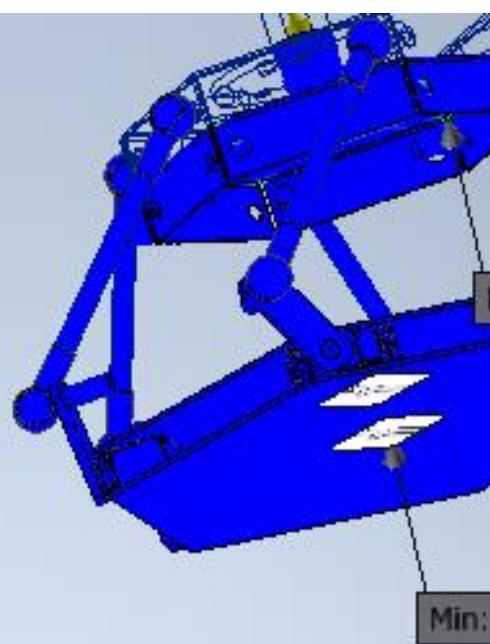
5.277e-05

3.958e-05

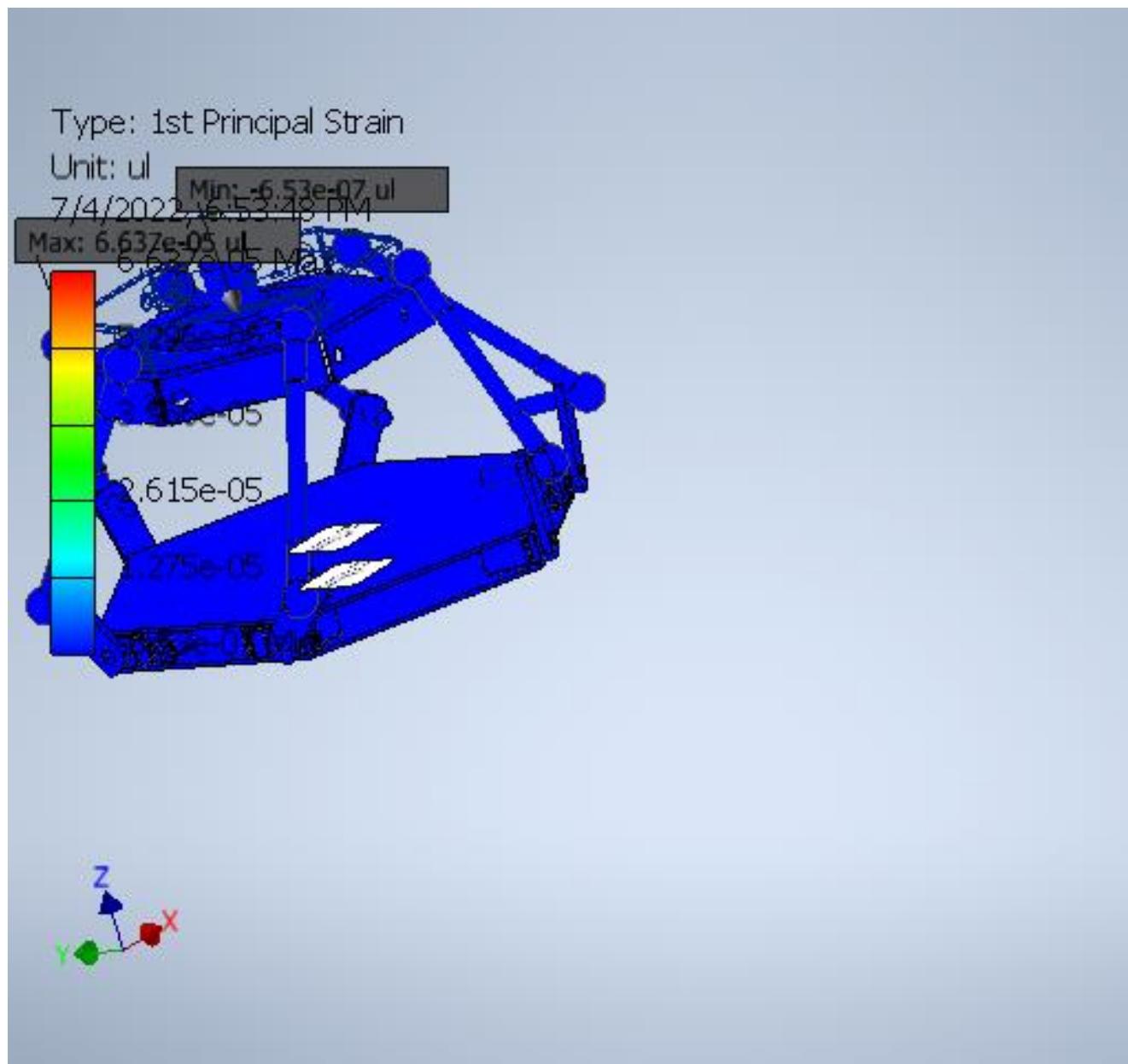
2.638e-05

1.319e-05

0e+00 Min



**1st Principal Strain**



Type: 1st Principal Strain

Unit:  $\mu\epsilon$

7/4/2022, 6:53:48 PM

6.637e-05 Max

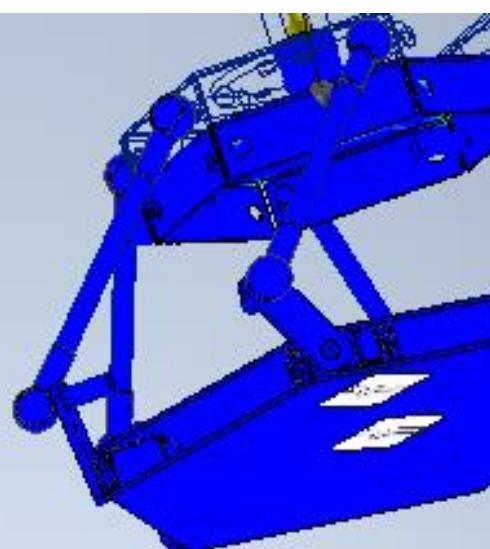
5.296e-05

3.956e-05

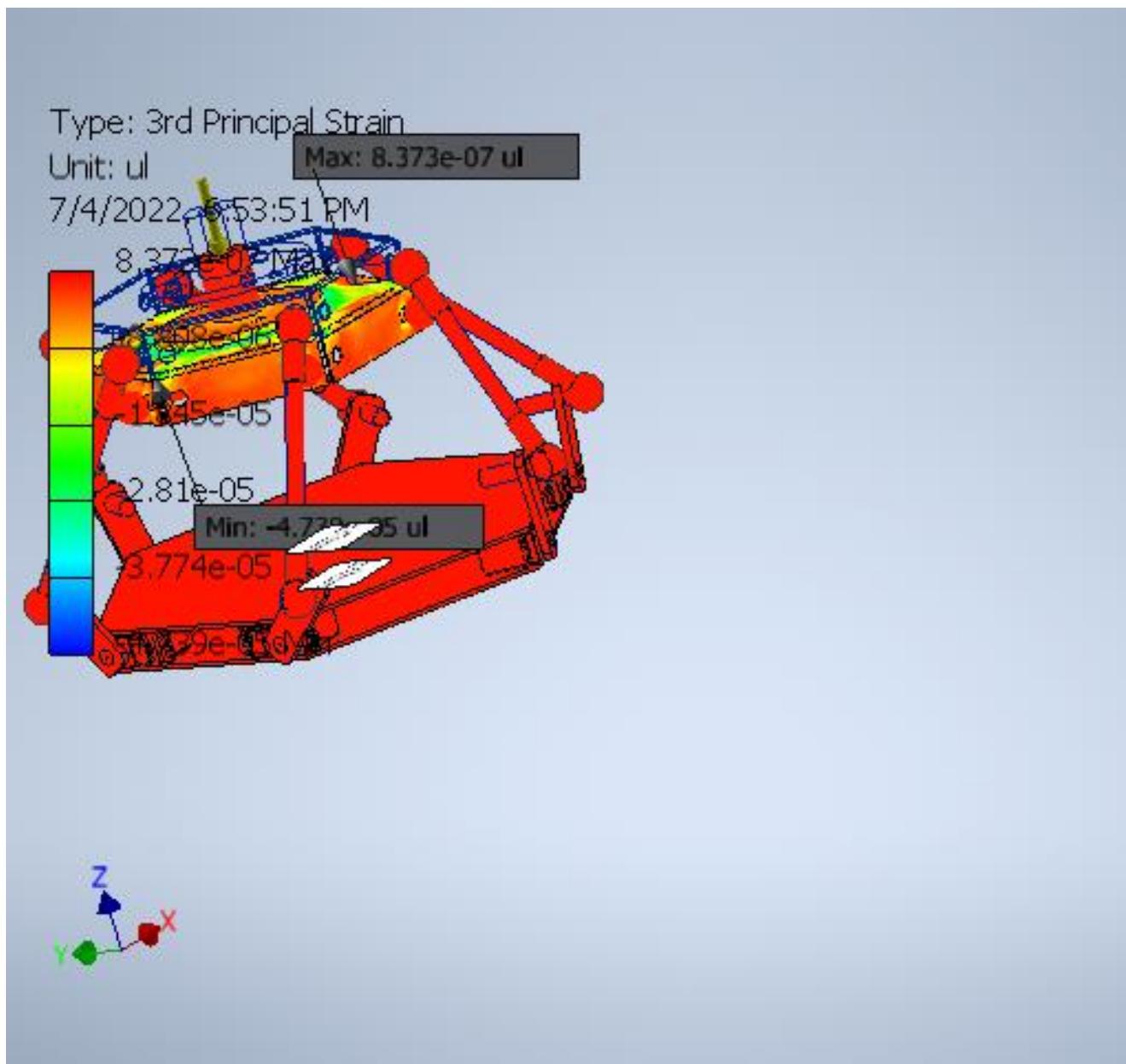
2.615e-05

1.275e-05

-6.53e-07 Min



**3rd Principal Strain**



Type: 3rd Principal Strain

Unit:  $\mu\epsilon$

7/4/2022, 6:53:51 PM

8.373e-07 Max

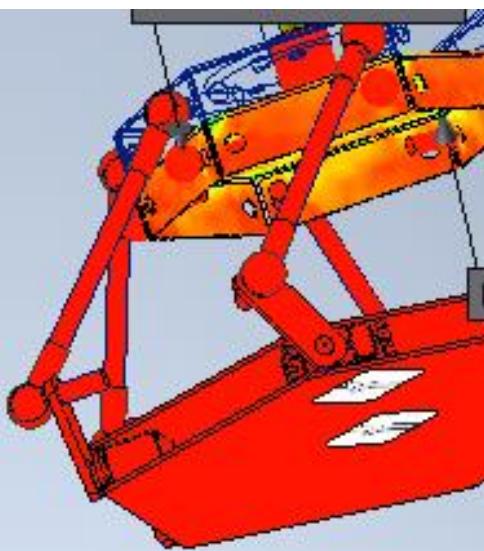
-8.808e-06

-1.845e-05

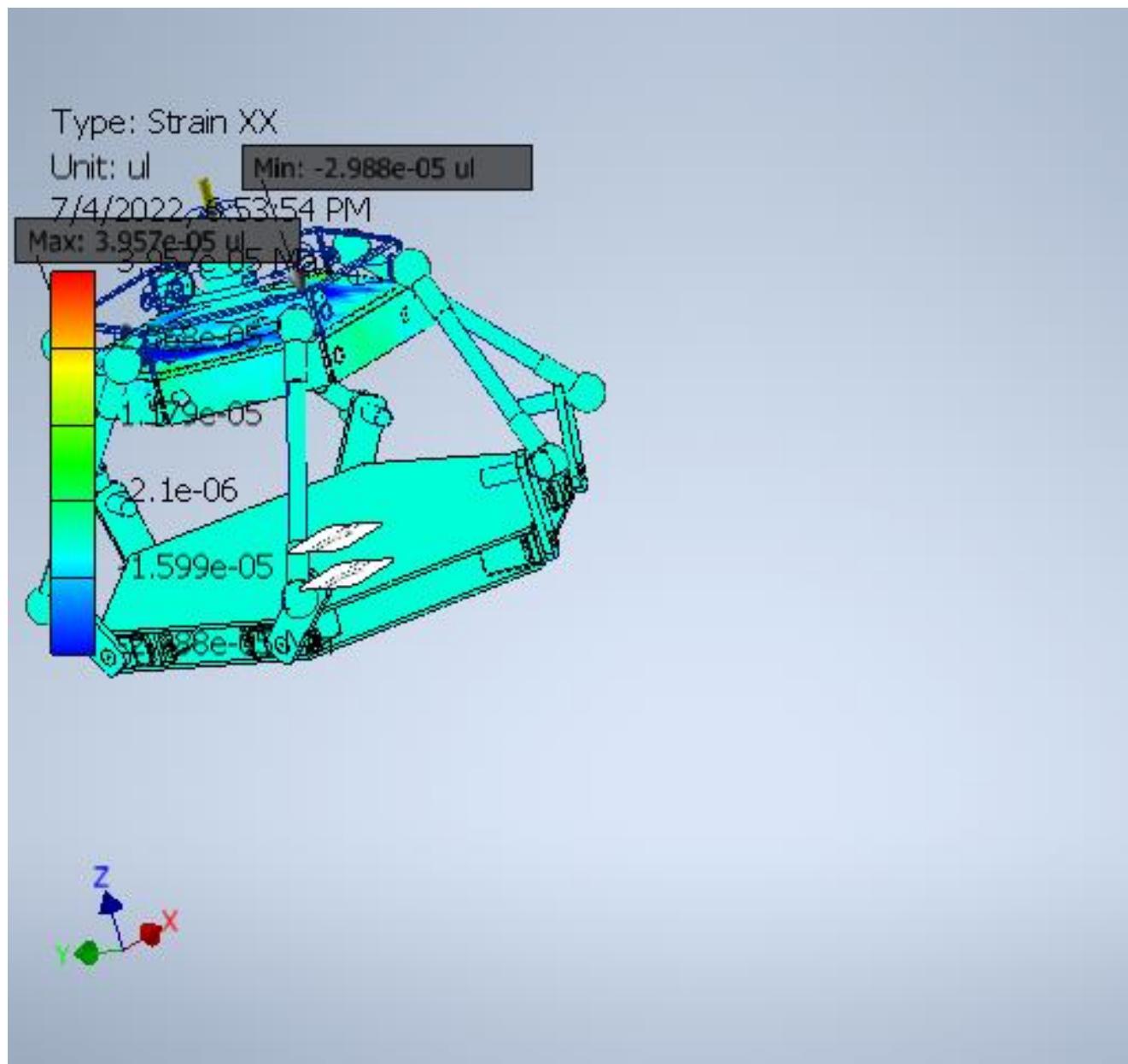
-2.81e-05

-3.774e-05

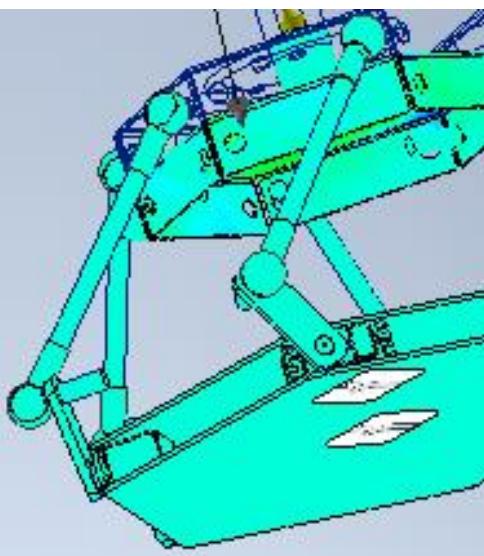
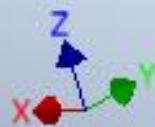
-4.739e-05 Min



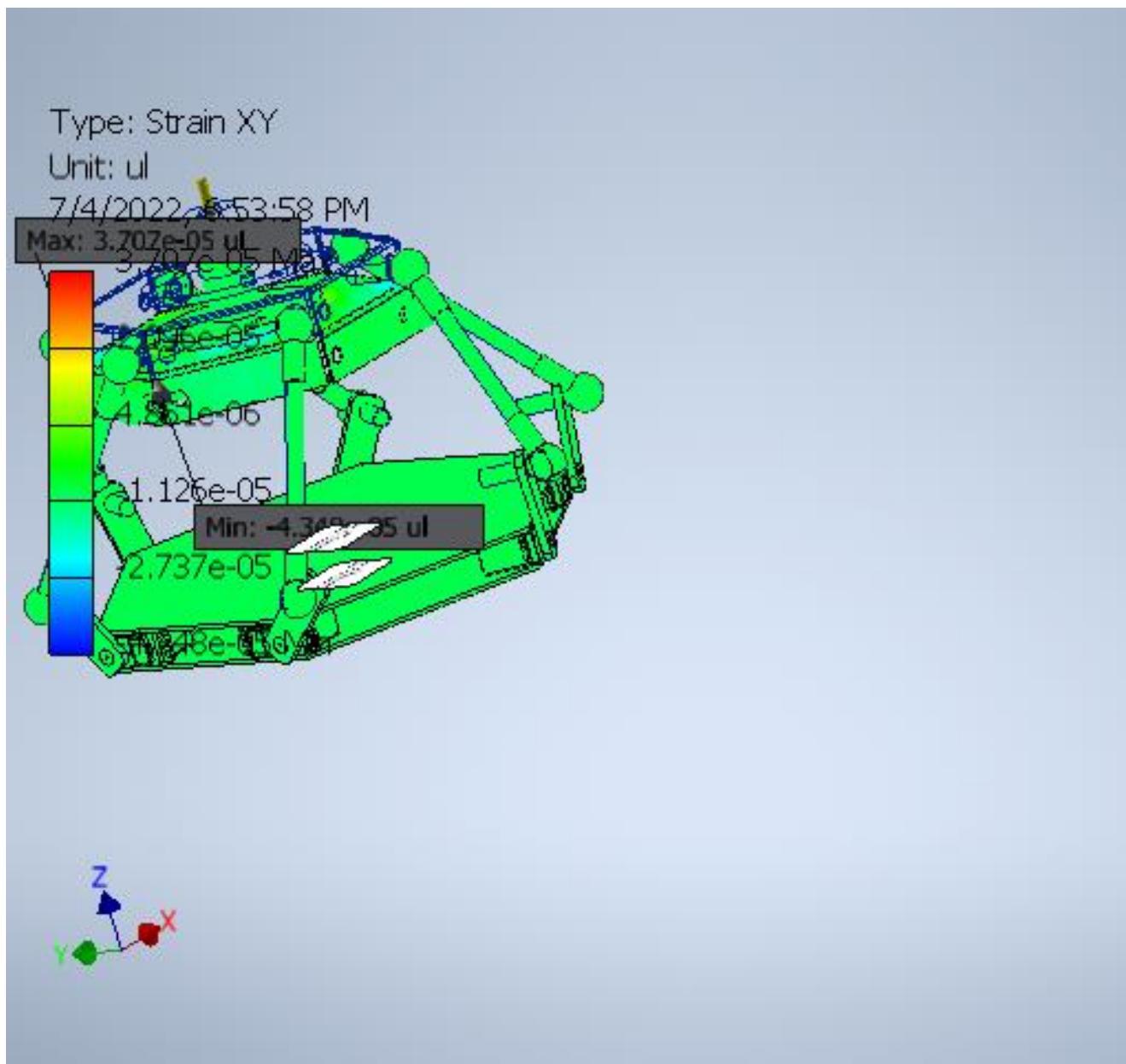
**Strain XX**



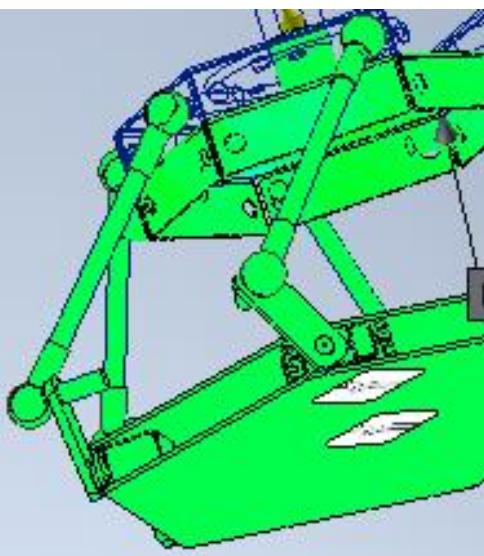
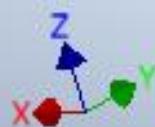
Type: Strain XX  
Unit:  $\mu\epsilon$   
7/4/2022, 6:53:54 PM  
3.957e-05 Max  
2.568e-05  
1.179e-05  
-2.1e-06  
-1.599e-05  
-2.988e-05 Min



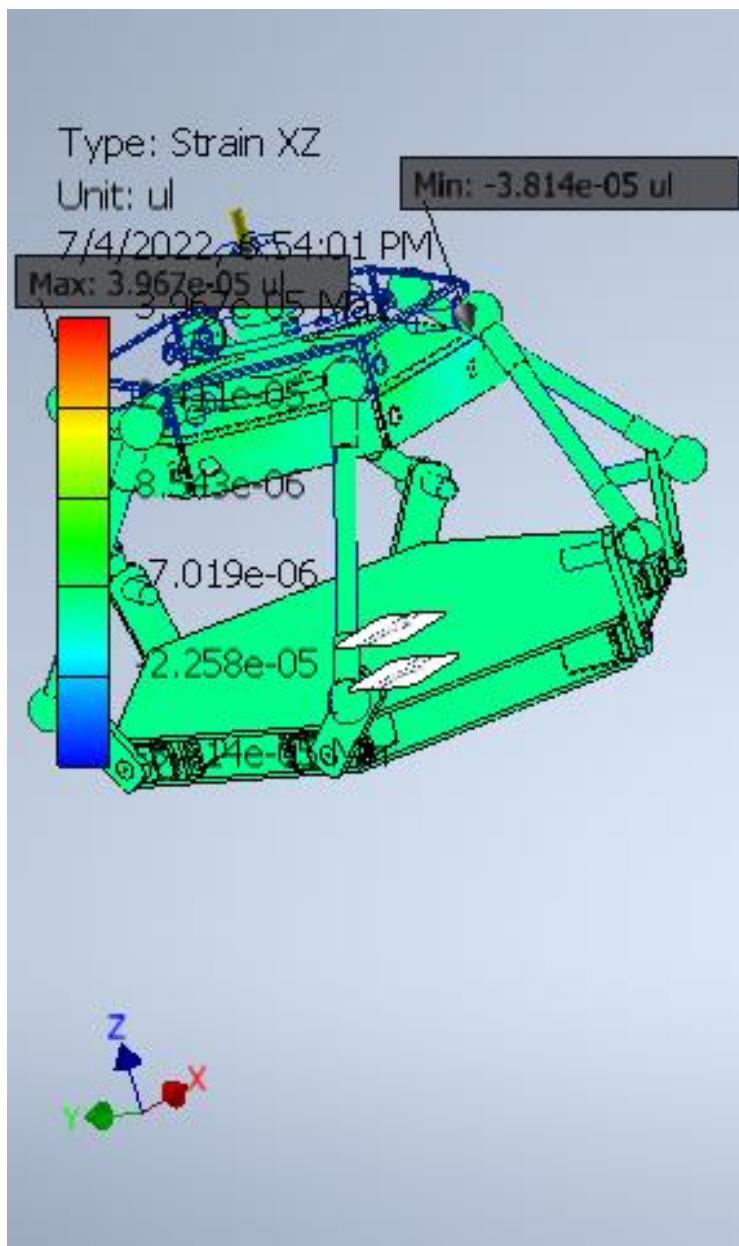
**Strain XY**



Type: Strain XY  
Unit:  $\mu\epsilon$   
7/4/2022, 6:53:58 PM  
3.707e-05 Max  
2.096e-05  
4.851e-06  
-1.126e-05  
-2.737e-05  
-4.348e-05 Min



**Strain XZ**



Min: -3.814e-05 ul

Type: Strain XZ

Unit: ul

7/4/2022, 6:54:01 PM

3.967e-05 Max

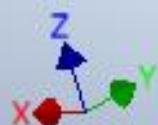
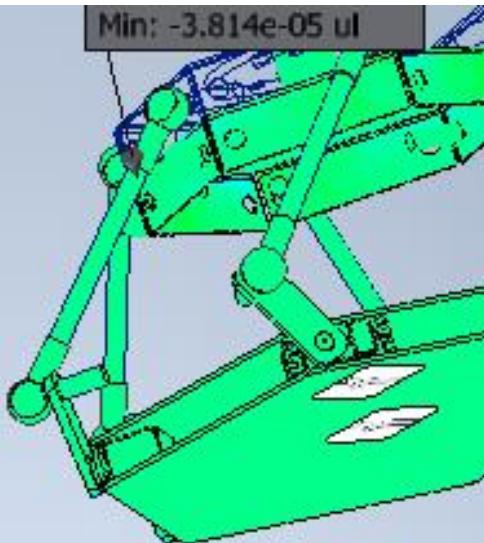
2.411e-05

8.543e-06

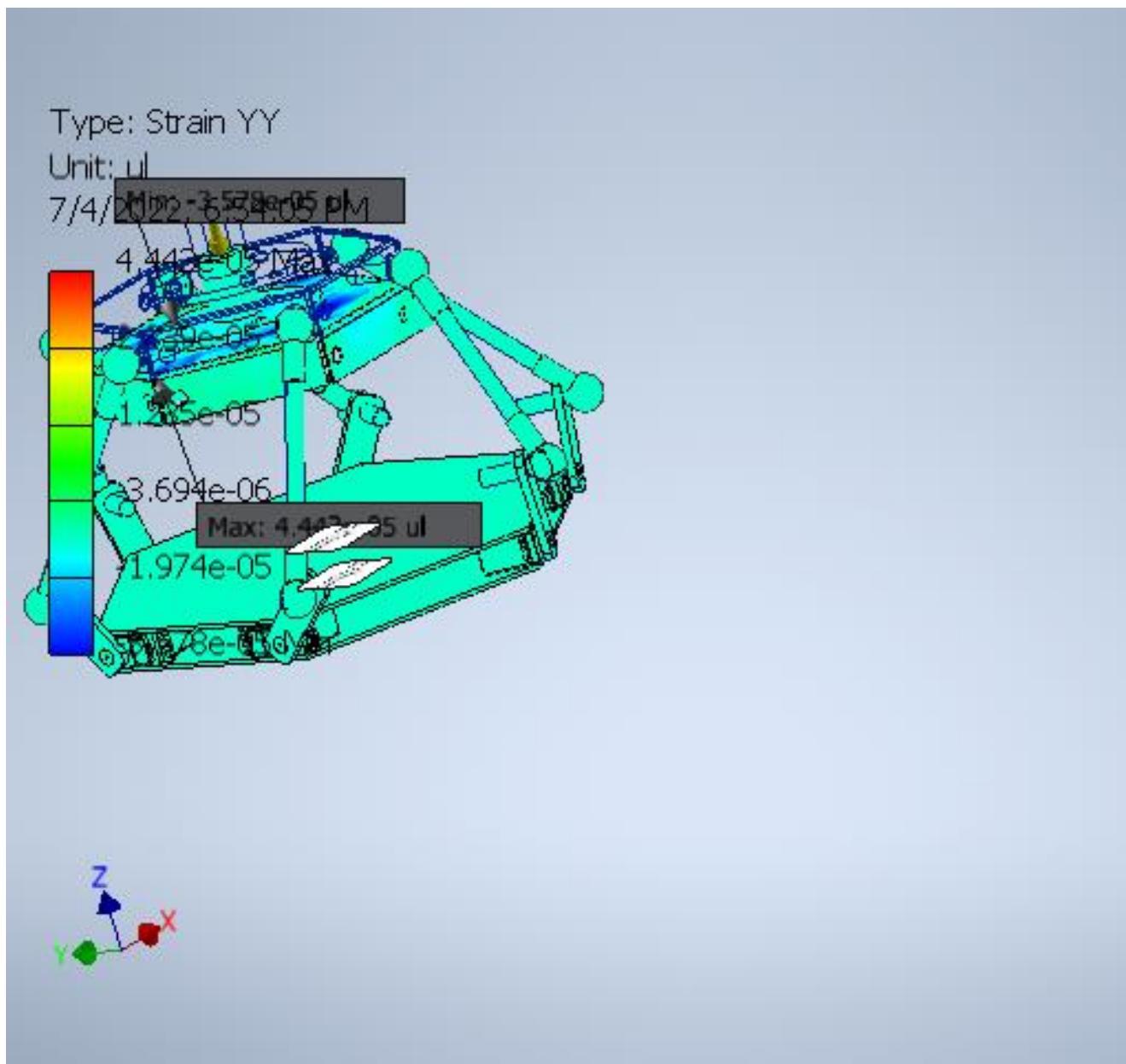
-7.019e-06

-2.258e-05

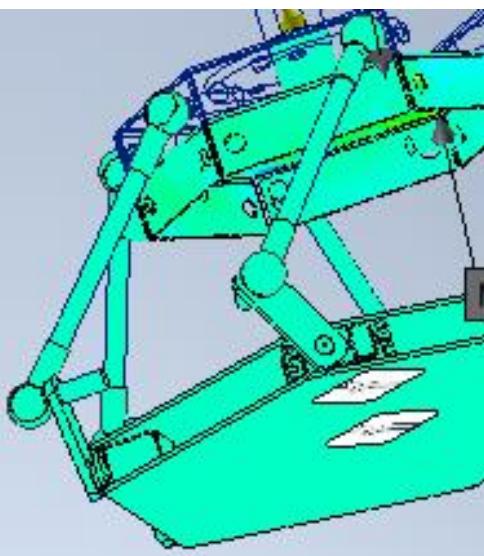
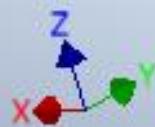
-3.814e-05 Min



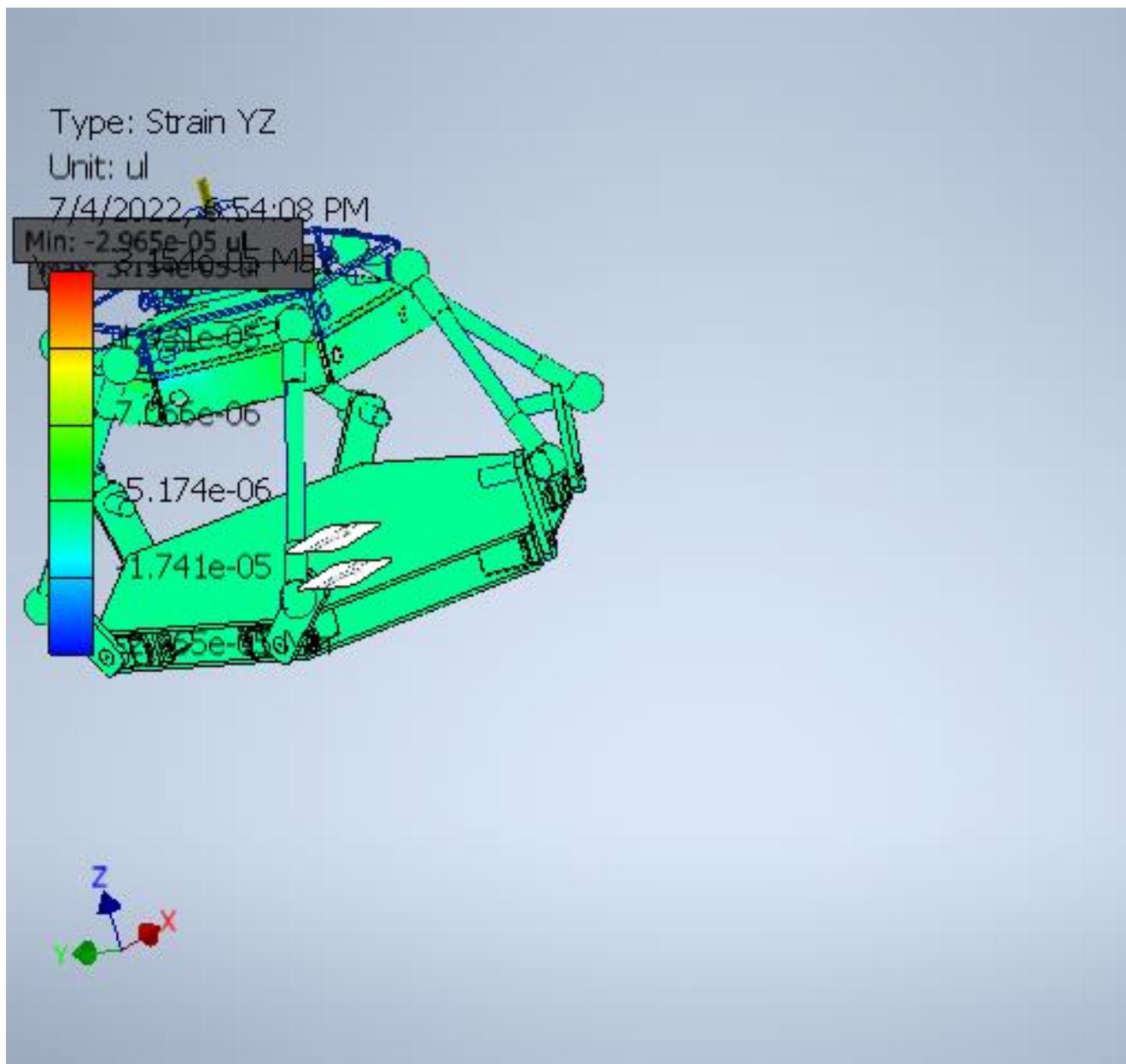
**Strain YY**



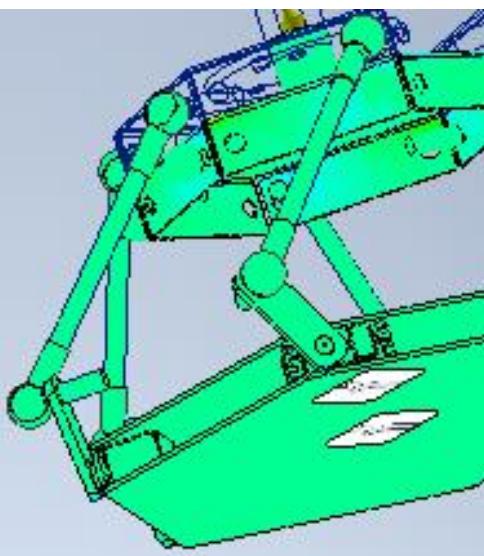
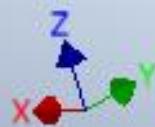
Type: Strain YY  
Unit:  $\mu$ ε  
7/4/2022, 6:54:05 PM  
4.443e-05 Max  
2.839e-05  
1.235e-05  
-3.694e-06  
-1.974e-05  
-3.578e-05 Min



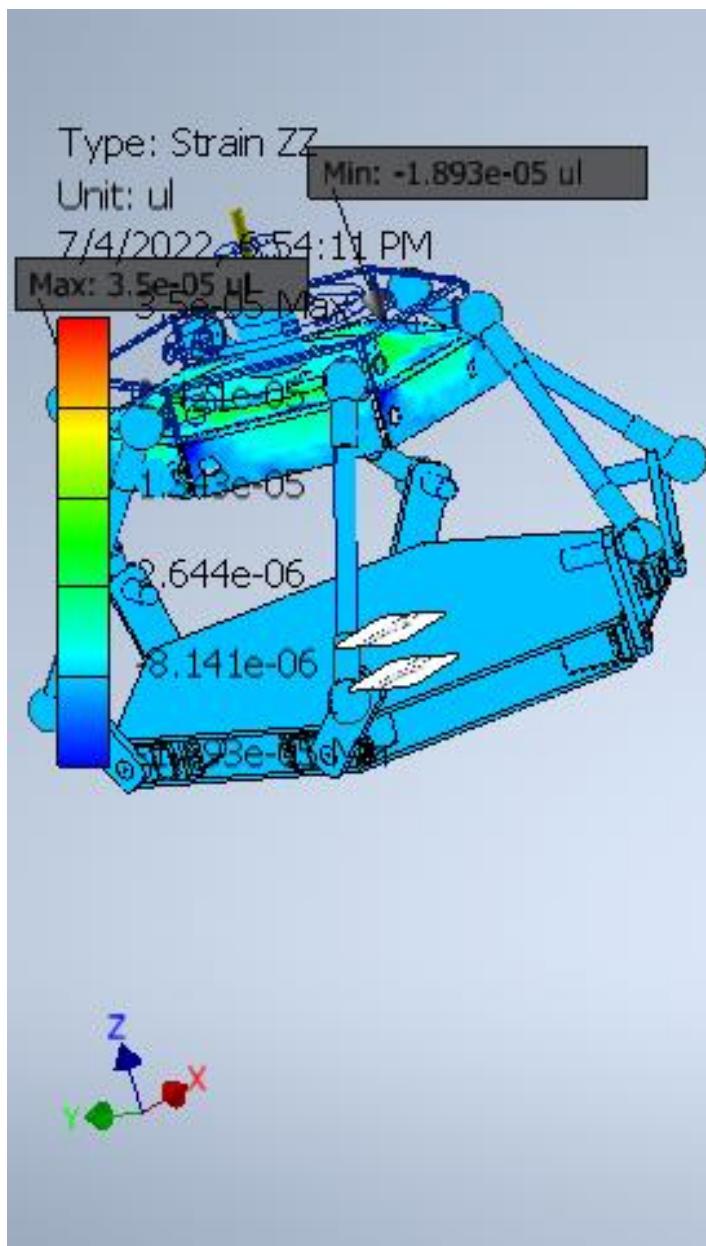
**Strain YZ**



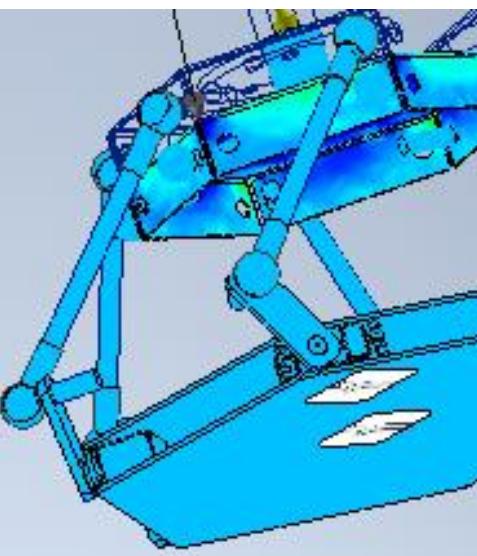
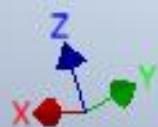
Type: Strain YZ  
Unit:  $\mu\epsilon$   
7/4/2022, 6:54:08 PM  
3.154e-05 Max  
1.931e-05  
7.066e-06  
-5.174e-06  
-1.741e-05  
-2.965e-05 Min



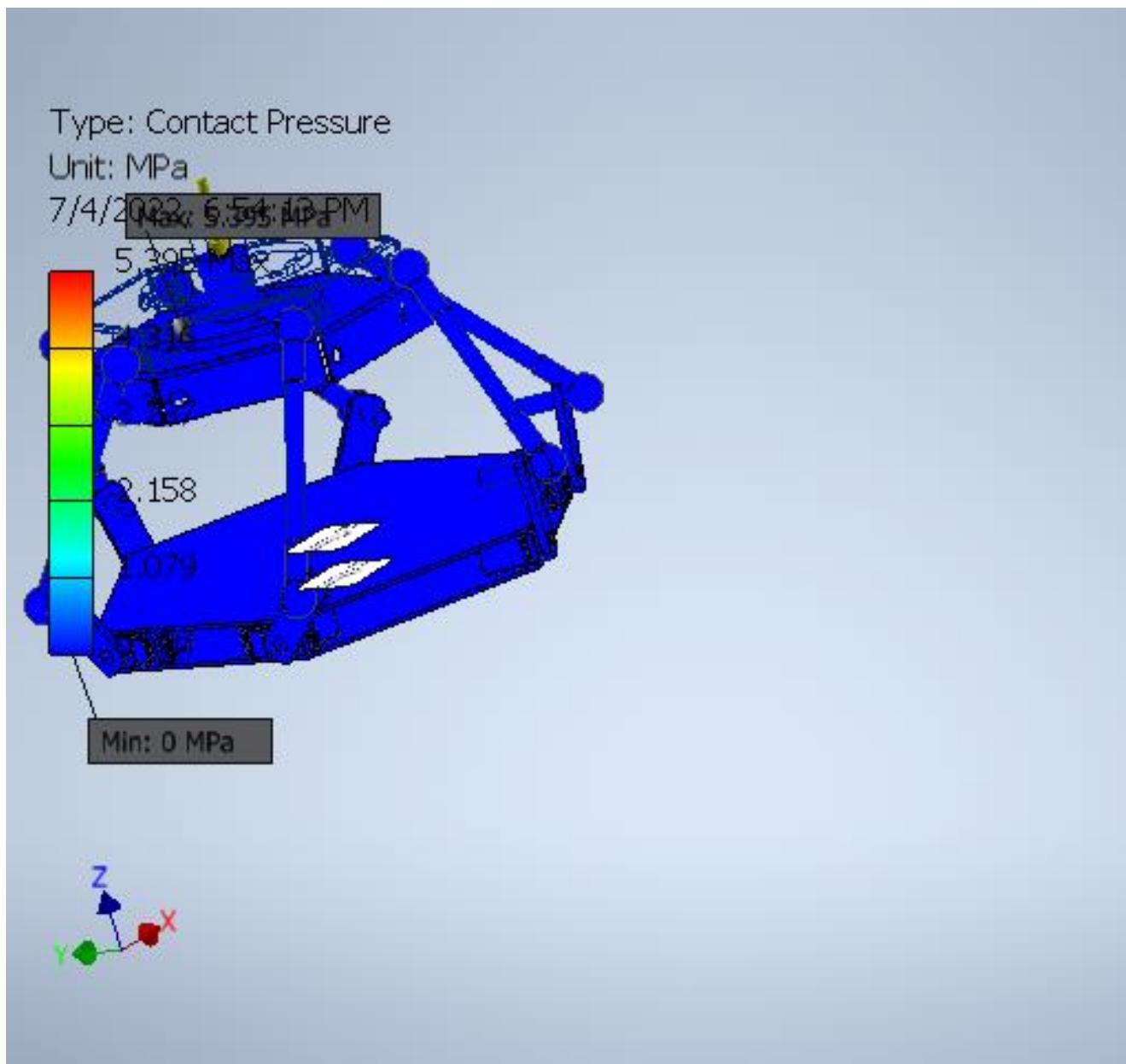
**Strain ZZ**



Type: Strain ZZ  
Unit:  $\mu\epsilon$   
7/4/2022, 6:54:11 PM  
3.5e-05 Max  
2.421e-05  
1.343e-05  
2.644e-06  
-8.141e-06  
-1.893e-05 Min



**Contact Pressure**



Type: Contact Pressure

Unit: MPa

7/4/2022, 6:54:13 PM

5.395 Max

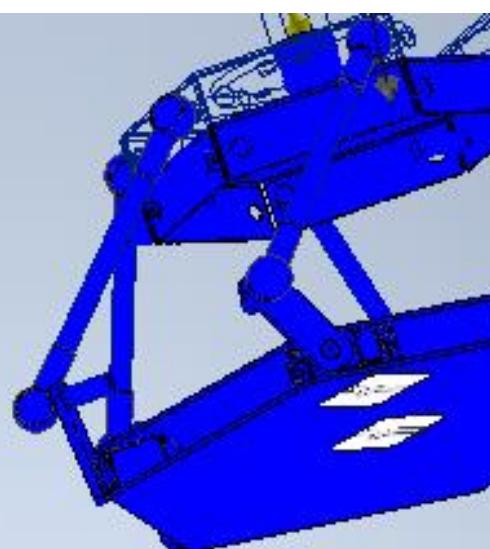
4.316

3.237

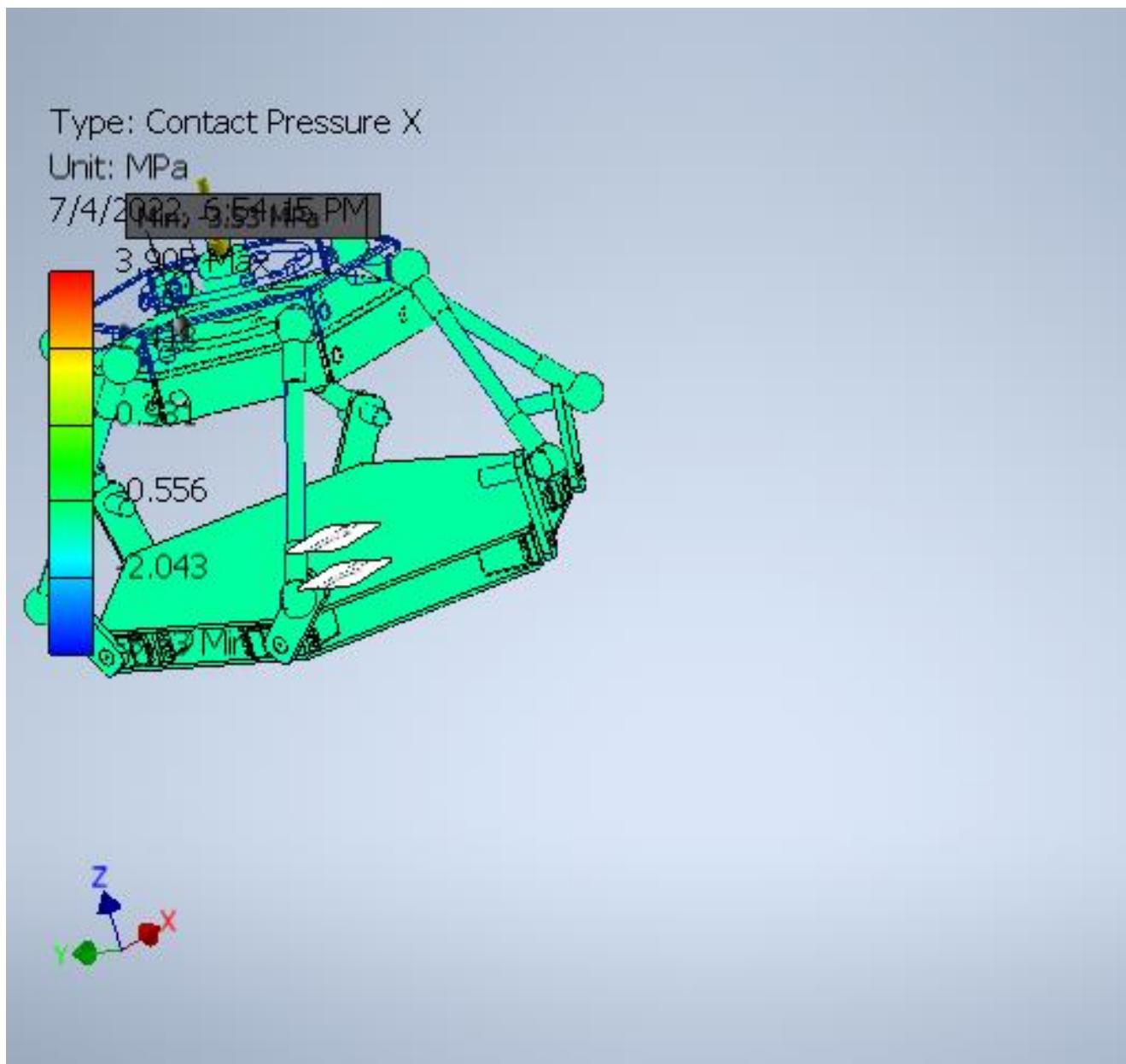
2.158

1.079

0 Min



**Contact Pressure X**



Type: Contact Pressure X

Unit: MPa

7/4/2022, 6:54:15 PM

3.905 Max

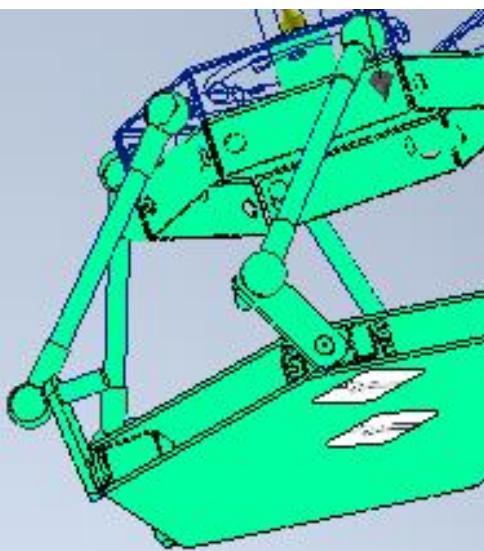
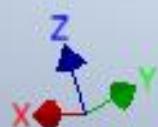
2.418

0.931

-0.556

-2.043

-3.53 Min

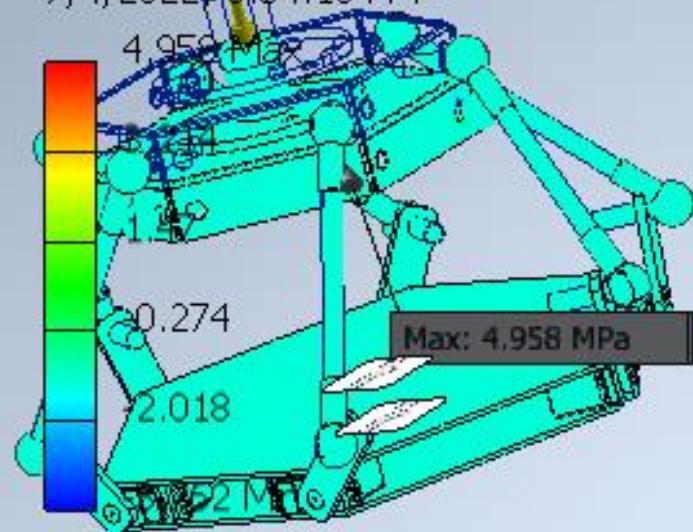


**Contact Pressure Y**

Type: Contact Pressure Y

Unit: MPa

7/4/2022 6:54:18 PM



Type: Contact Pressure Y

Unit: MPa

7/4/2022, 6:54:18 PM

4.958 Max

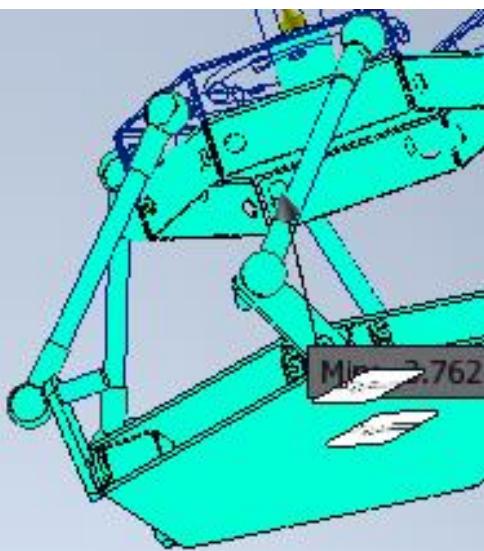
3.214

1.47

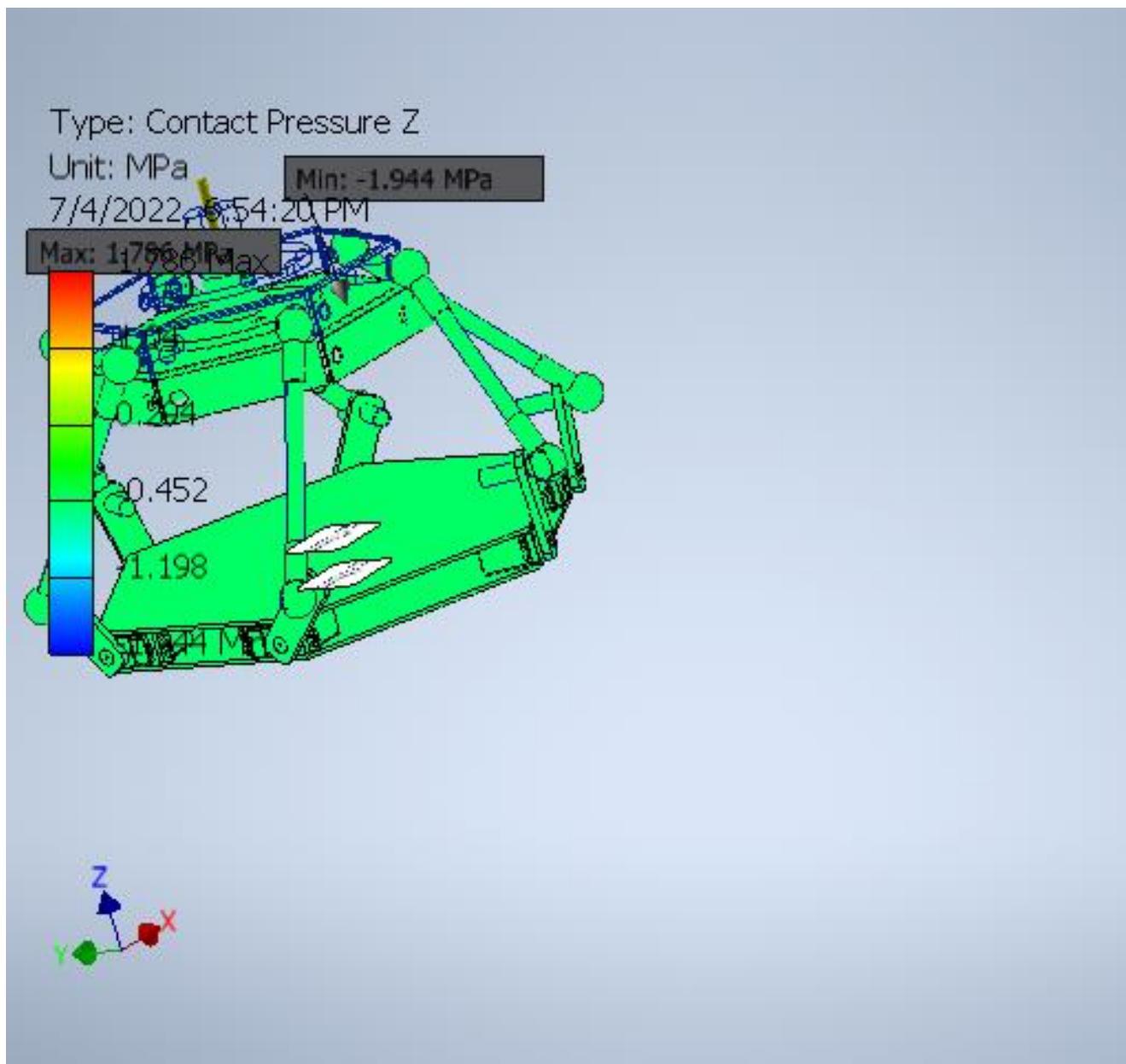
-0.274

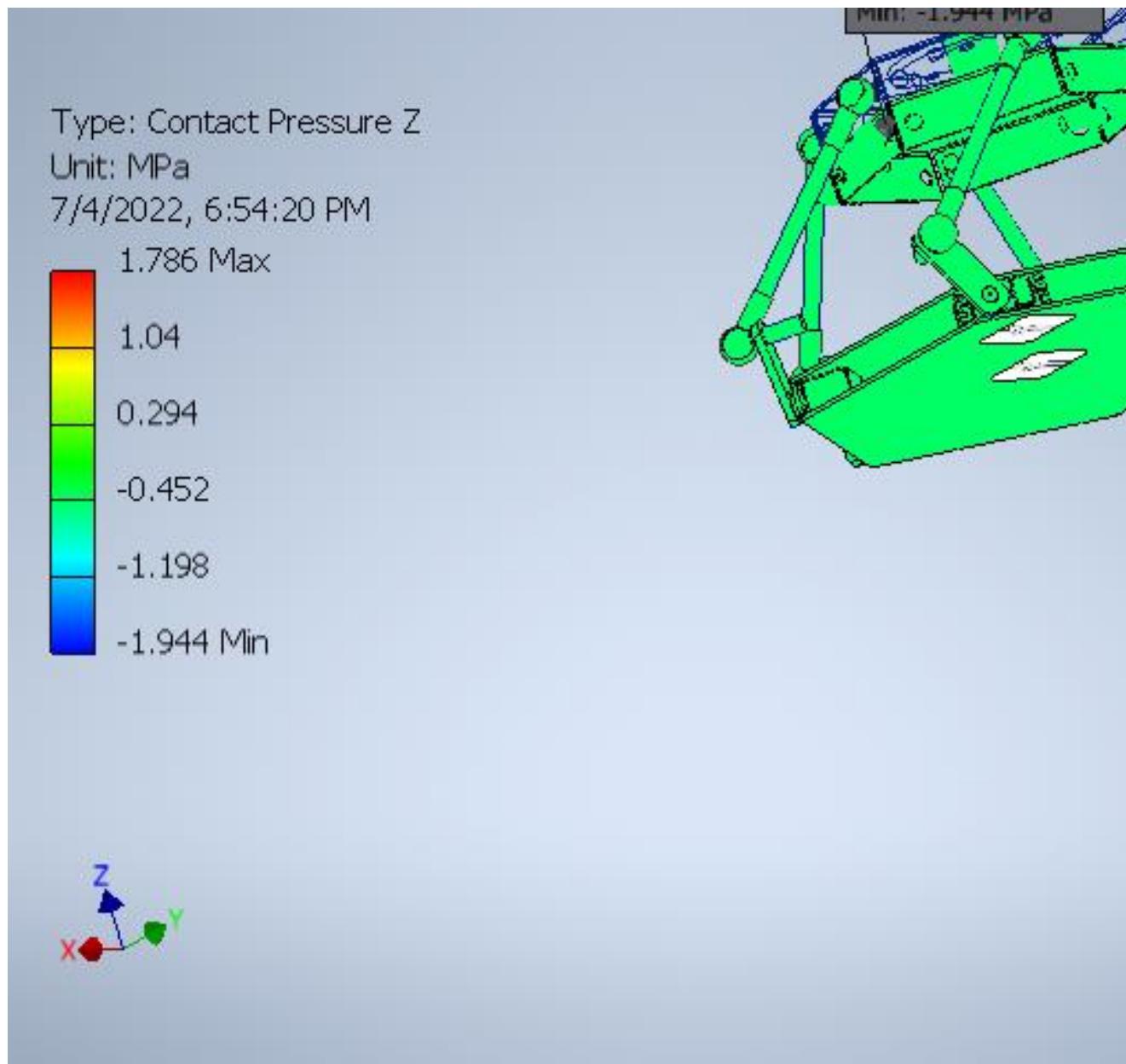
-2.018

-3.762 Min



**Contact Pressure Z**





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## Static Analysis:2

### General objective and settings:

Design Objective	Single Point
Study Type	Static Analysis
Last Modification Date	7/4/2022, 6:36 PM
Model State	[Primary]
Design View	Default
Positional	[Primary]

Detect and Eliminate Rigid Body Modes	No
Separate Stresses Across Contact Surfaces	No
Motion Loads Analysis	No

## iProperties

### Summary

Author	earls
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### Project

Part Number	Assemby 3
Designer	earls
Cost	\$0.00
Date Created	6/30/2022

### Status

Design Status	WorkInProgress
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### Physical

Mass	2.04222 kg
Area	521050 mm <sup>2</sup>
Volume	756378 mm <sup>3</sup>
Center of Gravity	x=-5.11334 mm y=-5.76516 mm z=26.0107 mm

Note: Physical values could be different from Physical values used by FEA reported below.

### Mesh settings:

Avg. Element Size (fraction of model diameter)	0.1
Min. Element Size (fraction of avg. size)	0.2
Grading Factor	1.5
Max. Turn Angle	60 deg
Create Curved Mesh Elements	No
Use part based measure for Assembly mesh	Yes

### Material(s)

Name	Aluminum 6061	
General	Mass Density	2.7 g/cm <sup>3</sup>

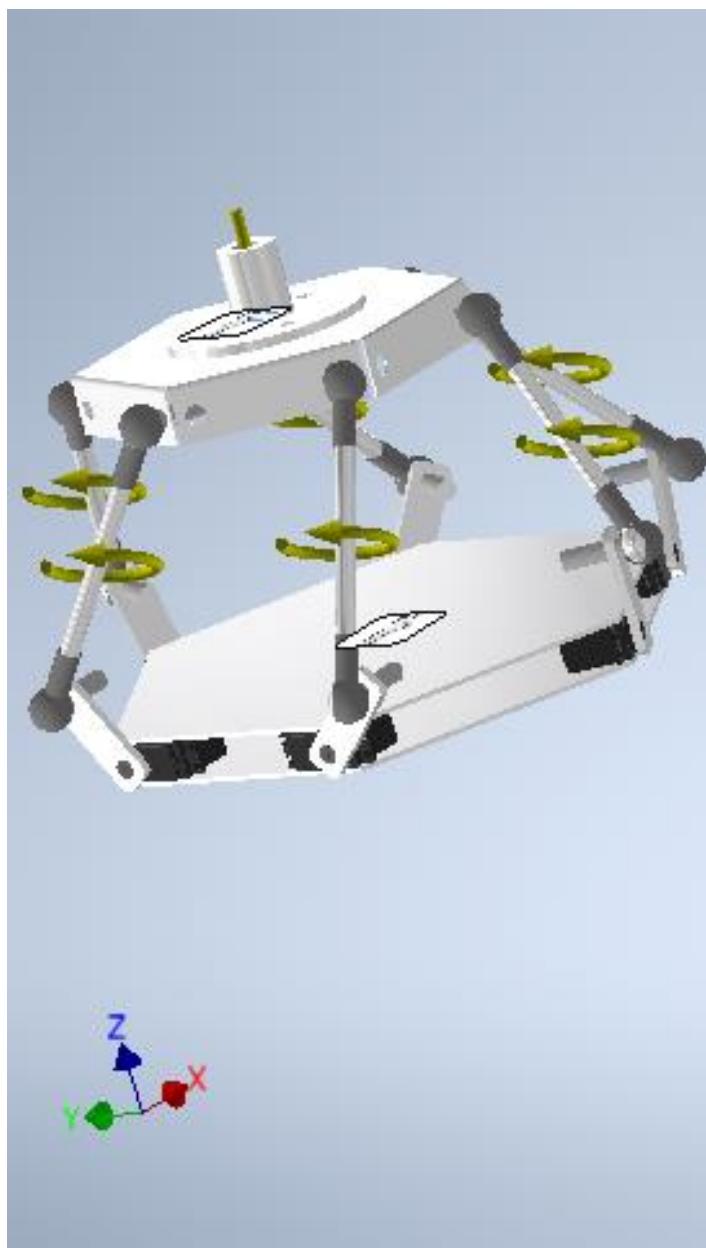
	Yield Strength	275 MPa
	Ultimate Tensile Strength	310 MPa
Stress	Young's Modulus	68.9 GPa
	Poisson's Ratio	0.33 ul
	Shear Modulus	25.9023 GPa
Part Name(s)	Bottom plate 2.5mm.ipt Servo arm.ipt Test flange.ipt Servo.ipt Part2.ipt Rod qty-6.ipt Part1.ipt Moving platform.ipt	

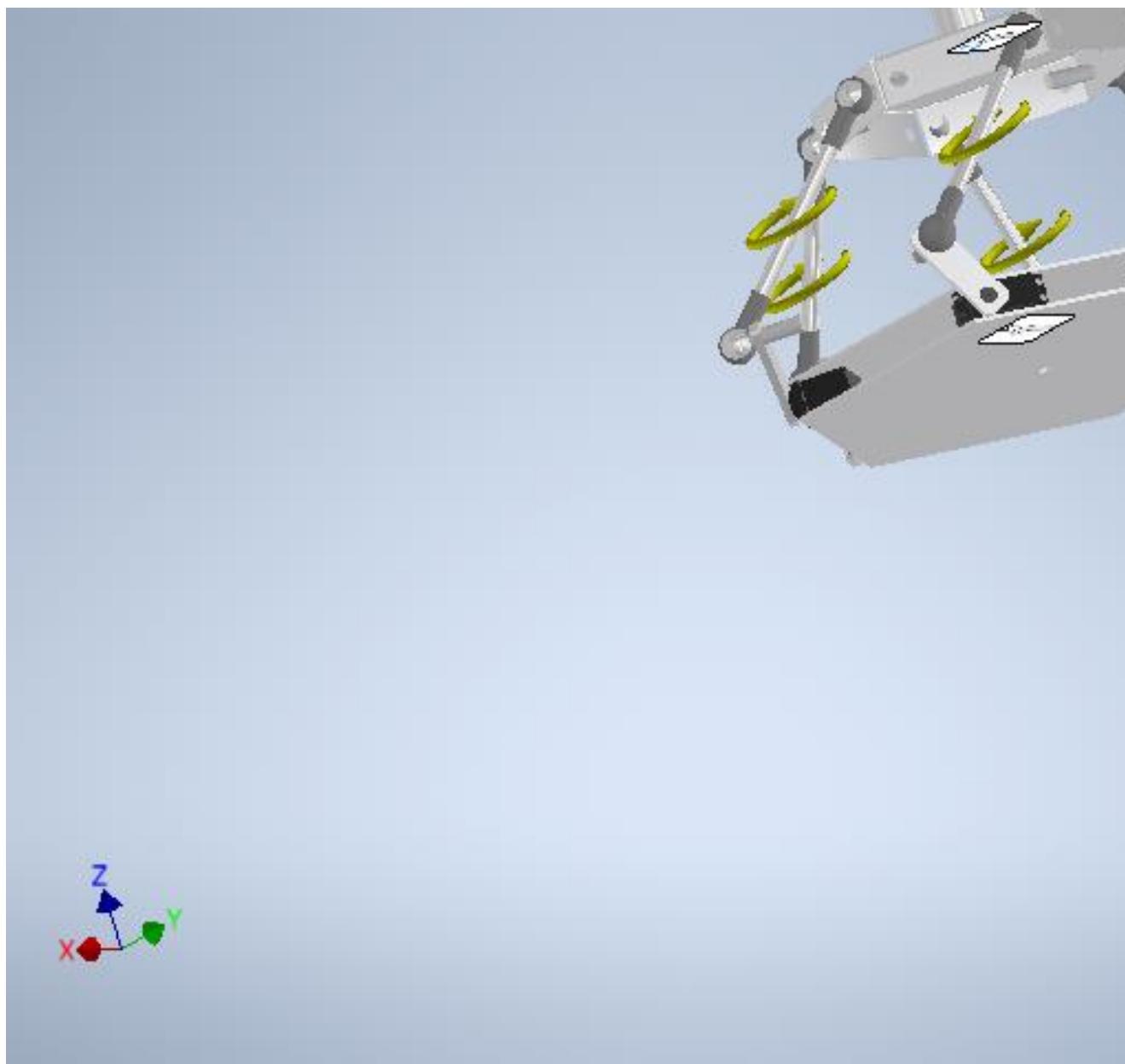
## Operating conditions

### Force:1

Load Type	Force
Magnitude	40.000 N
Vector X	-2.409 N
Vector Y	-0.575 N
Vector Z	-39.923 N

### Selected Face(s)

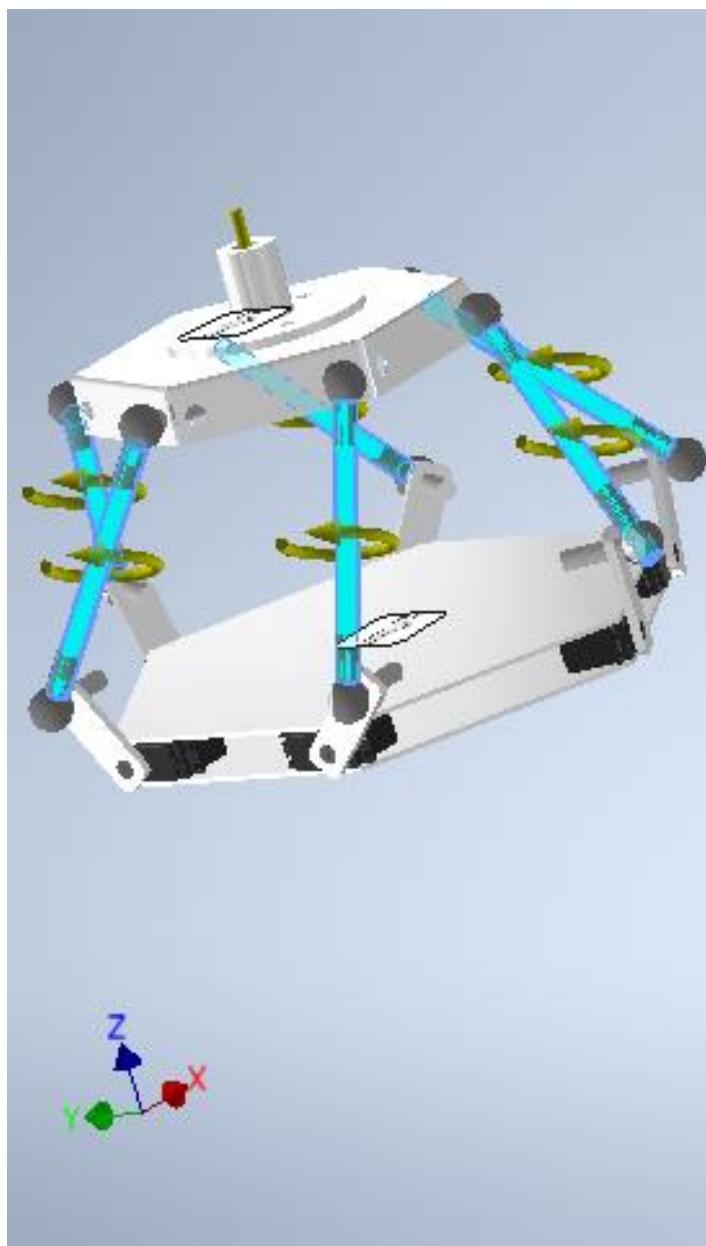


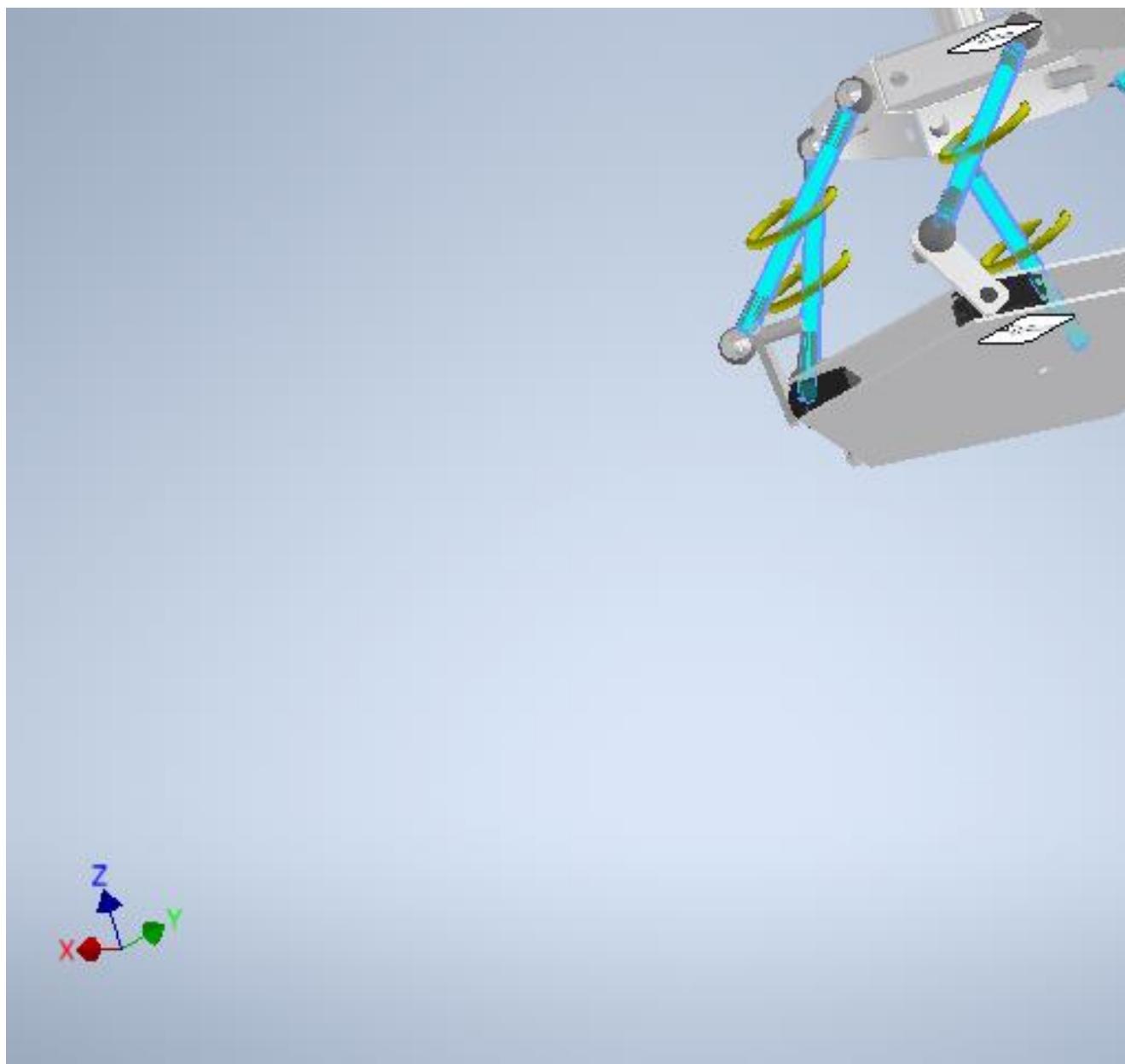


### Moment:1

Load Type	Moment
Magnitude	20.000 N mm
Vector X	-9.987 N mm
Vector Y	-1.668 N mm
Vector Z	-17.248 N mm

**Selected Face(s)**

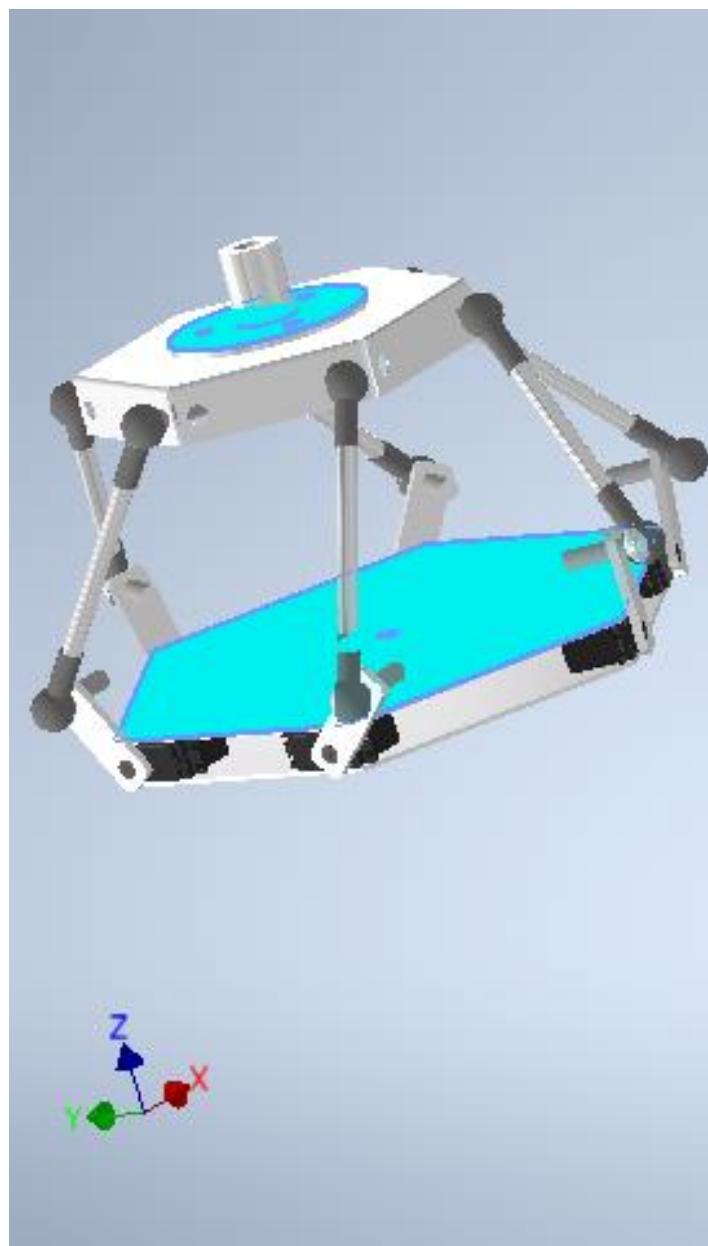


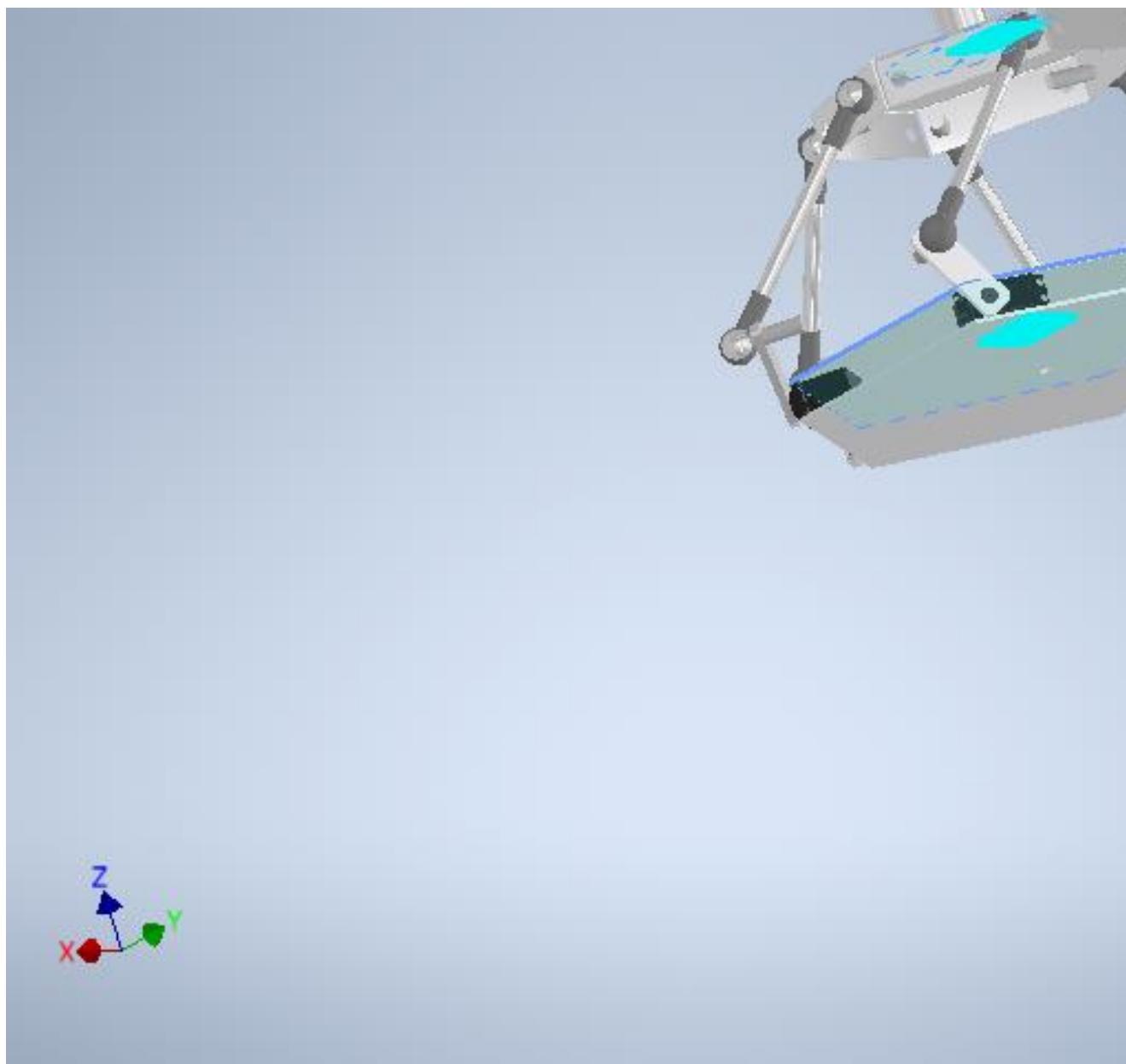


### Fixed Constraint:1

Constraint Type	Fixed Constraint
-----------------	------------------

**Selected Face(s)**





### Contacts (Bonded)

Name	Part Name(s)
Bonded:1	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1
Bonded:2	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Servo arm:5
Bonded:3	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Servo arm:2
Bonded:4	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Servo arm:6

Bonded:5	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Servo arm:4
Bonded:6	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Servo arm:3
Bonded:7	Moving platform:1 Part2:11
Bonded:8	Moving platform:1 Part2:7
Bonded:9	Moving platform:1 Part2:3
Bonded:10	Moving platform:1 Part2:9
Bonded:11	Moving platform:1 Part2:1
Bonded:12	Moving platform:1 Part2:6
Bonded:13	Part1:12 Rod qty-6:6
Bonded:14	Part1:1 Rod qty-6:1
Bonded:15	Part1:2 Rod qty-6:1
Bonded:16	Part1:8 Rod qty-6:4
Bonded:17	Part1:7 Rod qty-6:4
Bonded:18	Part1:5 Rod qty-6:3
Bonded:19	Part1:6 Rod qty-6:3
Bonded:20	Part1:9 Rod qty-6:5
Bonded:21	Part1:10 Rod qty-6:5
Bonded:22	Part1:11 Rod qty-6:6
Bonded:23	Part1:9 Rod qty-6:5
Bonded:24	Part1:8 Rod qty-6:4
Bonded:25	Part1:7 Rod qty-6:4
Bonded:26	Part1:6 Rod qty-6:3

Bonded:27	Part1:5 Rod qty-6:3
Bonded:28	Part1:12 Rod qty-6:6
Bonded:29	Part1:10 Rod qty-6:5
Bonded:30	Part1:2 Rod qty-6:1
Bonded:31	Part1:11 Rod qty-6:6
Bonded:32	Part1:1 Rod qty-6:1
Bonded:33	Moving platform:1 Test flange:1
Bonded:34	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:3
Bonded:35	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:6
Bonded:36	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:4
Bonded:37	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:7
Bonded:38	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:5
Bonded:39	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:2
Bonded:40	Stewart Assembly:1/Servo arm:3 Part2:2
Bonded:41	Stewart Assembly:1/Servo arm:4 Part2:12
Bonded:42	Stewart Assembly:1/Servo arm:5 Part2:8
Bonded:43	Stewart Assembly:1/Servo arm:6 Part2:10
Bonded:44	Stewart Assembly:1/Servo arm:2 Part2:5
Bonded:45	Stewart Assembly:1/Servo arm:1 Part2:4
Bonded:46	Stewart Assembly:1/Servo arm:3 Part1:1
Bonded:47	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Servo arm:4
Bonded:48	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1

Bonded:49	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Servo arm:2
Bonded:50	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Servo arm:6
Bonded:51	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Servo arm:5
Bonded:52	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Servo arm:3
Bonded:53	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1
Bonded:54	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Servo arm:5
Bonded:55	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Servo arm:3
Bonded:56	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Servo arm:4
Bonded:57	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1
Bonded:58	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Servo arm:2
Bonded:59	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Servo arm:6
Bonded:60	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:61	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:62	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:63	Rod qty-6:2 Part1:3
Bonded:64	Rod qty-6:2 Part1:4
Bonded:65	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:66	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:67	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Bottom plate 2.5mm:2

## Results

### Reaction Force and Moment on Constraints

Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Component (X,Y,Z)	Magnitude	Component (X,Y,Z)

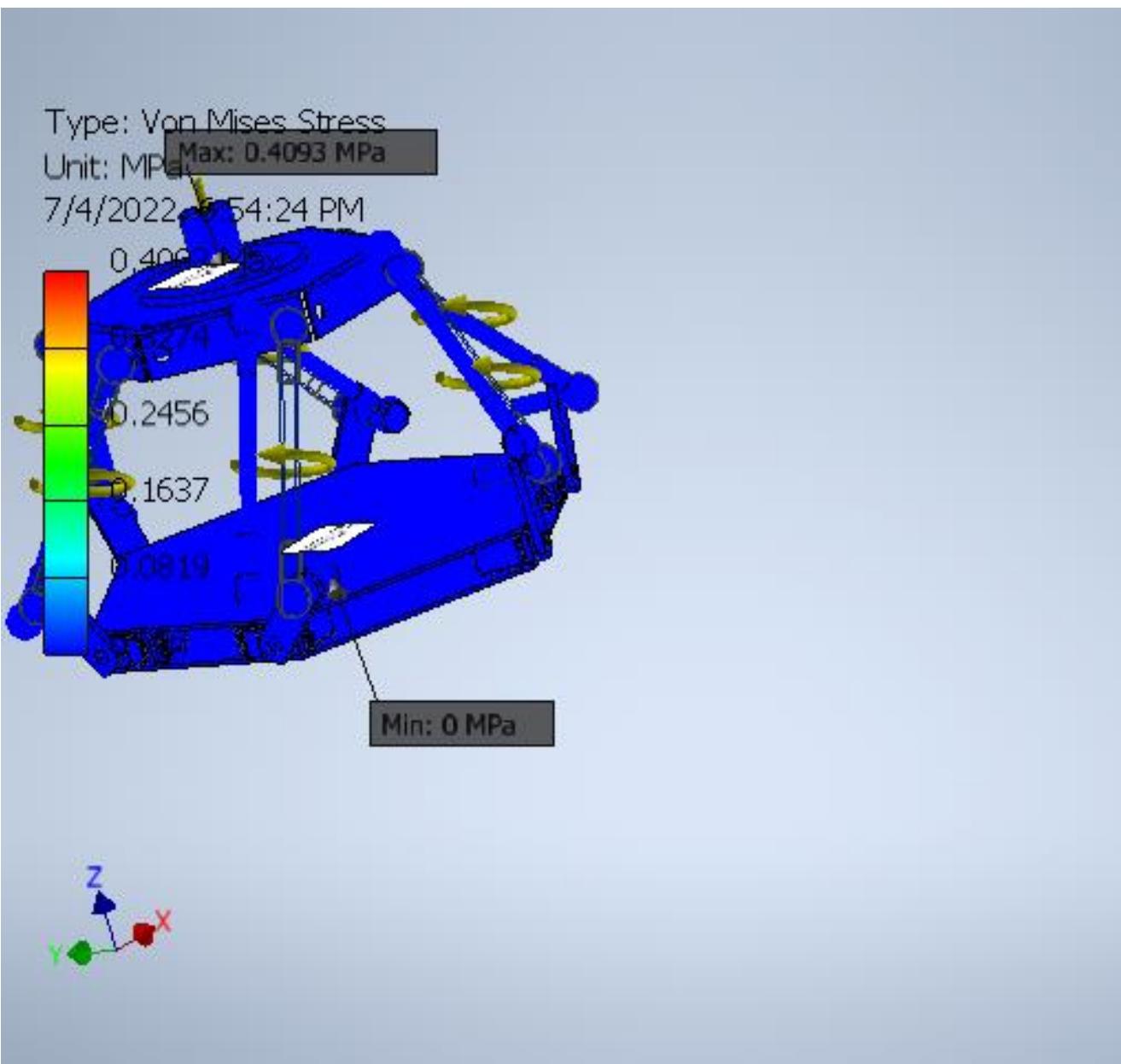
Fixed Constraint:1	39.9999 N	2.40946 N	0.840708 N m	0.0639959 N m
		0.574981 N		0.838172 N m
		39.9231 N		-0.0127776 N m

## Result Summary

Name	Minimum	Maximum
Volume	756379 mm <sup>3</sup>	
Mass	2.04222 kg	
Von Mises Stress	0.0000000000000769232 MPa	0.40929 MPa
1st Principal Stress	-0.38215 MPa	0.337477 MPa
3rd Principal Stress	-0.505216 MPa	0.0857065 MPa
Displacement	0 mm	0.0422519 mm
Safety Factor	15 ul	15 ul
Stress XX	-0.444822 MPa	0.299223 MPa
Stress XY	-0.116663 MPa	0.116043 MPa
Stress XZ	-0.152972 MPa	0.189622 MPa
Stress YY	-0.435235 MPa	0.321758 MPa
Stress YZ	-0.164763 MPa	0.15975 MPa
Stress ZZ	-0.473755 MPa	0.221424 MPa
X Displacement	-0.0281233 mm	0.0284647 mm
Y Displacement	-0.0244686 mm	0.0304521 mm
Z Displacement	-0.0306555 mm	0.0305262 mm
Equivalent Strain	0.000000000000000119545 ul	0.00000538569 ul
1st Principal Strain	-0.00000122671 ul	0.00000500479 ul
3rd Principal Strain	-0.00000452107 ul	0.00000000108134 ul
Strain XX	-0.00000238946 ul	0.00000395916 ul
Strain XY	-0.00000225198 ul	0.00000224002 ul
Strain XZ	-0.00000295287 ul	0.00000366033 ul
Strain YY	-0.0000022044 ul	0.00000416231 ul
Strain YZ	-0.00000318048 ul	0.0000030837 ul
Strain ZZ	-0.00000377796 ul	0.00000313385 ul
Contact Pressure	0 MPa	0.0920194 MPa
Contact Pressure X	-0.0670292 MPa	0.0725323 MPa
Contact Pressure Y	-0.0759952 MPa	0.0775878 MPa
Contact Pressure Z	-0.0243301 MPa	0.0552289 MPa

## Figures

### Von Mises Stress



Type: Von Mises Stress

Unit: MPa

7/4/2022, 6:54:24 PM

0.4093 Max

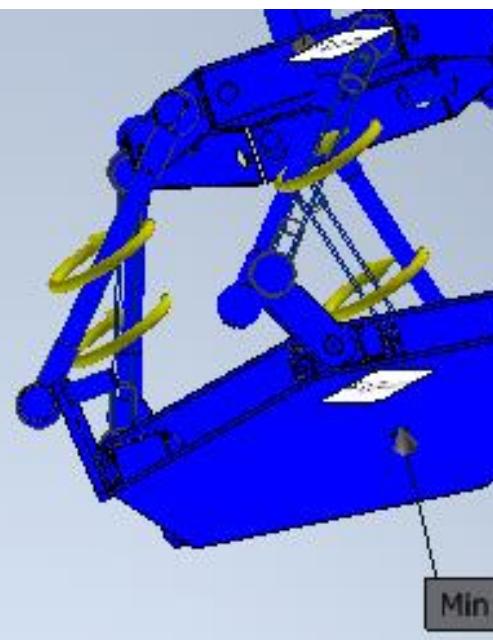
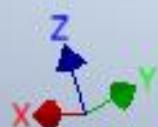
0.3274

0.2456

0.1637

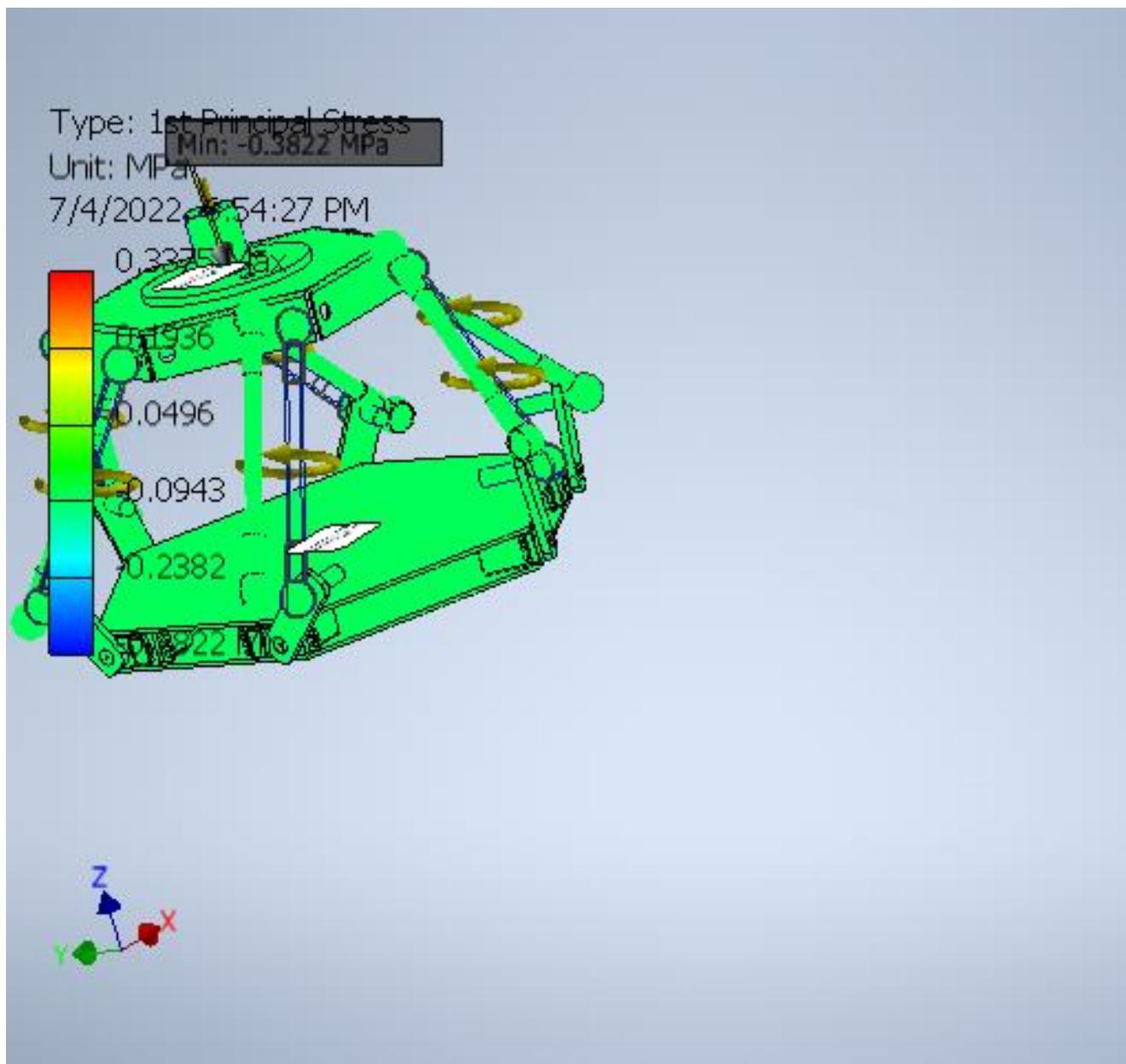
0.0819

0 Min



Min

**1st Principal Stress**



Type: 1st Principal Stress

Unit: MPa

7/4/2022, 6:54:27 PM

0.3375 Max

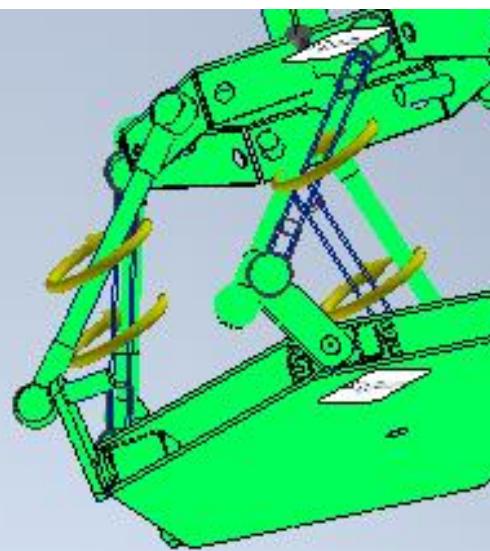
0.1936

0.0496

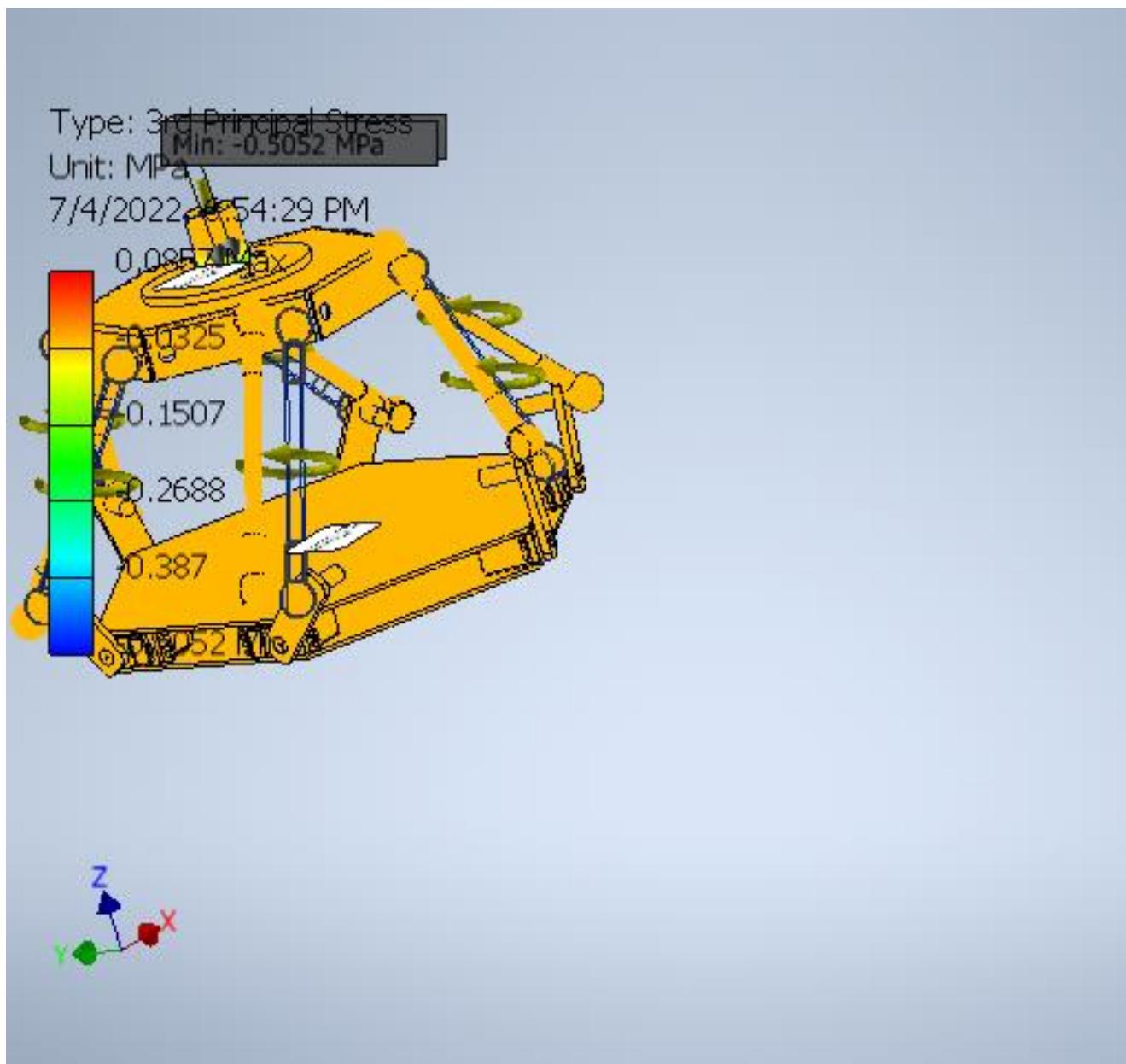
-0.0943

-0.2382

-0.3822 Min



**3rd Principal Stress**



Type: 3rd Principal Stress

Unit: MPa

7/4/2022, 6:54:29 PM

0.0857 Max

-0.0325

-0.1507

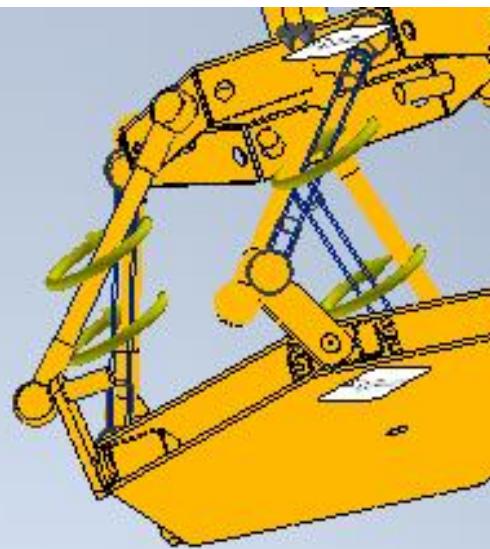
-0.2688

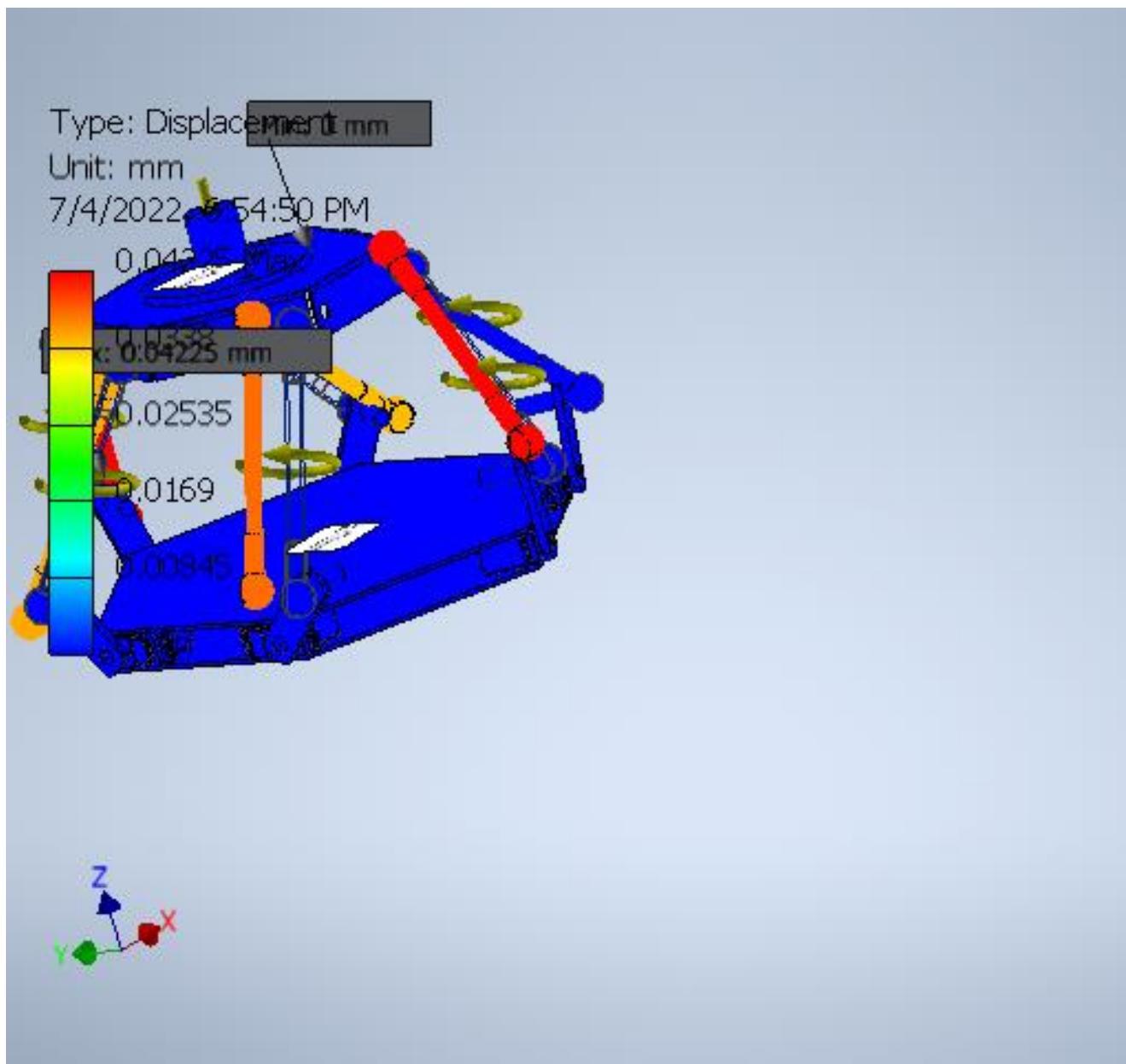
-0.387

-0.5052 Min



**Displacement**





Type: Displacement  
Unit: mm  
7/4/2022, 6:54:50 PM

0.04225 Max

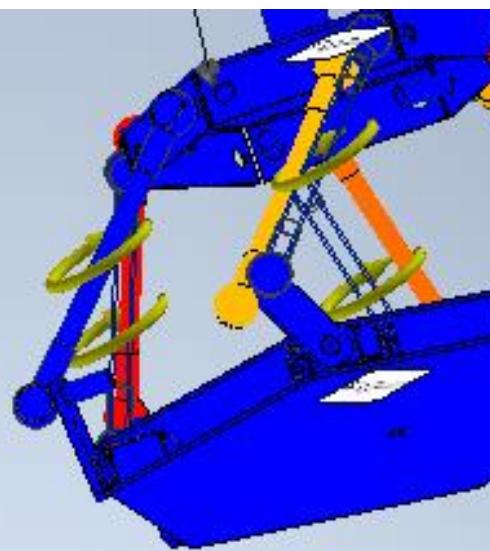
0.0338

0.02535

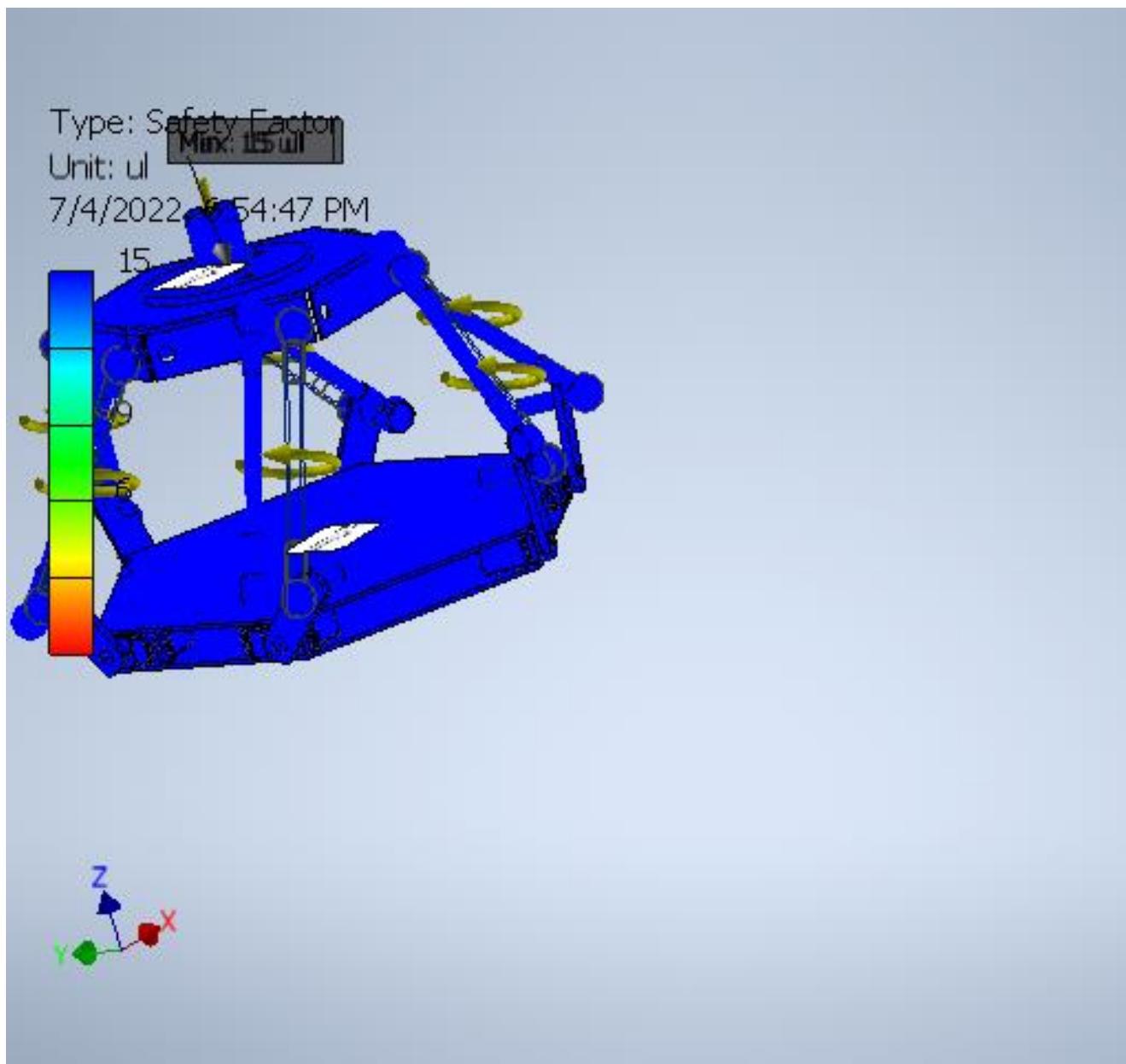
0.0169

0.00845

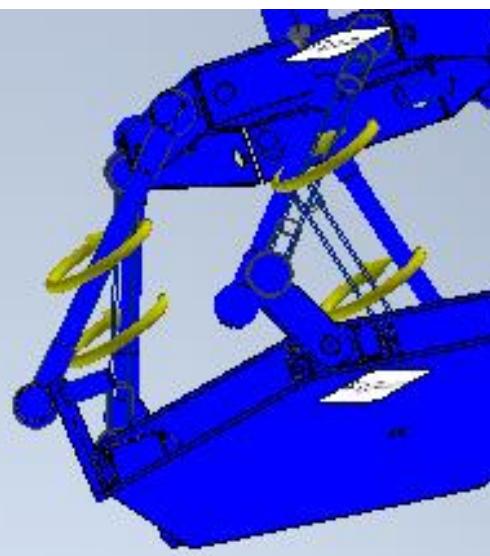
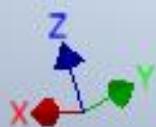
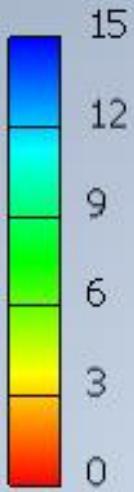
0 Min



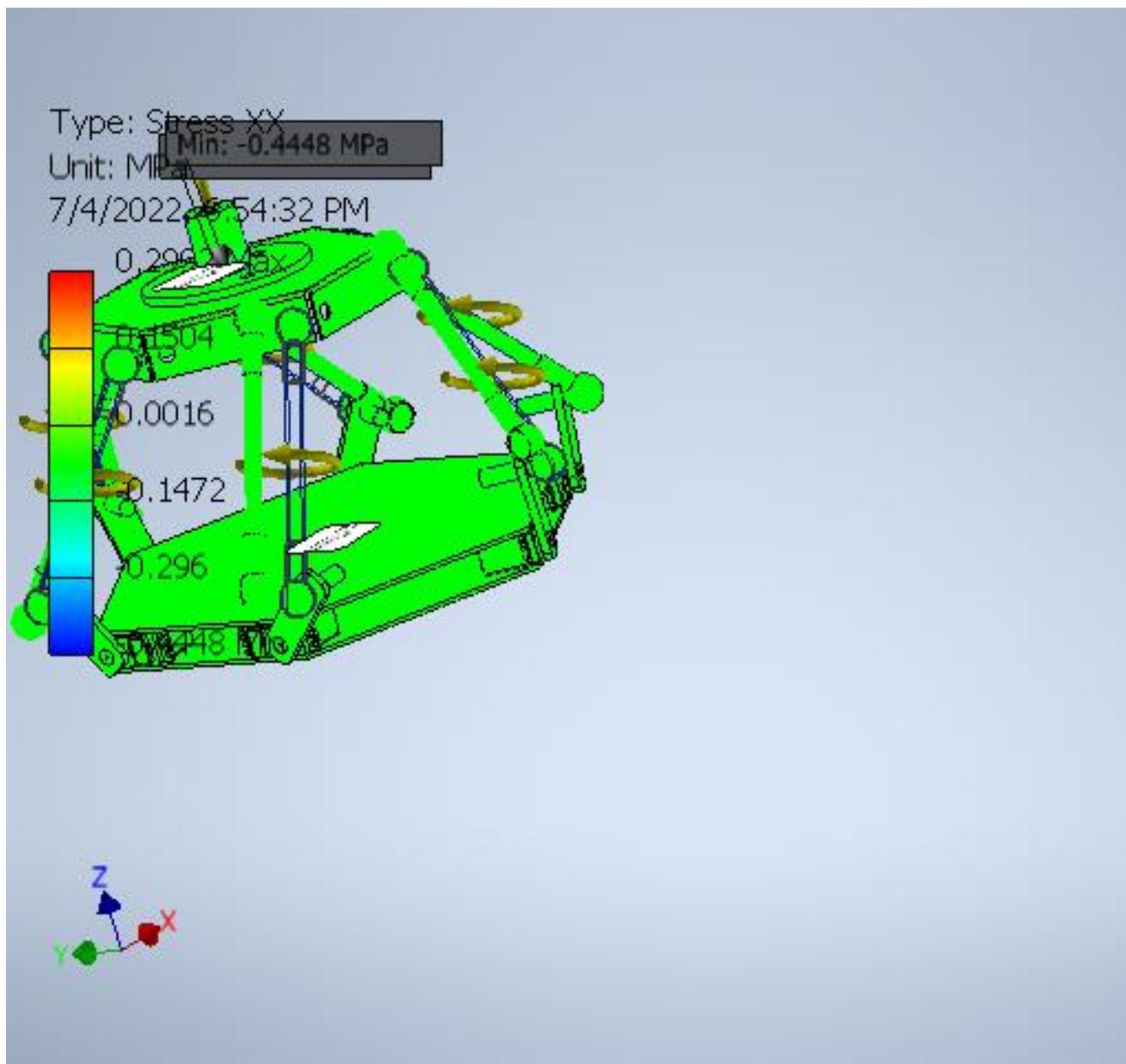
### Safety Factor



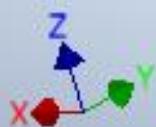
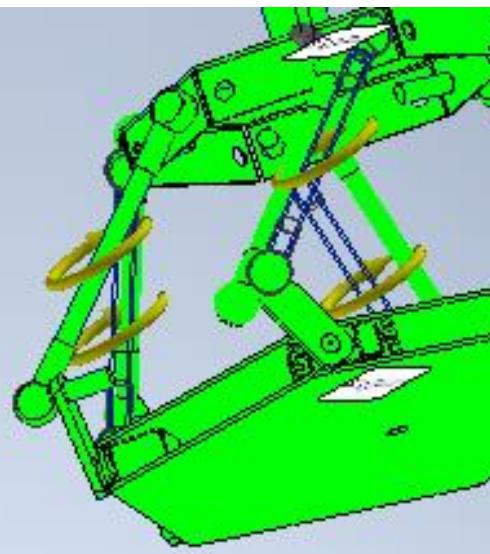
Type: Safety Factor  
Unit: ul  
7/4/2022, 6:54:47 PM



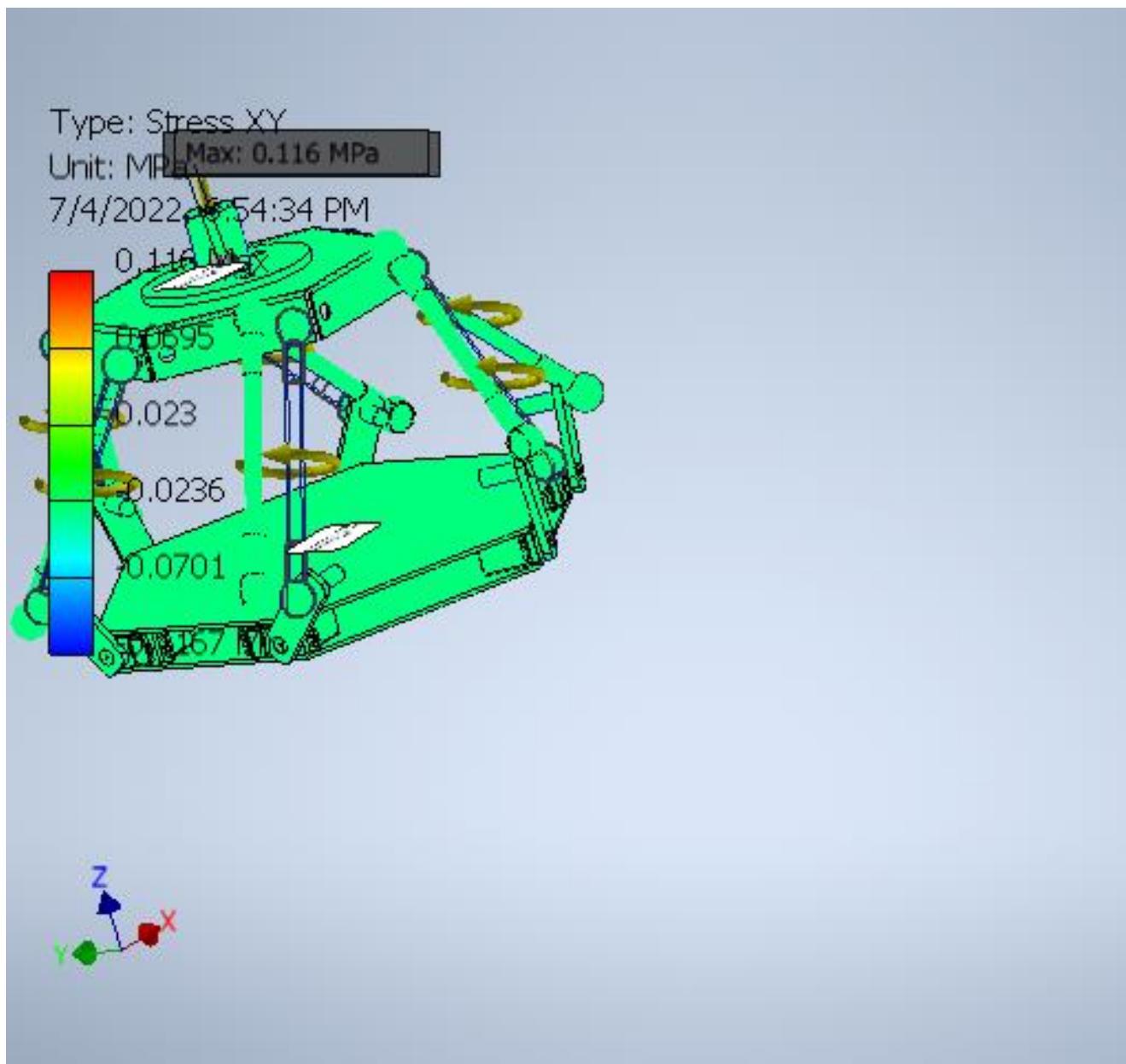
**Stress XX**



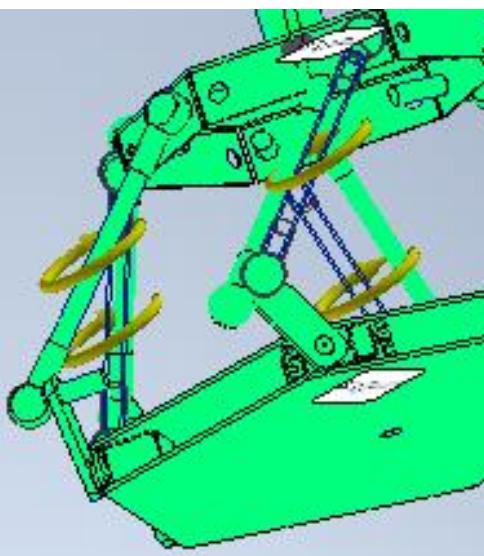
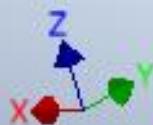
Type: Stress XX  
Unit: MPa  
7/4/2022, 6:54:32 PM



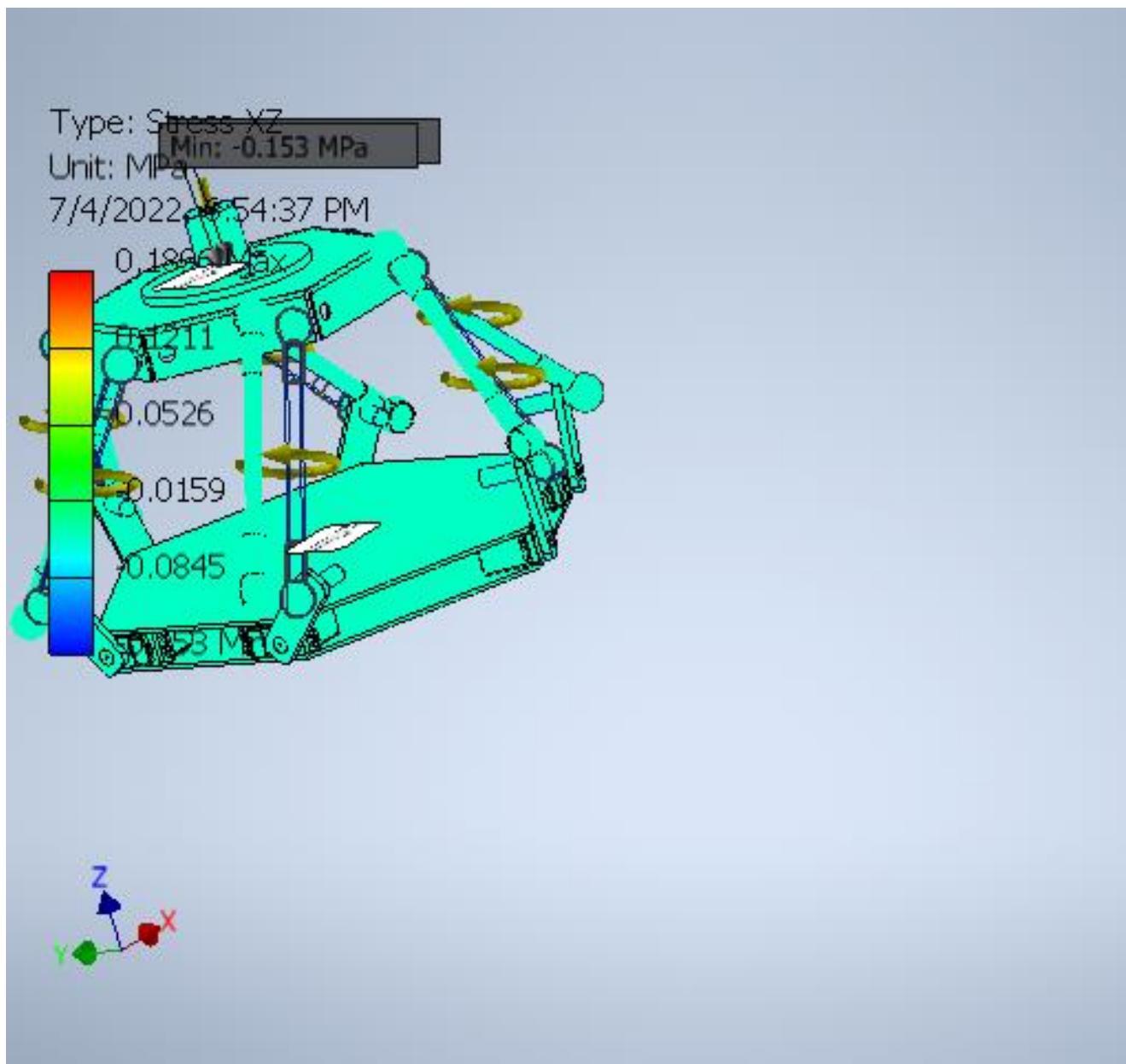
**Stress XY**



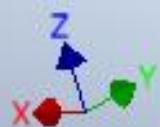
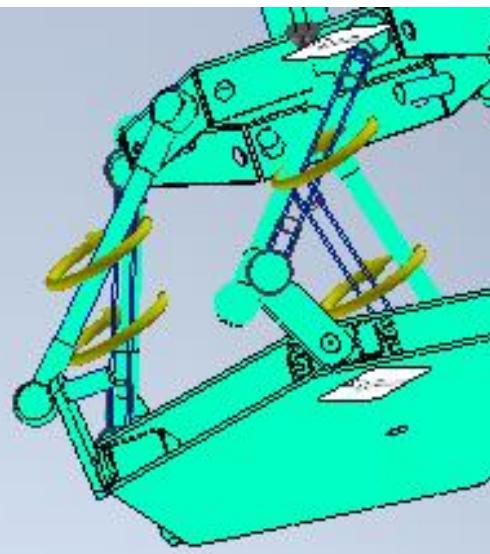
Type: Stress XY  
Unit: MPa  
7/4/2022, 6:54:34 PM  
0.116 Max  
0.0695  
0.023  
-0.0236  
-0.0701  
-0.1167 Min



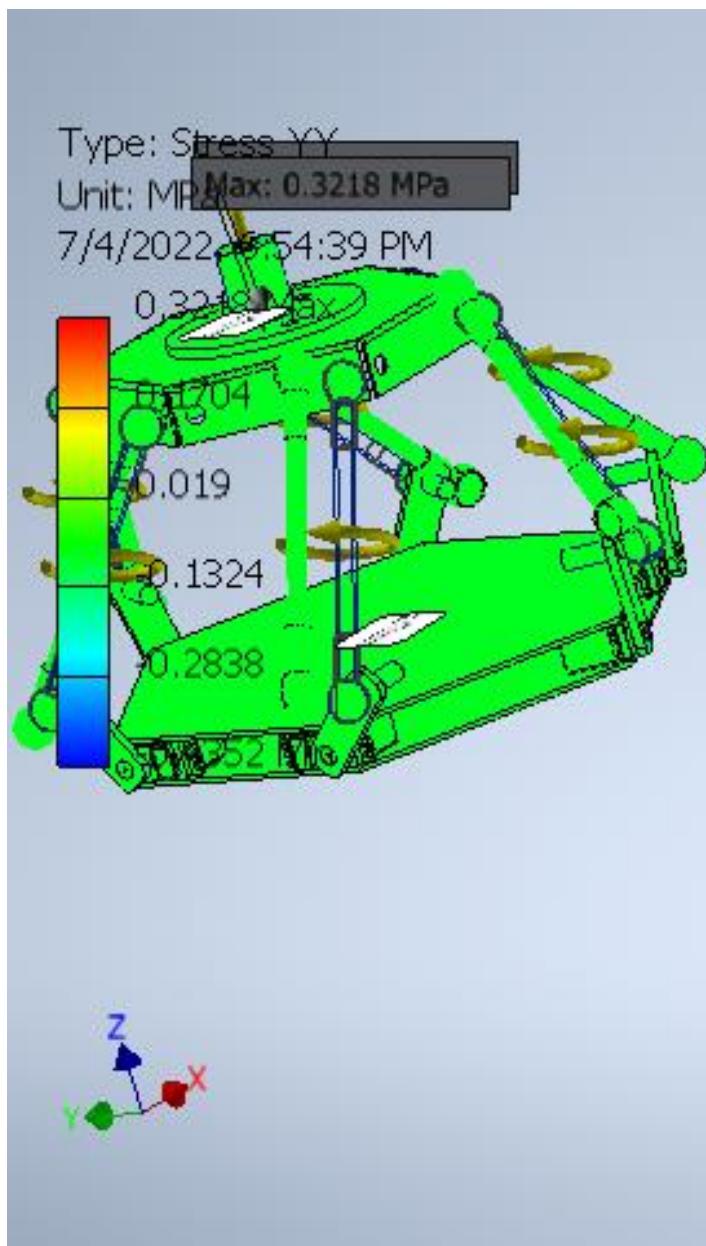
**Stress XZ**



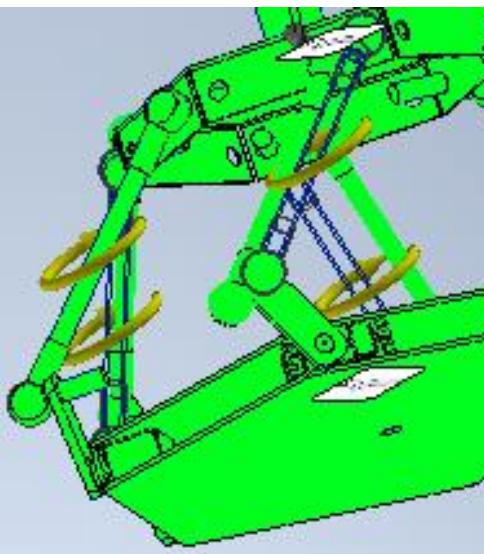
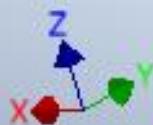
Type: Stress XZ  
Unit: MPa  
7/4/2022, 6:54:37 PM



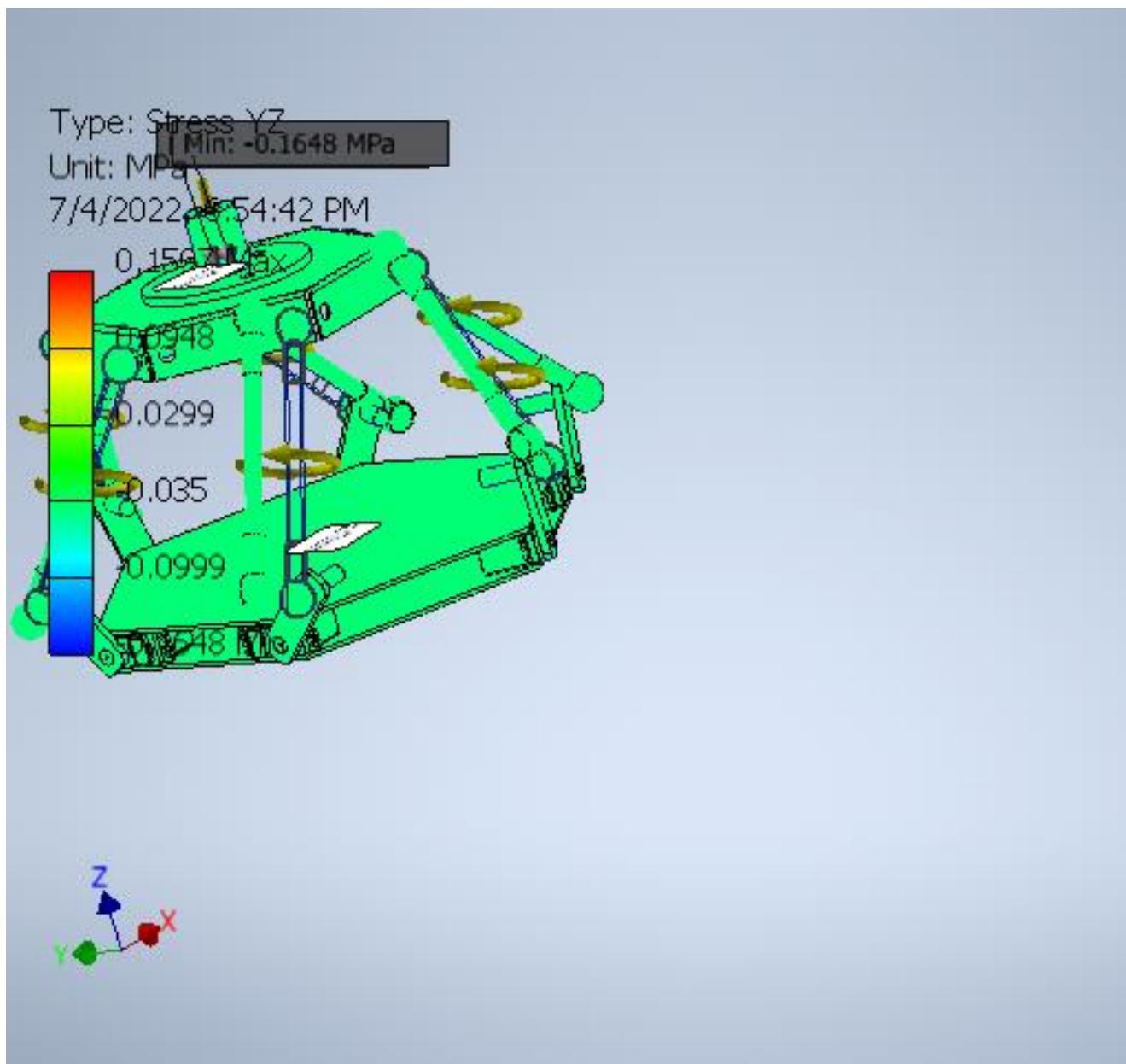
**Stress YY**



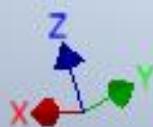
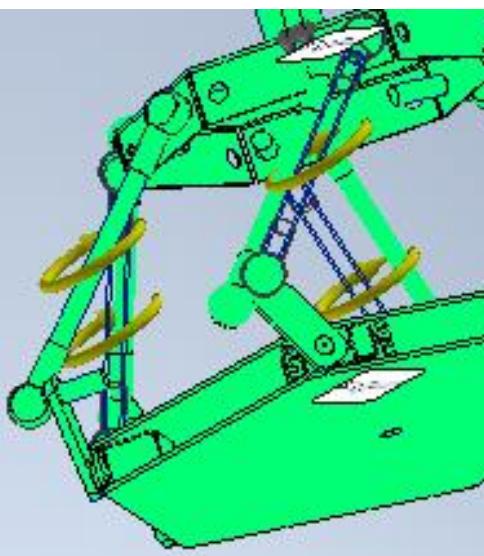
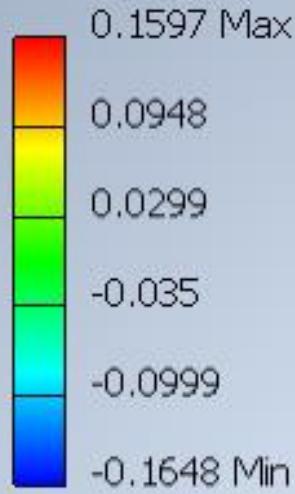
Type: Stress YY  
Unit: MPa  
7/4/2022, 6:54:39 PM  
0.3218 Max  
0.1704  
0.019  
-0.1324  
-0.2838  
-0.4352 Min



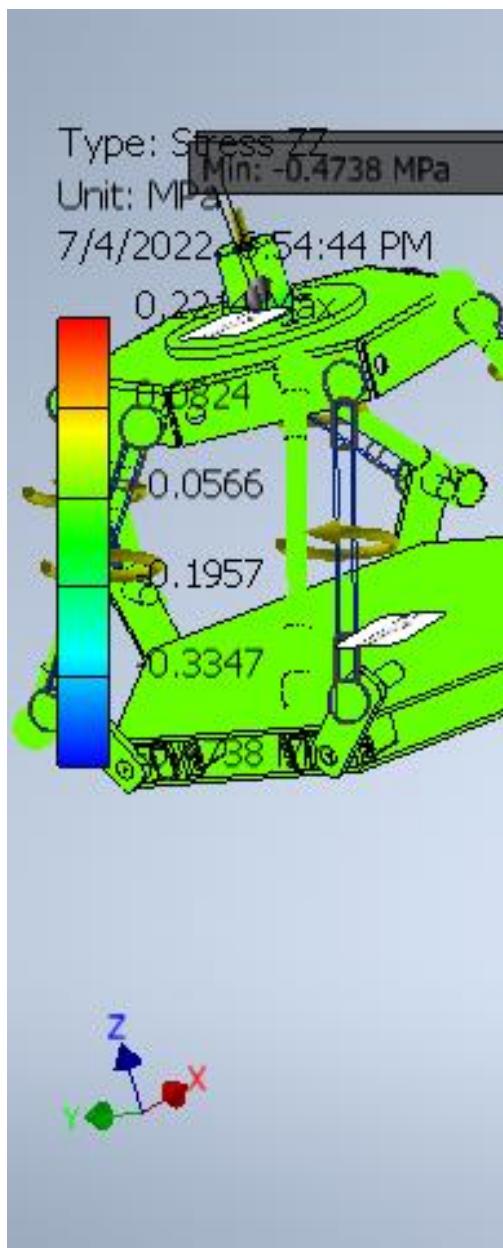
**Stress YZ**



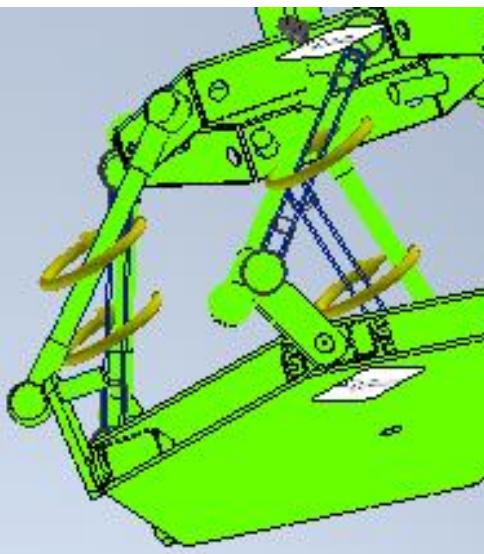
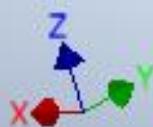
Type: Stress YZ  
Unit: MPa  
7/4/2022, 6:54:42 PM



**Stress ZZ**



Type: Stress ZZ  
Unit: MPa  
7/4/2022, 6:54:44 PM  
0.2214 Max  
0.0824  
-0.0566  
-0.1957  
-0.3347  
-0.4738 Min

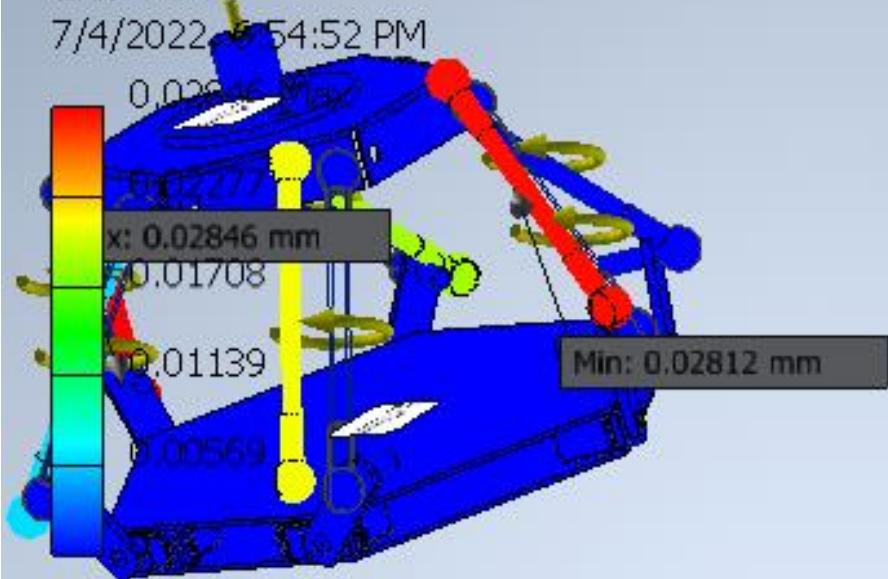


**X Displacement**

Type: X Displacement

Unit: mm

7/4/2022 5:54:52 PM



Type: X Displacement

Unit: mm

7/4/2022, 6:54:52 PM

0.02846 Max

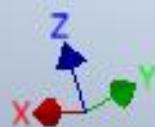
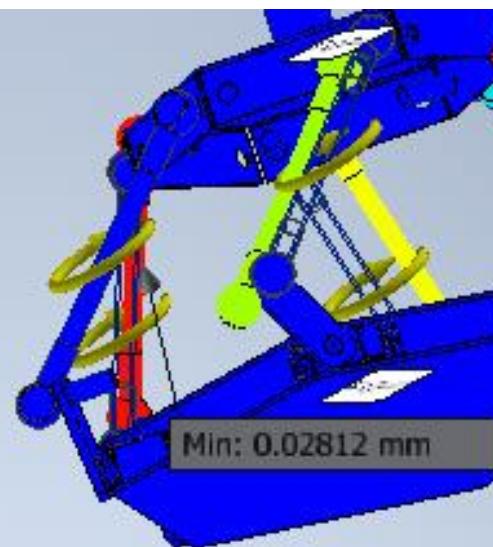
0.02277

0.01708

0.01139

0.00569

0

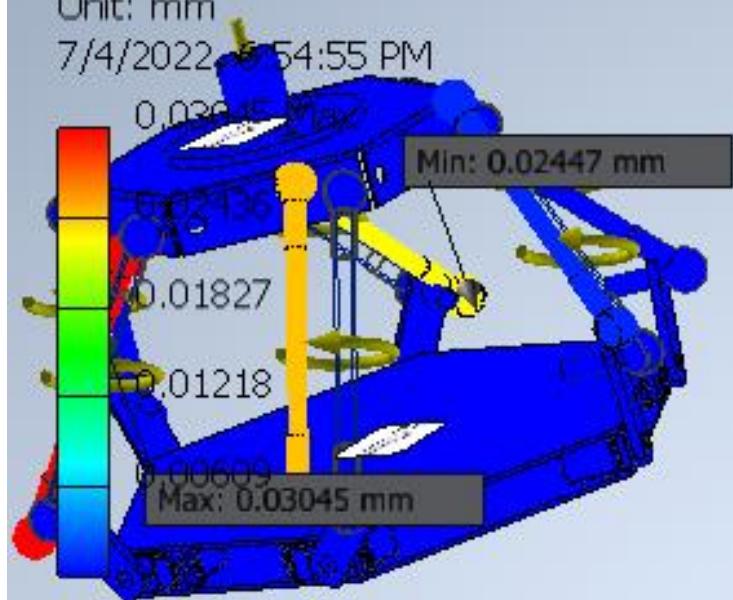


**X Displacement**

Type: Y Displacement

Unit: mm

7/4/2022 5:54:55 PM



Type: Y Displacement

Unit: mm

7/4/2022, 6:54:55 PM

0.03045 Max

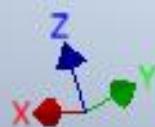
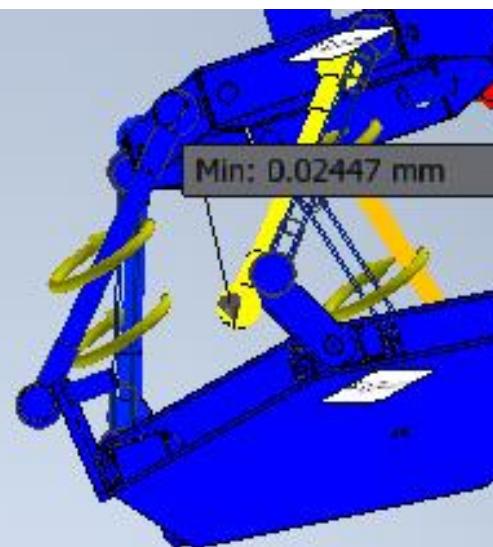
0.02436

0.01827

0.01218

0.00609

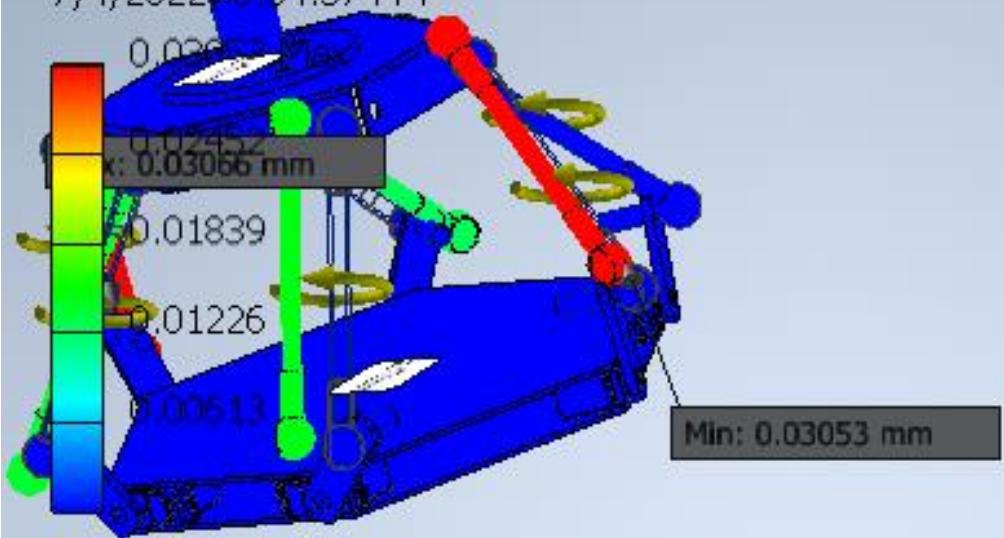
0



**Z Displacement**

Type: Z Displacement  
Unit: mm

7/4/2022 5:54:57 PM



Type: Z Displacement

Unit: mm

7/4/2022, 6:54:57 PM

0.03053 Max

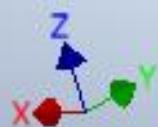
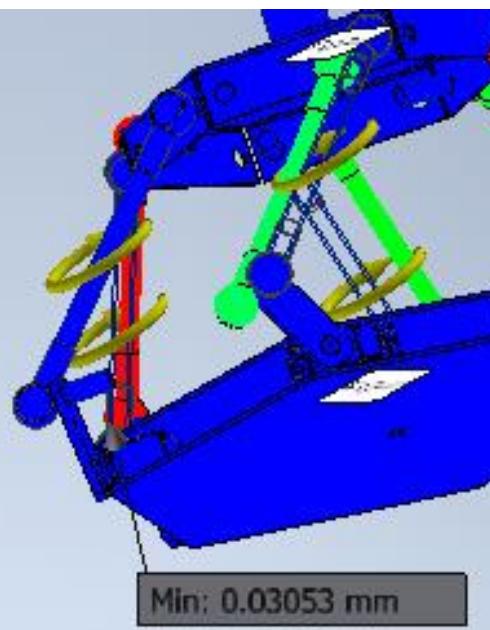
0.02452

0.01839

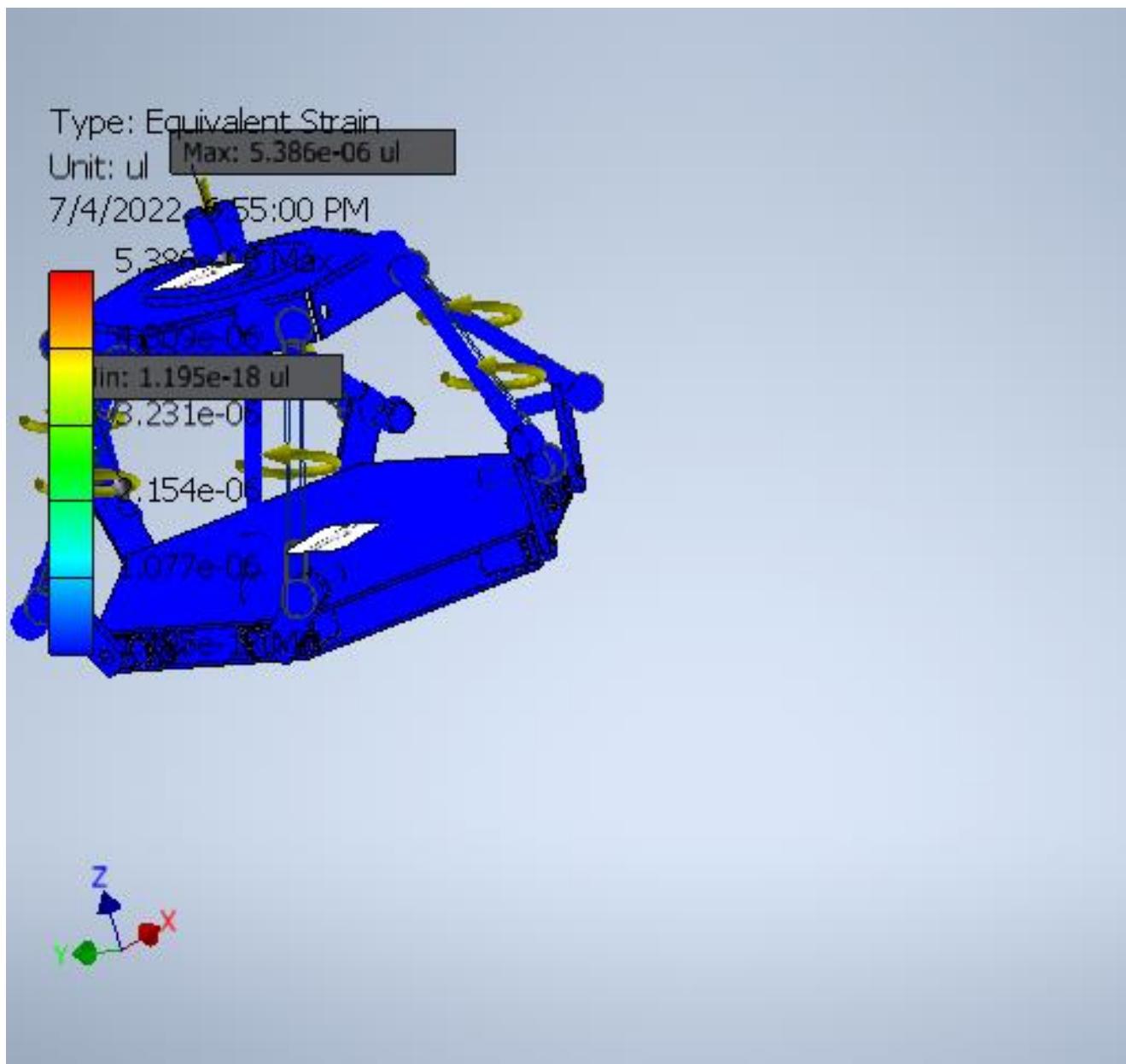
0.01226

0.00613

0



**Equivalent Strain**



Type: Equivalent Strain

Unit:  $\mu\epsilon$

7/4/2022, 6:55:00 PM

5.386e-06 Max

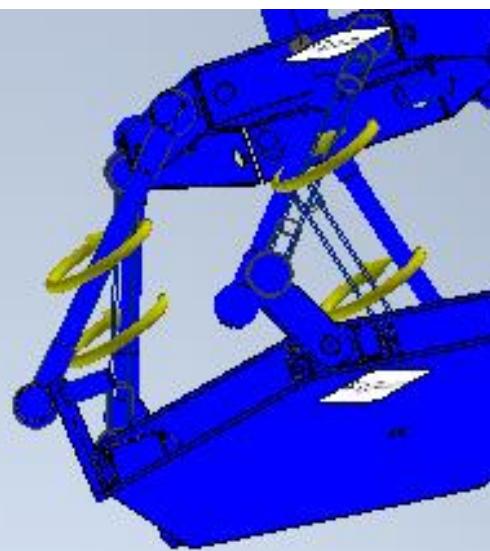
4.309e-06

3.231e-06

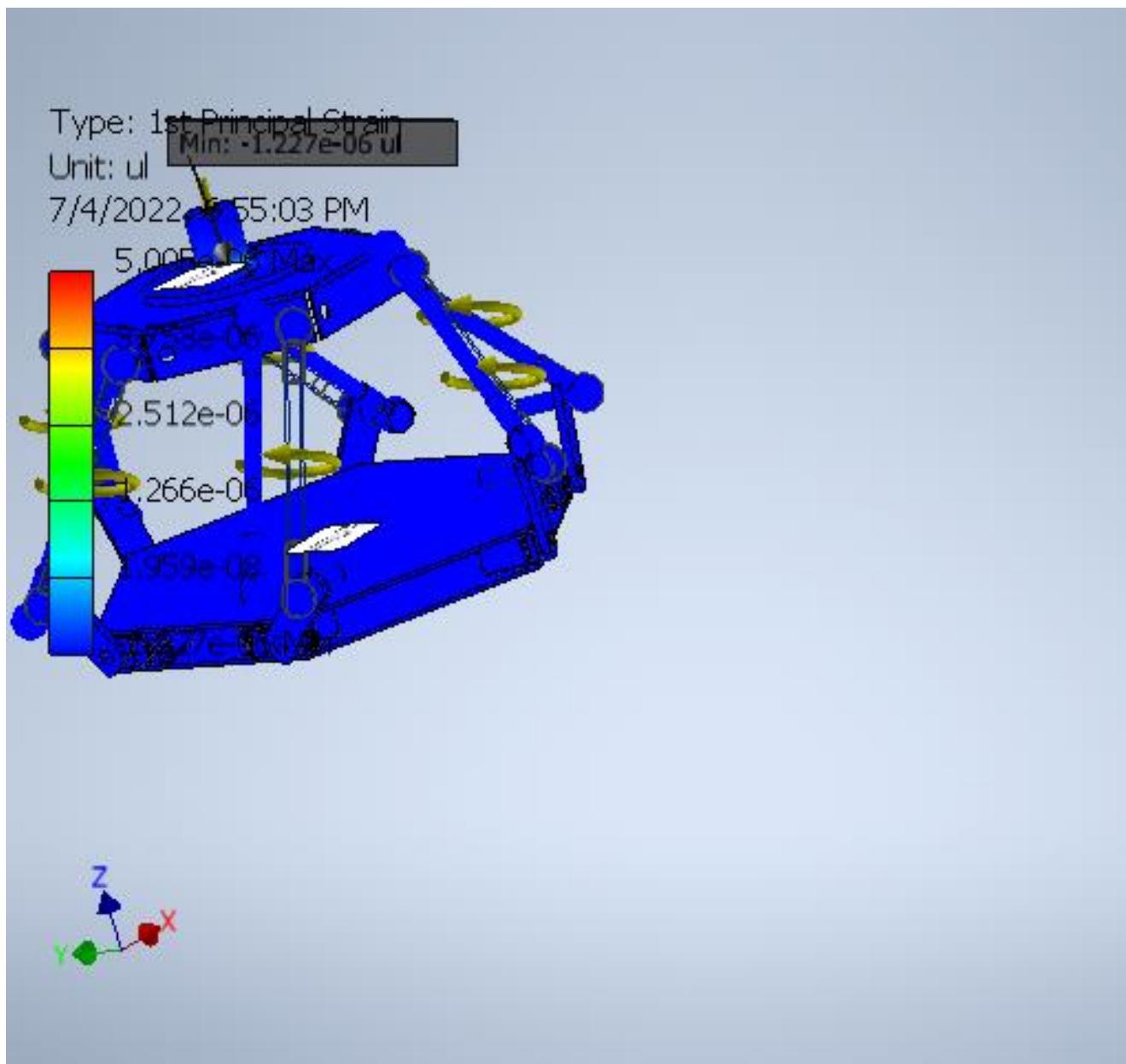
2.154e-06

1.077e-06

1.195e-18 Min



**1st Principal Strain**



Type: 1st Principal Strain

Unit: ul

7/4/2022, 6:55:03 PM

5.005e-06 Max

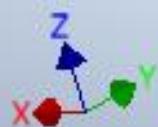
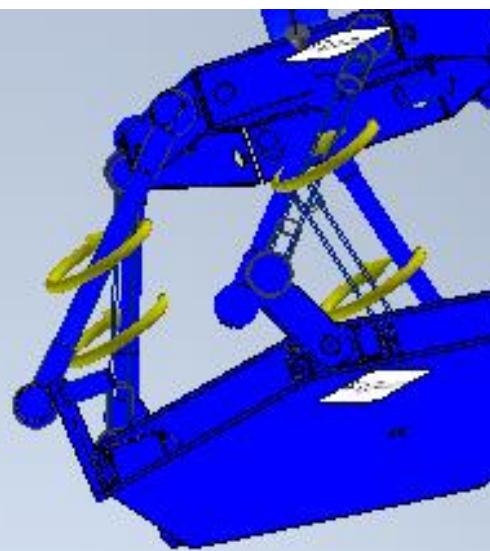
3.758e-06

2.512e-06

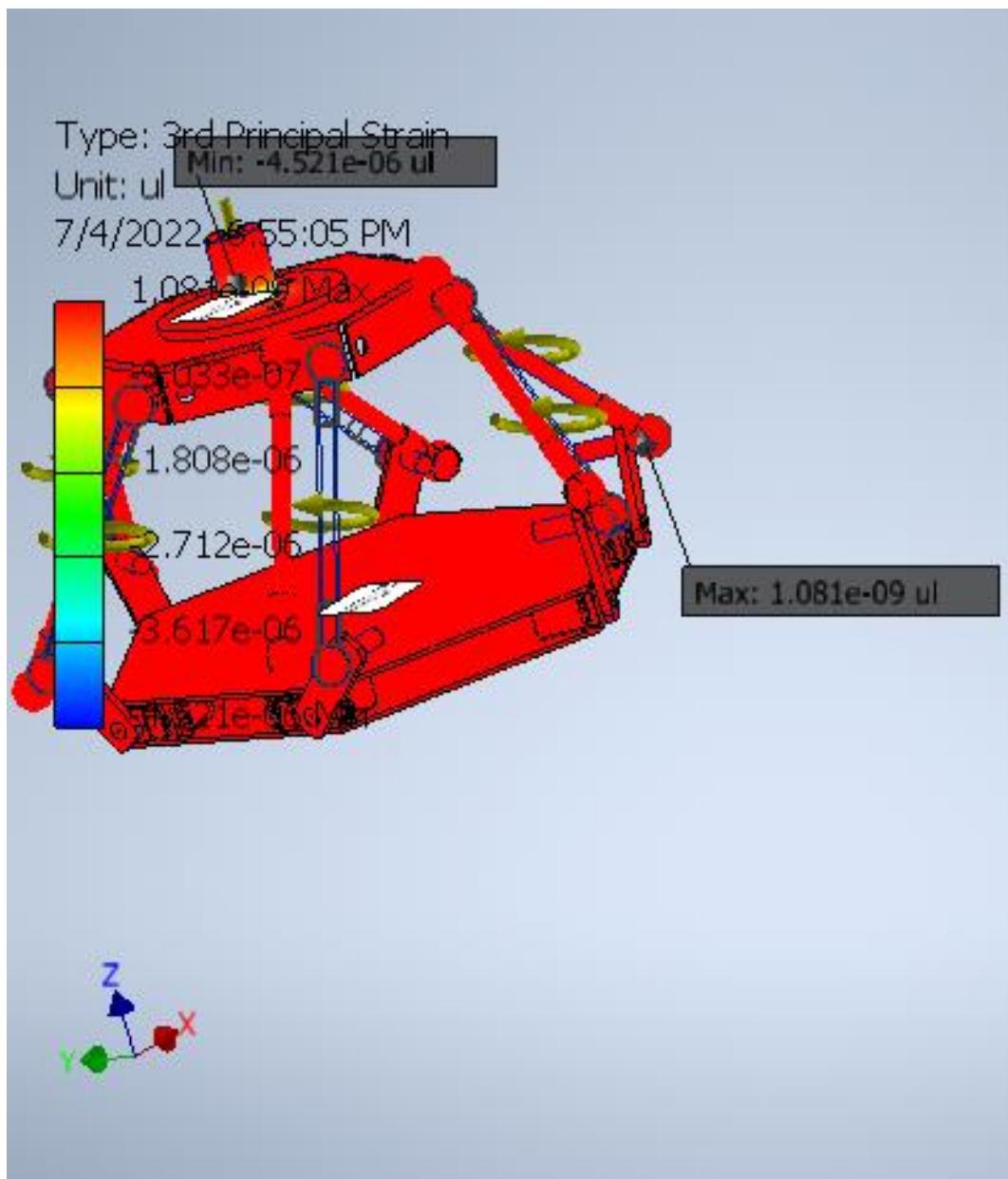
1.266e-06

1.959e-08

-1.227e-06 Min



**3rd Principal Strain**



Type: 3rd Principal Strain

Unit:  $\mu\epsilon$

7/4/2022, 6:55:05 PM

1.081e-09 Max

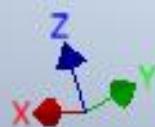
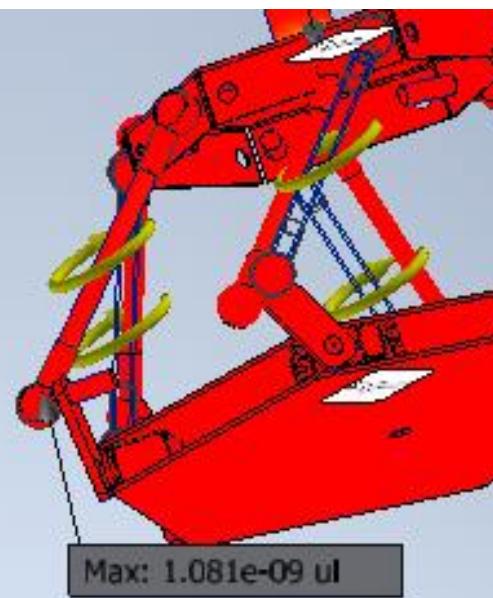
-9.033e-07

-1.808e-06

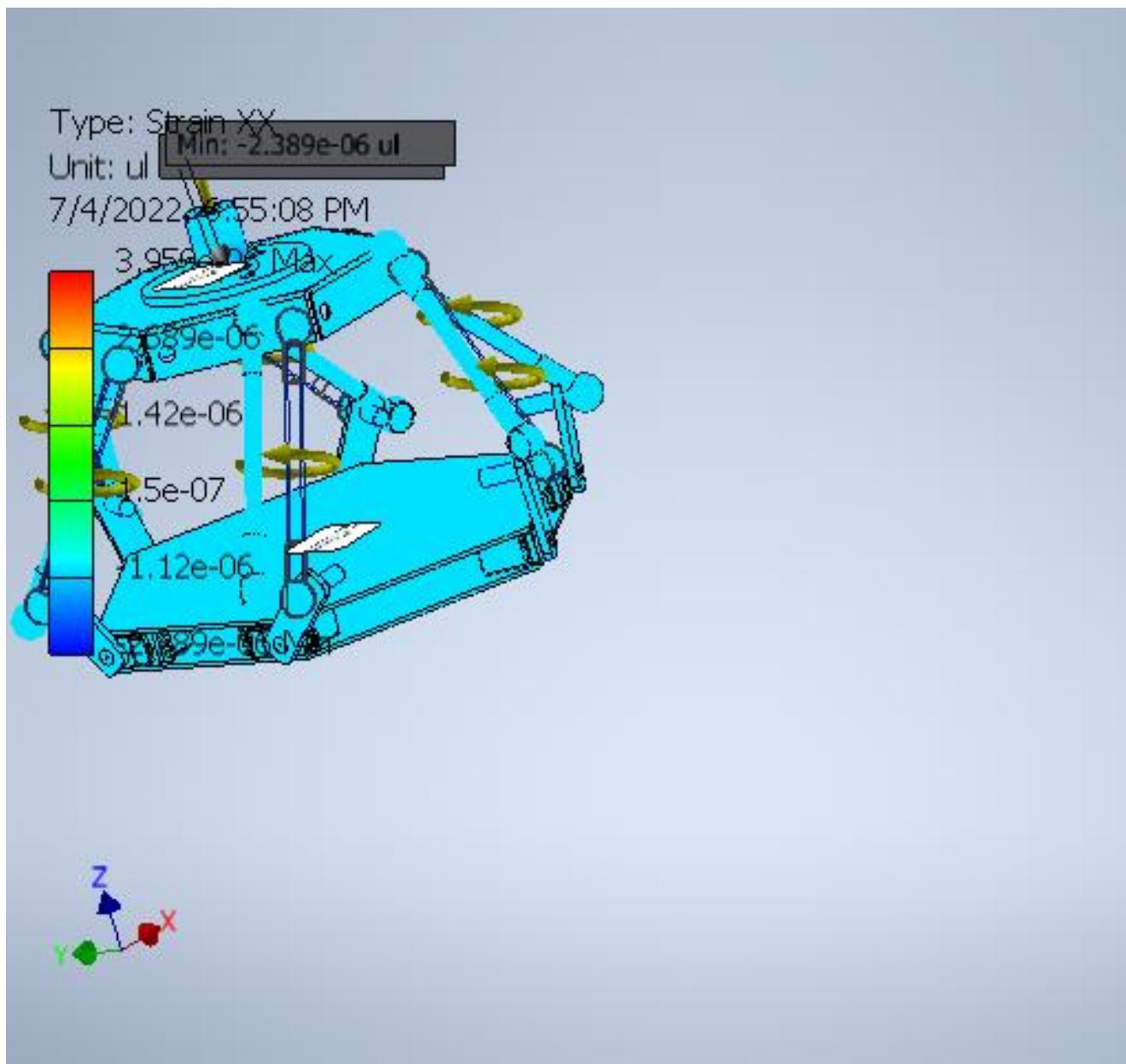
-2.712e-06

-3.617e-06

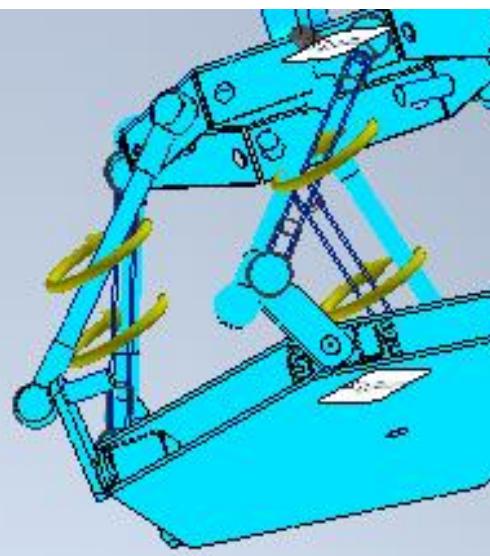
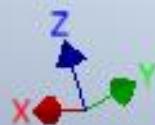
-4.521e-06 Min



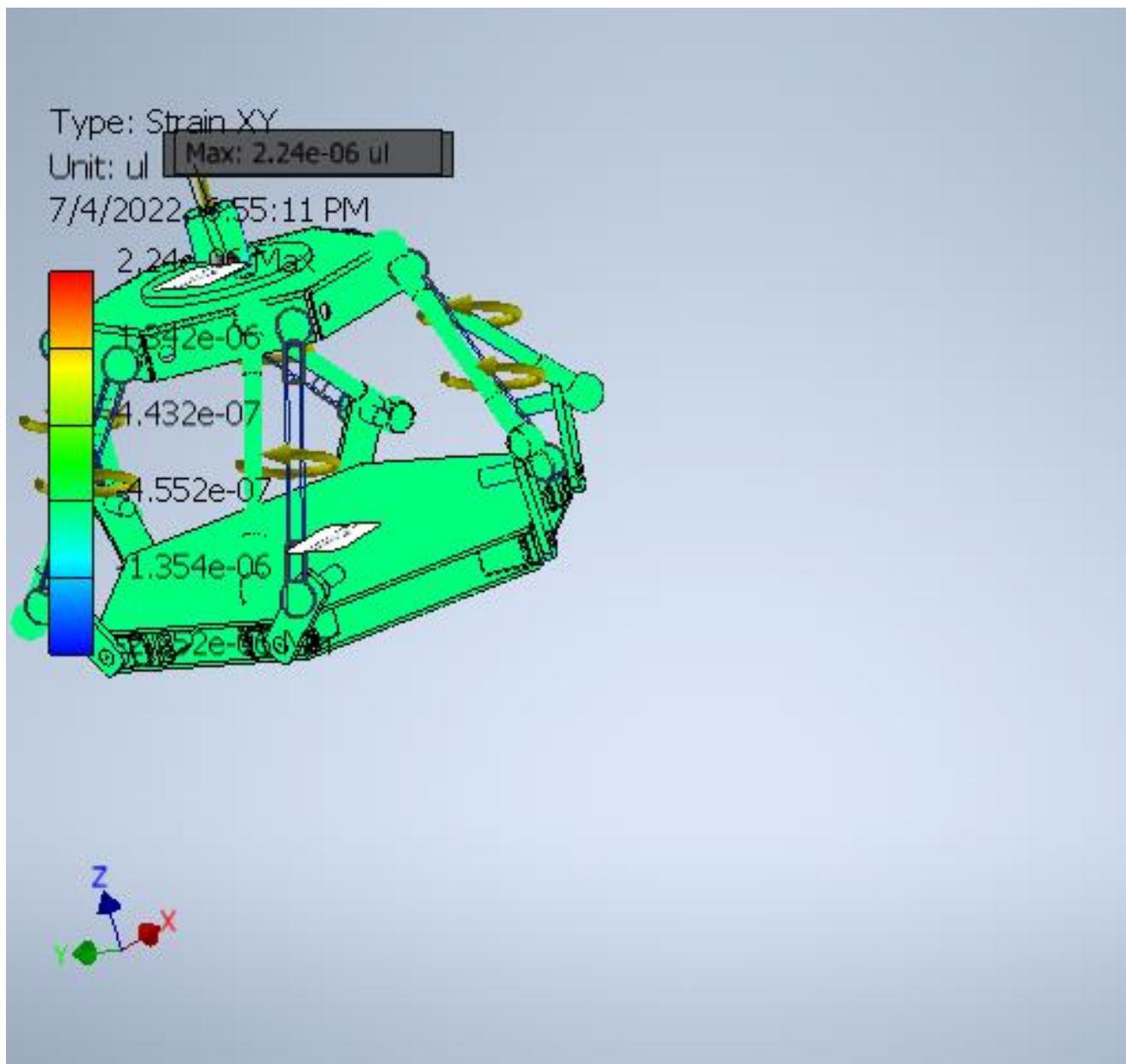
**Strain XX**



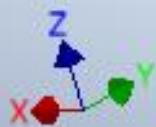
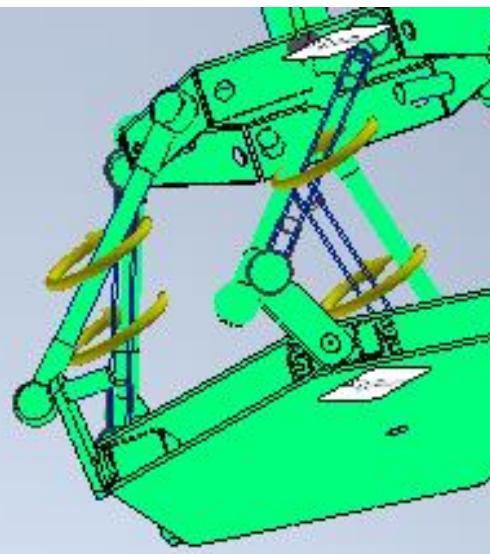
Type: Strain XX  
Unit:  $\mu\epsilon$   
7/4/2022, 6:55:08 PM  
3.959e-06 Max  
2.689e-06  
1.42e-06  
1.5e-07  
-1.12e-06  
-2.389e-06 Min



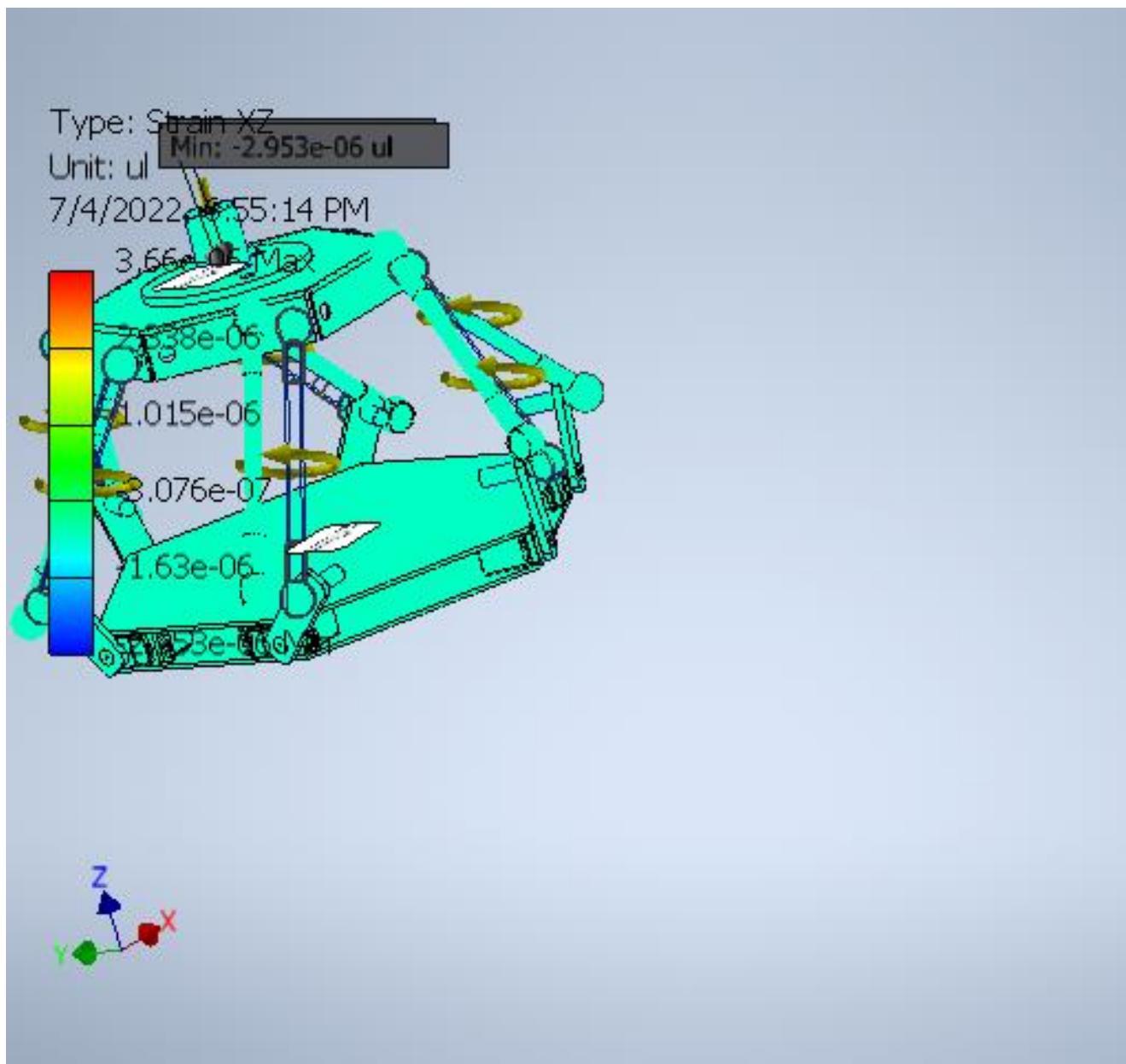
**Strain XY**



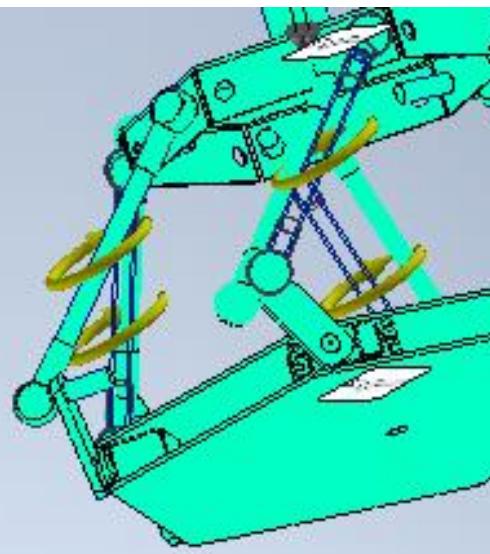
Type: Strain XY  
Unit:  $\mu\epsilon$   
7/4/2022, 6:55:11 PM  
2.24e-06 Max  
  
1.342e-06  
4.432e-07  
-4.552e-07  
-1.354e-06  
-2.252e-06 Min



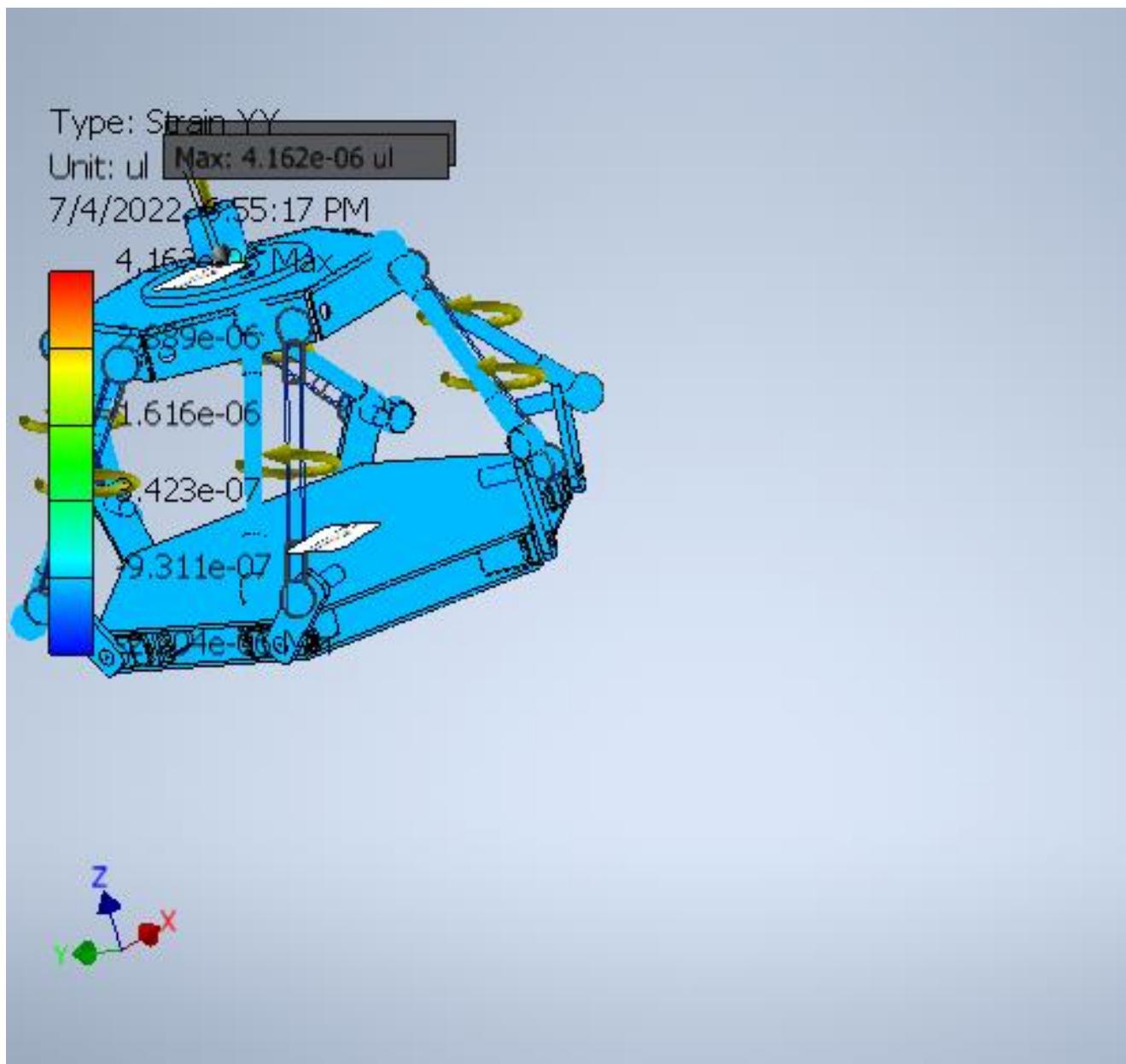
**Strain XZ**



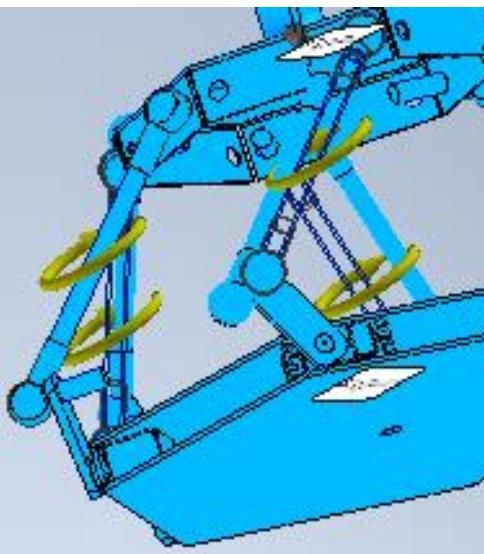
Type: Strain XZ  
Unit:  $\mu\epsilon$   
7/4/2022, 6:55:14 PM  
3.66e-06 Max  
2.338e-06  
1.015e-06  
-3.076e-07  
-1.63e-06  
-2.953e-06 Min



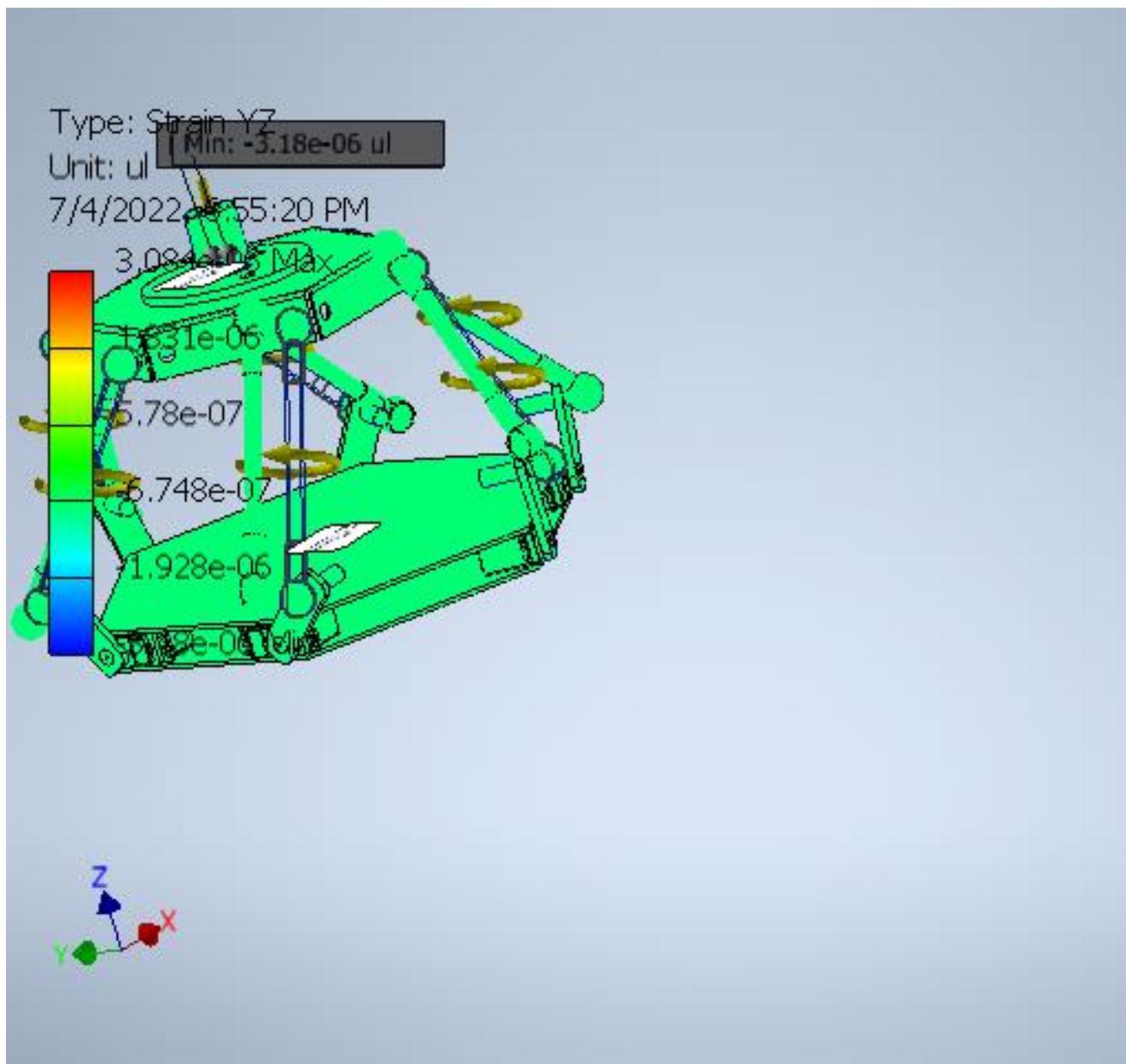
**Strain YY**



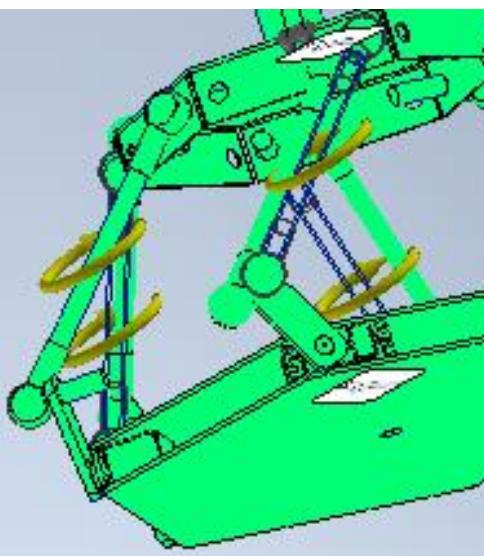
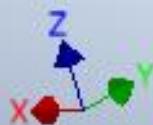
Type: Strain YY  
Unit:  $\mu$ ε  
7/4/2022, 6:55:17 PM  
4.162e-06 Max  
2.889e-06  
1.616e-06  
3.423e-07  
-9.311e-07  
-2.204e-06 Min



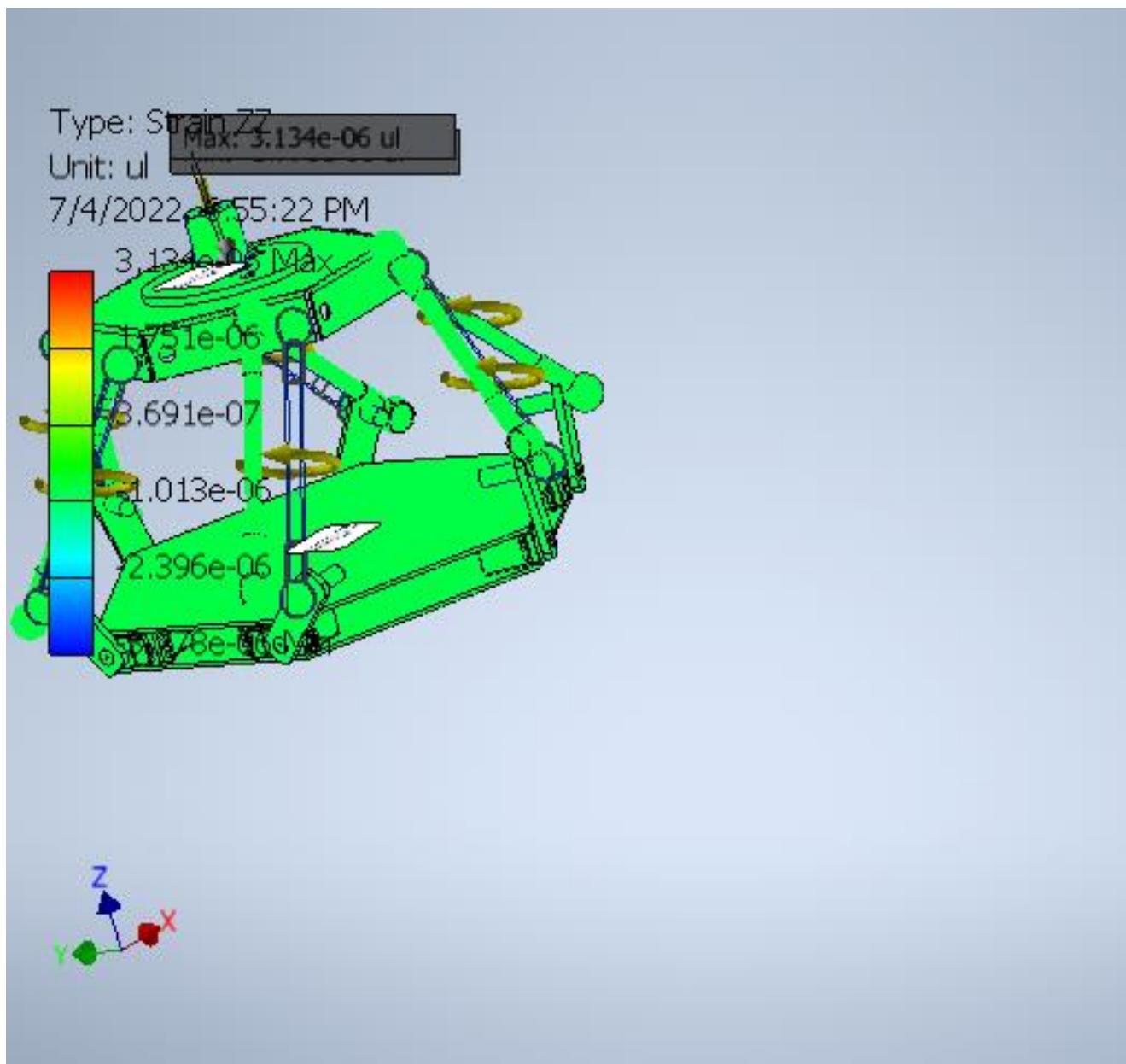
**Strain YZ**



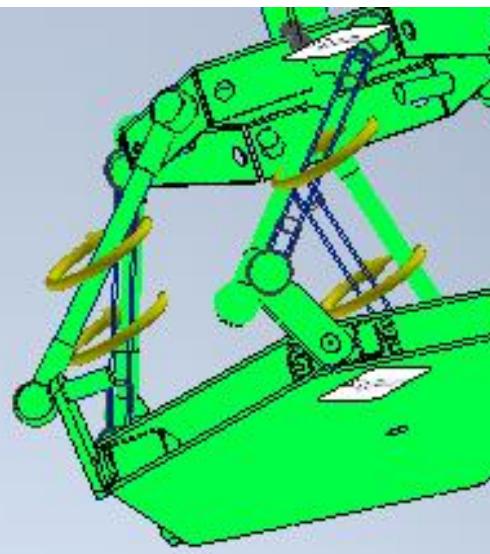
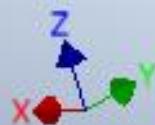
Type: Strain YZ  
Unit:  $\mu\epsilon$   
7/4/2022, 6:55:20 PM  
3.084e-06 Max  
1.831e-06  
5.78e-07  
-6.748e-07  
-1.928e-06  
-3.18e-06 Min



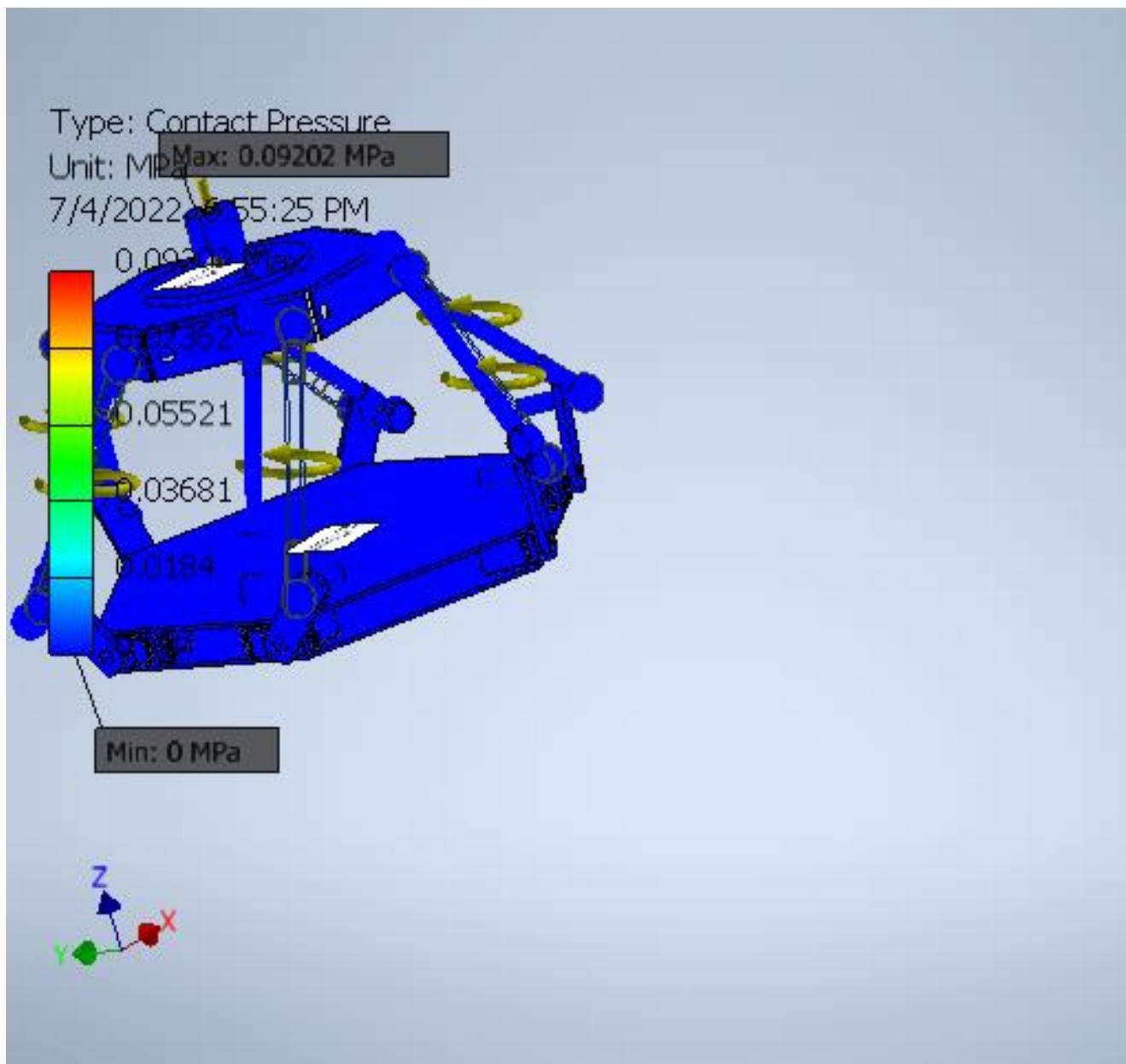
**Strain ZZ**



Type: Strain ZZ  
Unit:  $\mu\epsilon$   
7/4/2022, 6:55:22 PM  
3.134e-06 Max  
1.751e-06  
3.691e-07  
-1.013e-06  
-2.396e-06  
-3.778e-06 Min



**Contact Pressure**



Type: Contact Pressure

Unit: MPa

7/4/2022, 6:55:25 PM

0.09202 Max

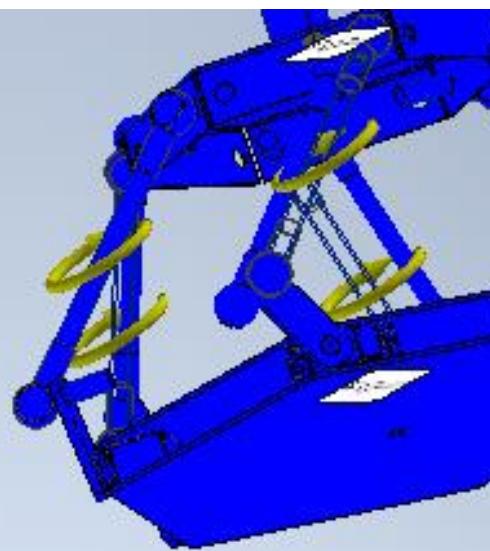
0.07362

0.05521

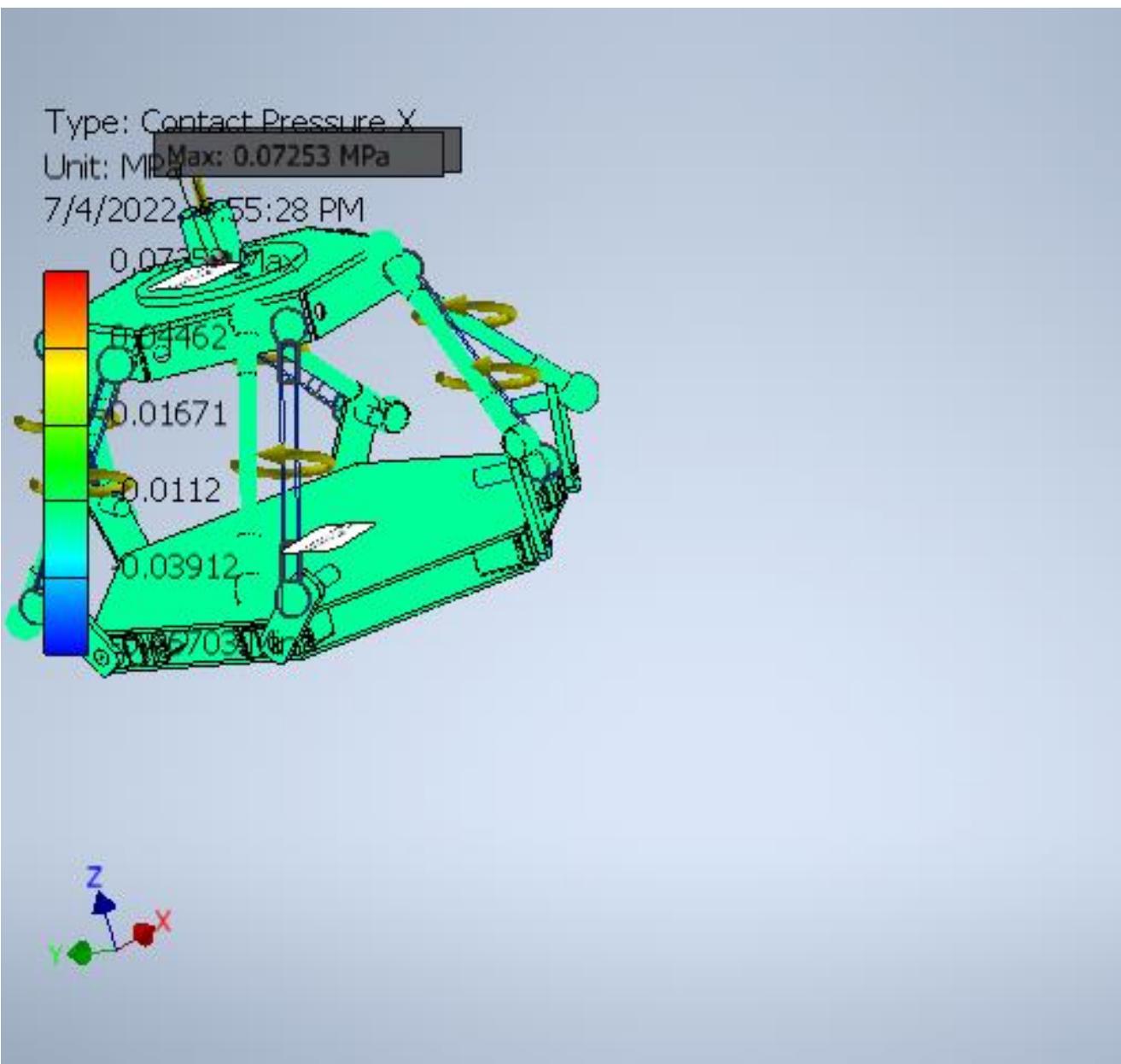
0.03681

0.0184

0 Min



**Contact Pressure X**



Type: Contact Pressure X

Unit: MPa

7/4/2022, 6:55:28 PM

0.07253 Max

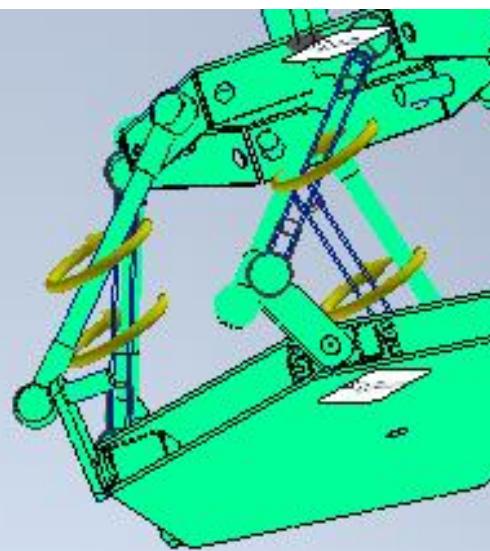
0.04462

0.01671

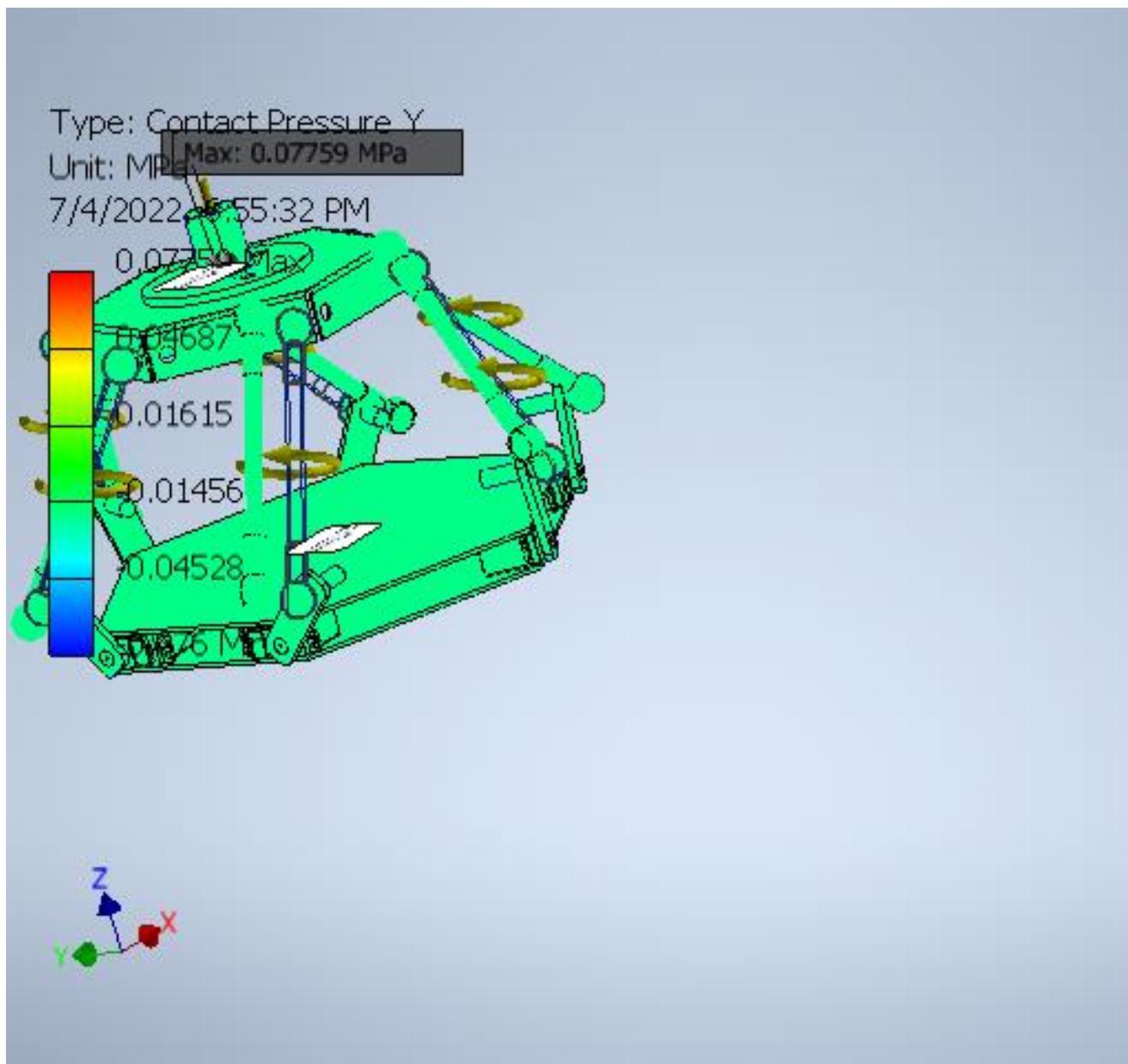
-0.0112

-0.03912

-0.06703 Min



**Contact Pressure Y**



Type: Contact Pressure Y

Unit: MPa

7/4/2022, 6:55:32 PM

0.07759 Max

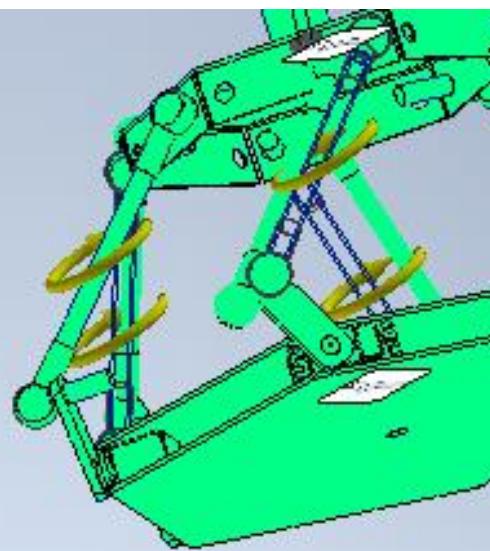
0.04687

0.01615

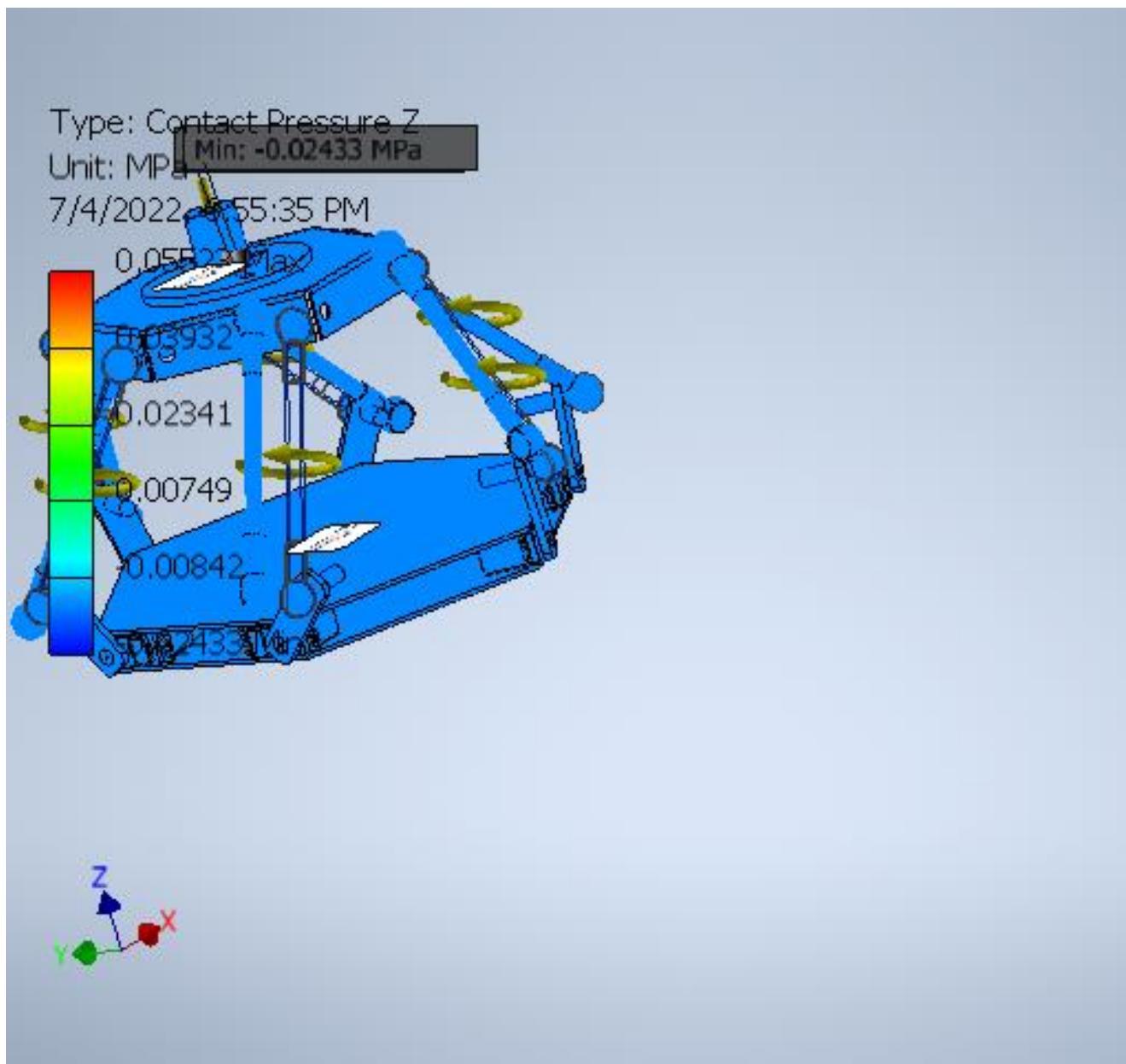
-0.01456

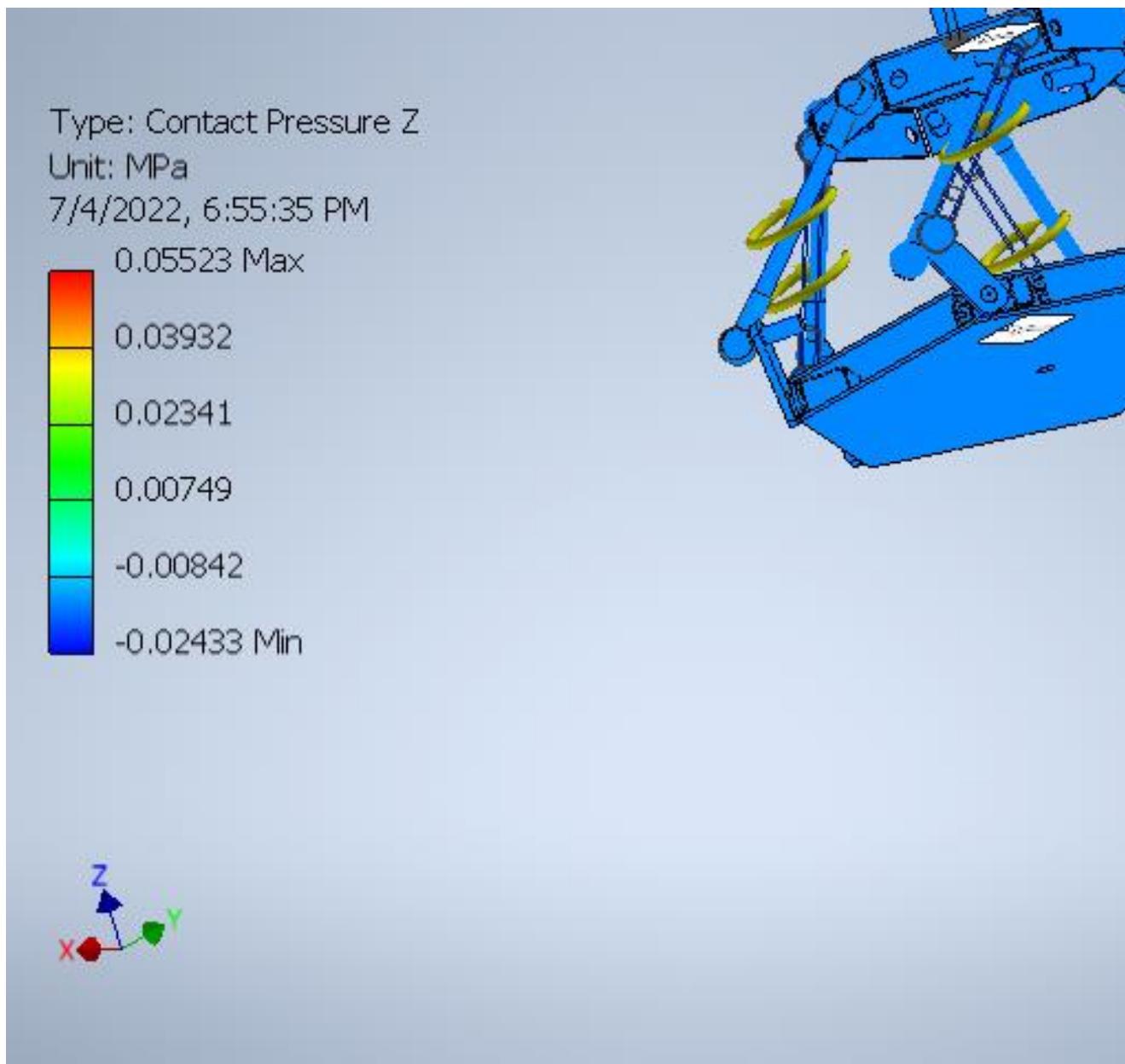
-0.04528

-0.076 Min



**Contact Pressure Z**





## Static Analysis:3

### General objective and settings:

Design Objective	Single Point
Study Type	Static Analysis
Last Modification Date	7/4/2022, 6:44 PM
Model State	[Primary]
Design View	Default
Positional	[Primary]

Detect and Eliminate Rigid Body Modes	Yes
Separate Stresses Across Contact Surfaces	Yes
Motion Loads Analysis	No

## iProperties

### Summary

Author	earls
--------	-------

### Project

Part Number	Assemby 3
Designer	earls
Cost	\$0.00
Date Created	6/30/2022

### Status

Design Status	WorkInProgress
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### Physical

Mass	2.04222 kg
Area	521050 mm <sup>2</sup>
Volume	756378 mm <sup>3</sup>
Center of Gravity	x=-5.11334 mm y=-5.76516 mm z=26.0107 mm

Note: Physical values could be different from Physical values used by FEA reported below.

### Mesh settings:

Avg. Element Size (fraction of model diameter)	0.1
Min. Element Size (fraction of avg. size)	0.2
Grading Factor	1.5
Max. Turn Angle	60 deg
Create Curved Mesh Elements	No
Use part based measure for Assembly mesh	Yes

### Material(s)

Name	Aluminum 6061	
General	Mass Density	2.7 g/cm <sup>3</sup>

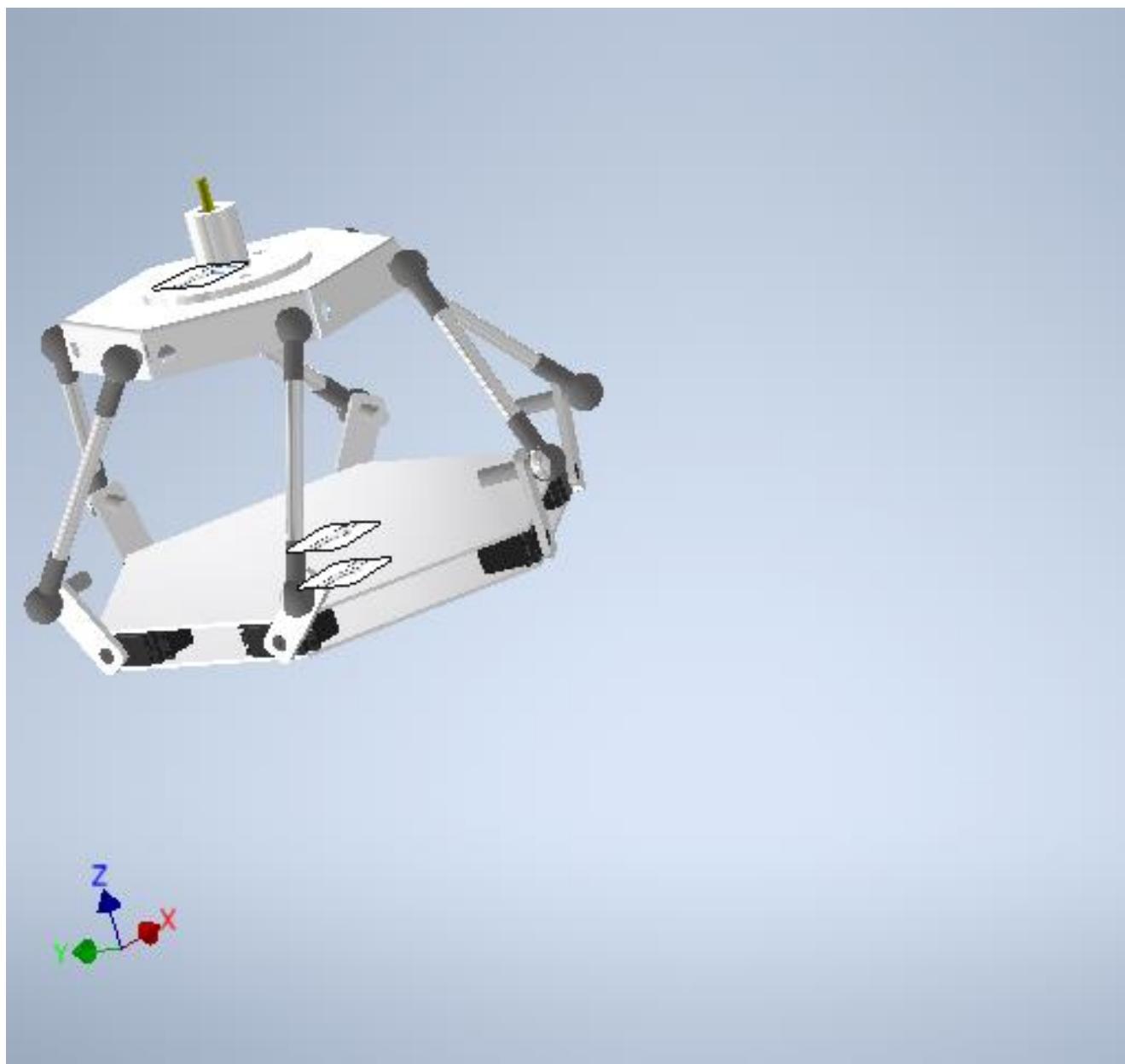
	Yield Strength	275 MPa
	Ultimate Tensile Strength	310 MPa
Stress	Young's Modulus	68.9 GPa
	Poisson's Ratio	0.33 ul
	Shear Modulus	25.9023 GPa
Part Name(s)	Bottom plate 2.5mm.ipt Servo arm.ipt Test flange.ipt Servo.ipt Part2.ipt Rod qty-6.ipt Part1.ipt Moving platform.ipt	

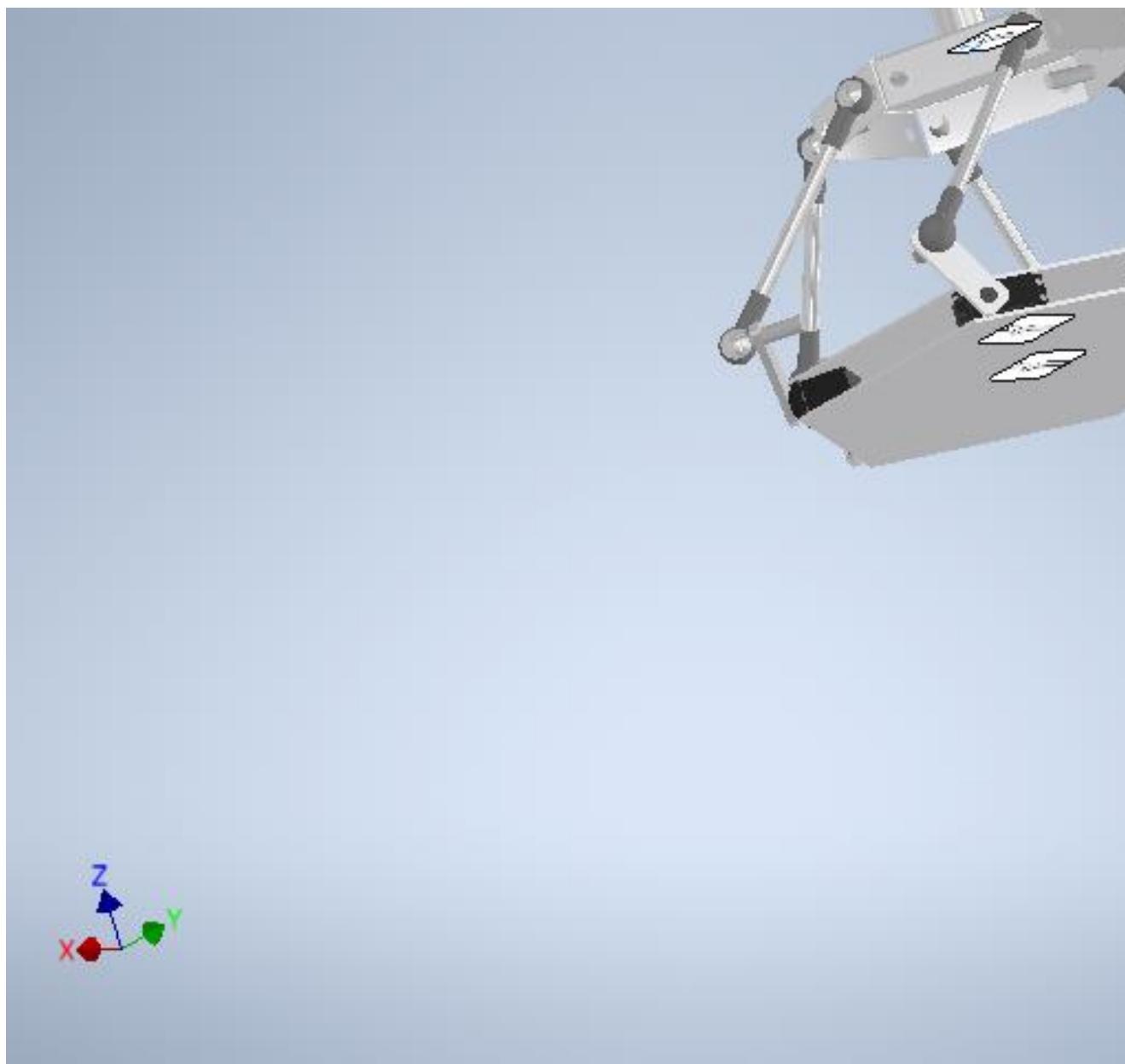
## Operating conditions

### Force:1

Load Type	Force
Magnitude	150.000 N
Vector X	-9.035 N
Vector Y	-2.156 N
Vector Z	-149.712 N

### Selected Face(s)

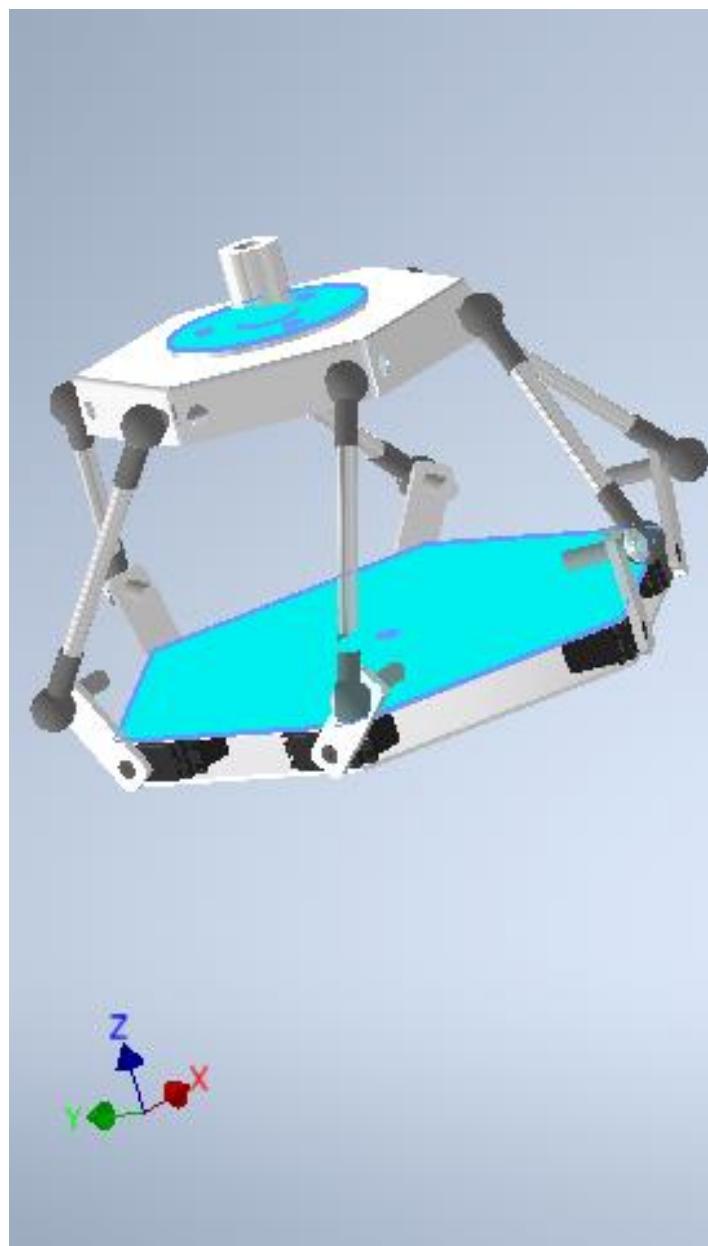


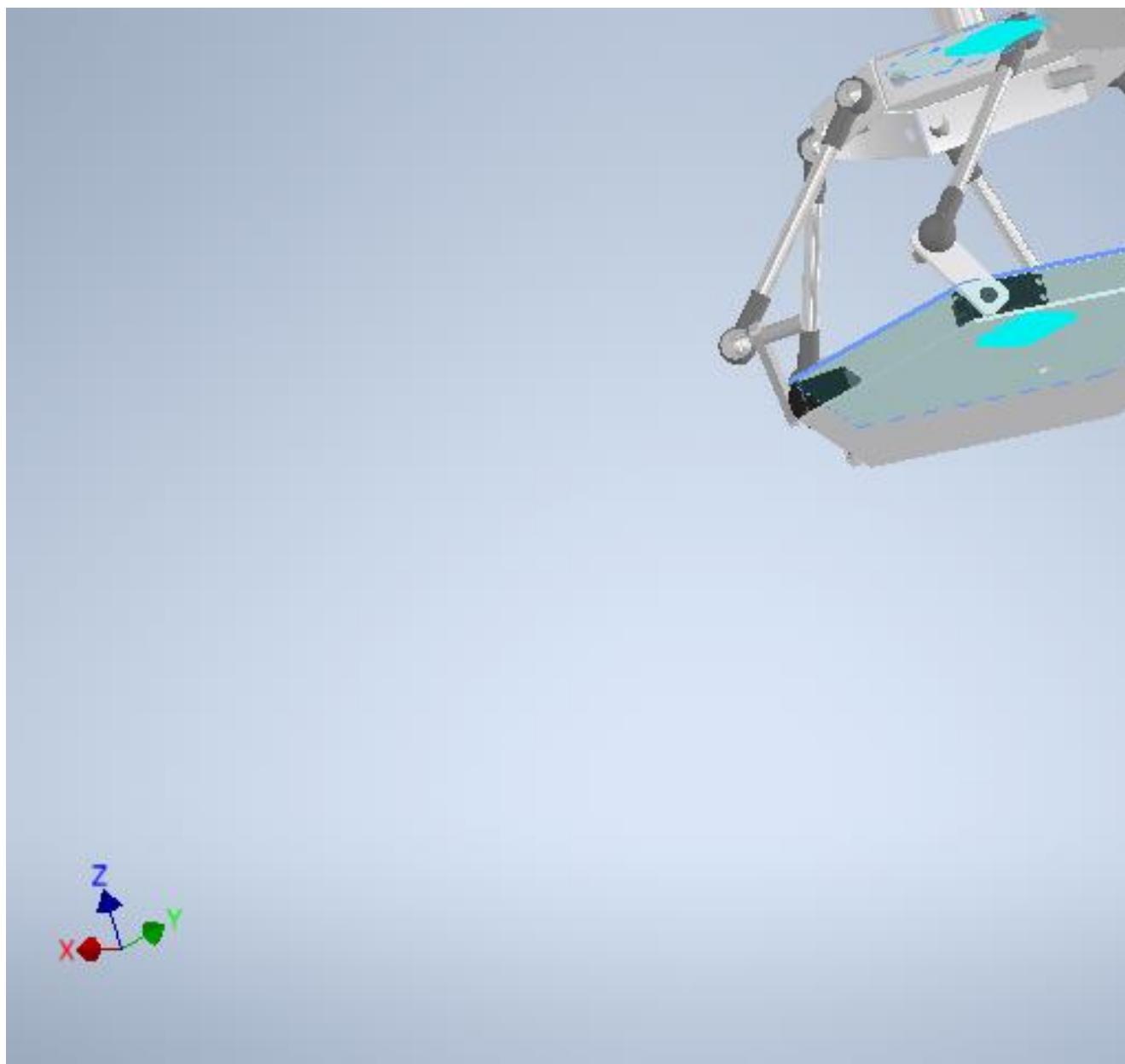


**Fixed Constraint:1**

Constraint Type	Fixed Constraint
-----------------	------------------

**Selected Face(s)**

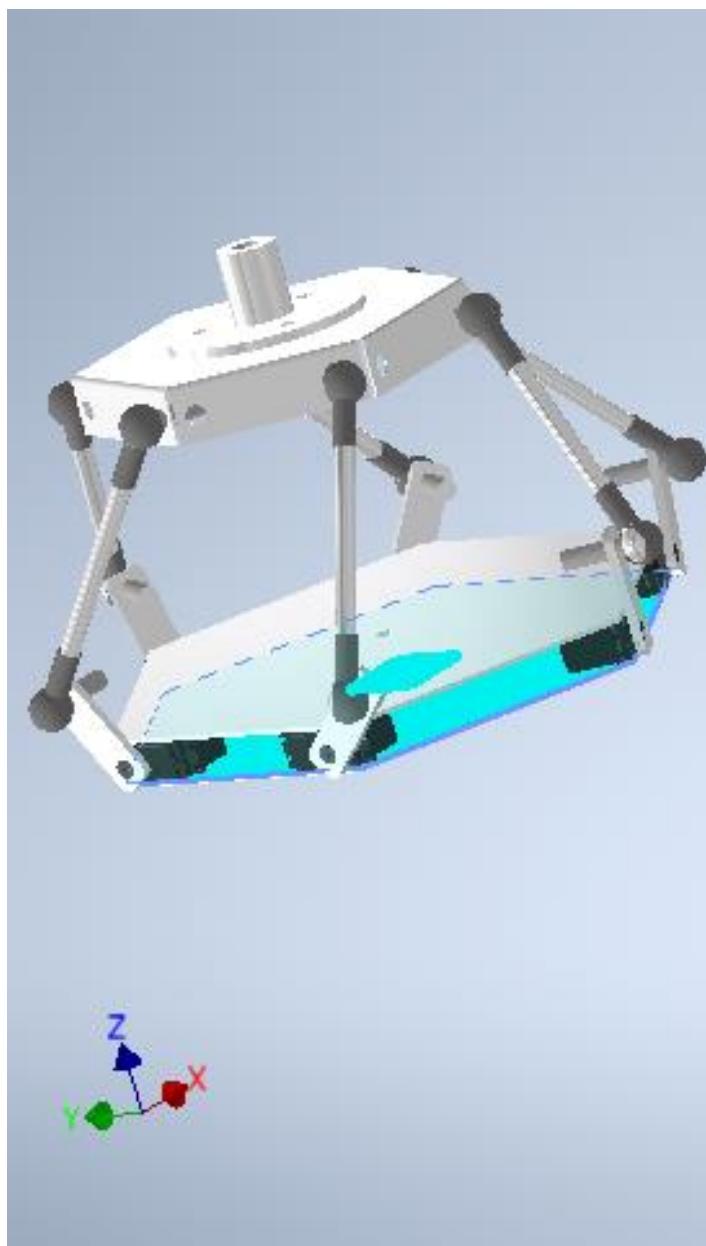


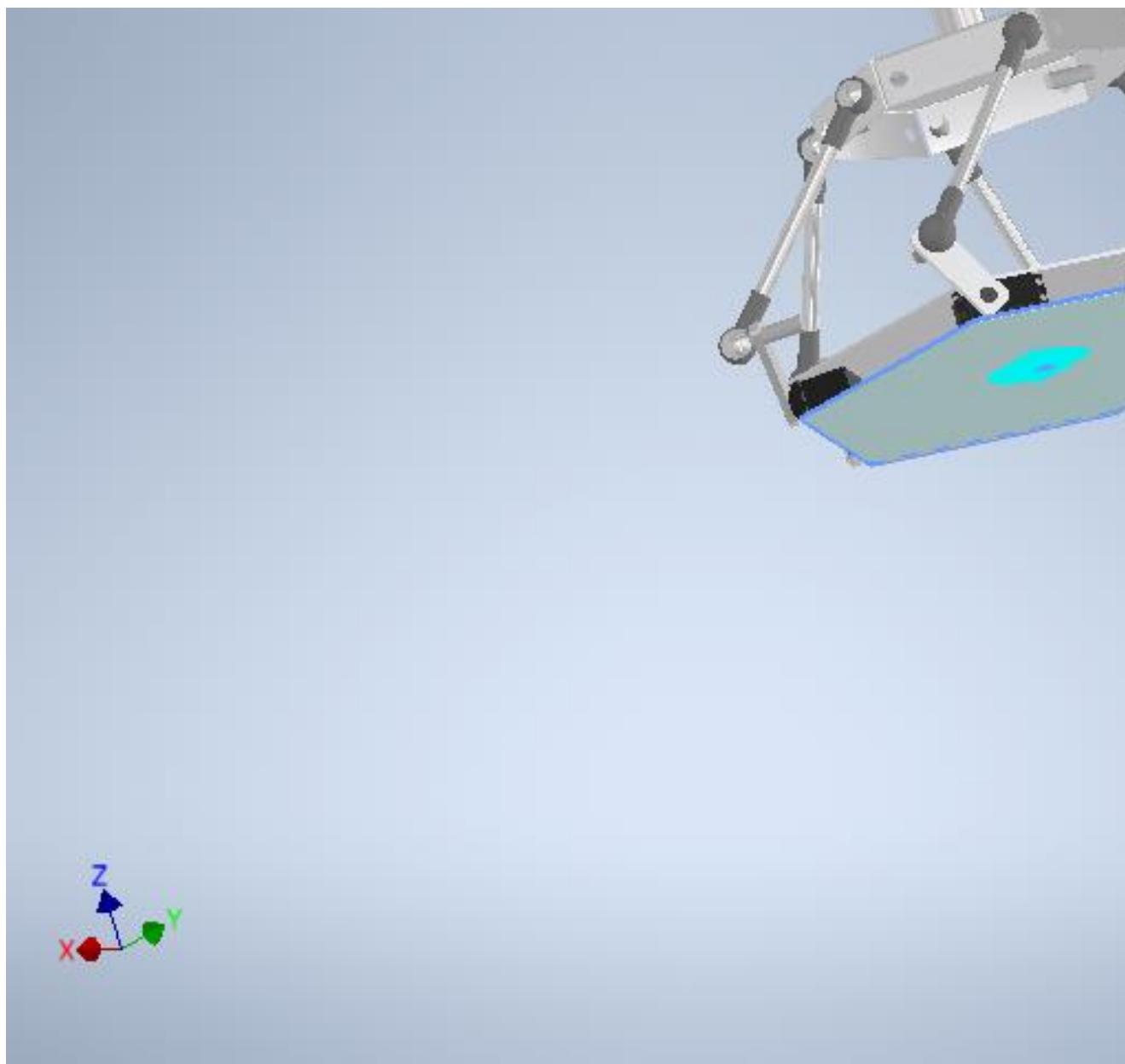


### Fixed Constraint:2

Constraint Type	Fixed Constraint
-----------------	------------------

**Selected Face(s)**





### Contacts (Bonded)

Name	Part Name(s)
Bonded:1	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1
Bonded:2	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Servo arm:5
Bonded:3	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Servo arm:2
Bonded:4	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Servo arm:6

Bonded:5	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Servo arm:4
Bonded:6	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Servo arm:3
Bonded:7	Moving platform:1 Part2:11
Bonded:8	Moving platform:1 Part2:7
Bonded:9	Moving platform:1 Part2:3
Bonded:10	Moving platform:1 Part2:9
Bonded:11	Moving platform:1 Part2:1
Bonded:12	Moving platform:1 Part2:6
Bonded:13	Part1:12 Rod qty-6:6
Bonded:14	Part1:1 Rod qty-6:1
Bonded:15	Part1:2 Rod qty-6:1
Bonded:16	Part1:8 Rod qty-6:4
Bonded:17	Part1:7 Rod qty-6:4
Bonded:18	Part1:5 Rod qty-6:3
Bonded:19	Part1:6 Rod qty-6:3
Bonded:20	Part1:9 Rod qty-6:5
Bonded:21	Part1:10 Rod qty-6:5
Bonded:22	Part1:11 Rod qty-6:6
Bonded:23	Part1:9 Rod qty-6:5
Bonded:24	Part1:8 Rod qty-6:4
Bonded:25	Part1:7 Rod qty-6:4
Bonded:26	Part1:6 Rod qty-6:3

Bonded:27	Part1:5 Rod qty-6:3
Bonded:28	Part1:12 Rod qty-6:6
Bonded:29	Part1:10 Rod qty-6:5
Bonded:30	Part1:2 Rod qty-6:1
Bonded:31	Part1:11 Rod qty-6:6
Bonded:32	Part1:1 Rod qty-6:1
Bonded:33	Moving platform:1 Test flange:1
Bonded:34	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:3
Bonded:35	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:6
Bonded:36	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:4
Bonded:37	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:7
Bonded:38	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:5
Bonded:39	Stewart Assembly:1/Bottom plate 2.5mm:1 Stewart Assembly:1/Servo:2
Bonded:40	Stewart Assembly:1/Servo arm:3 Part2:2
Bonded:41	Stewart Assembly:1/Servo arm:4 Part2:12
Bonded:42	Stewart Assembly:1/Servo arm:5 Part2:8
Bonded:43	Stewart Assembly:1/Servo arm:6 Part2:10
Bonded:44	Stewart Assembly:1/Servo arm:2 Part2:5
Bonded:45	Stewart Assembly:1/Servo arm:1 Part2:4
Bonded:46	Stewart Assembly:1/Servo arm:3 Part1:1
Bonded:47	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Servo arm:4
Bonded:48	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1

Bonded:49	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Servo arm:2
Bonded:50	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Servo arm:6
Bonded:51	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Servo arm:5
Bonded:52	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Servo arm:3
Bonded:53	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1
Bonded:54	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Servo arm:5
Bonded:55	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Servo arm:3
Bonded:56	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Servo arm:4
Bonded:57	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Servo arm:1
Bonded:58	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Servo arm:2
Bonded:59	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Servo arm:6
Bonded:60	Stewart Assembly:1/Servo:7 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:61	Stewart Assembly:1/Servo:5 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:62	Stewart Assembly:1/Servo:2 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:63	Rod qty-6:2 Part1:3
Bonded:64	Rod qty-6:2 Part1:4
Bonded:65	Stewart Assembly:1/Servo:6 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:66	Stewart Assembly:1/Servo:4 Stewart Assembly:1/Bottom plate 2.5mm:2
Bonded:67	Stewart Assembly:1/Servo:3 Stewart Assembly:1/Bottom plate 2.5mm:2

## Results

### Reaction Force and Moment on Constraints

Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Component (X,Y,Z)	Magnitude	Component (X,Y,Z)

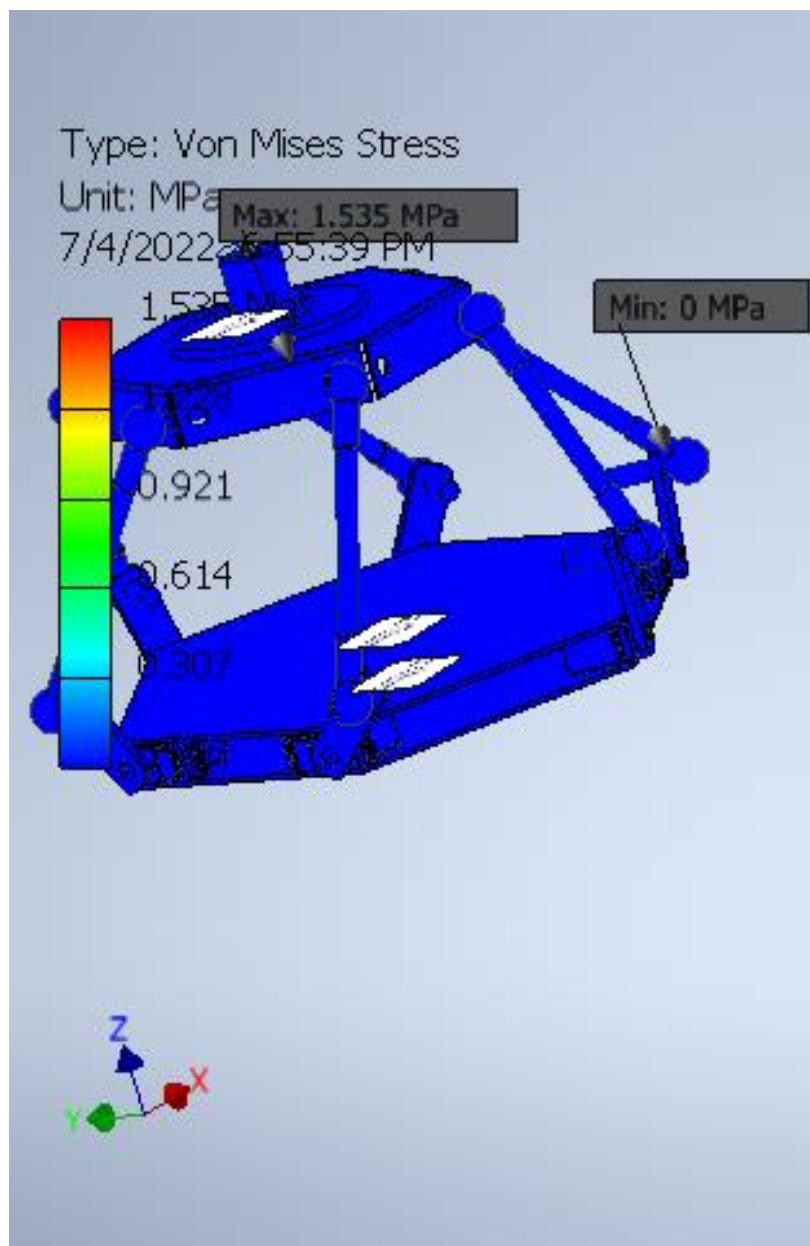
Fixed Constraint:1	149.984 N	9.02742 N	3.14652 N m	0.236996 N m
		2.14894 N		3.13702 N m
		149.696 N		-0.0594641 N m
Fixed Constraint:2	0 N	0 N	0 N m	0 N m
		0 N		0 N m
		0 N		0 N m

## Result Summary

Name	Minimum	Maximum
Volume	756379 mm <sup>3</sup>	
Mass	2.04222 kg	
Von Mises Stress	0 MPa	1.53484 MPa
1st Principal Stress	-1.43295 MPa	1.30541 MPa
3rd Principal Stress	-1.89454 MPa	0.321478 MPa
Displacement	0 mm	0.000303221 mm
Safety Factor	15 ul	15 ul
Stress XX	-1.66815 MPa	1.26927 MPa
Stress XY	-0.437543 MPa	0.435169 MPa
Stress XZ	-0.573639 MPa	0.71107 MPa
Stress YY	-1.63204 MPa	1.26054 MPa
Stress YZ	-0.617857 MPa	0.599056 MPa
Stress ZZ	-1.77654 MPa	0.830324 MPa
X Displacement	-0.0000849899 mm	0.0000650922 mm
Y Displacement	-0.0000760961 mm	0.0000736407 mm
Z Displacement	-0.000302811 mm	0.000000645084 mm
Equivalent Strain	0 ul	0.0000201963 ul
1st Principal Strain	-0.0000046014 ul	0.0000187677 ul
3rd Principal Strain	-0.0000169537 ul	0.000000000041404 ul
Strain XX	-0.00000896235 ul	0.0000148461 ul
Strain XY	-0.00000844605 ul	0.00000840022 ul
Strain XZ	-0.0000110731 ul	0.000013726 ul
Strain YY	-0.00000826524 ul	0.0000156072 ul
Strain YZ	-0.0000119267 ul	0.0000115638 ul
Strain ZZ	-0.0000141677 ul	0.0000117517 ul
Contact Pressure	0 MPa	0.345108 MPa
Contact Pressure X	-0.251382 MPa	0.271936 MPa
Contact Pressure Y	-0.28494 MPa	0.29096 MPa
Contact Pressure Z	-0.0910408 MPa	0.207692 MPa

## Figures

### Von Mises Stress



Type: Von Mises Stress

Unit: MPa

7/4/2022, 6:55:39 PM

1.535 Max

1.228

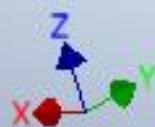
0.921

0.614

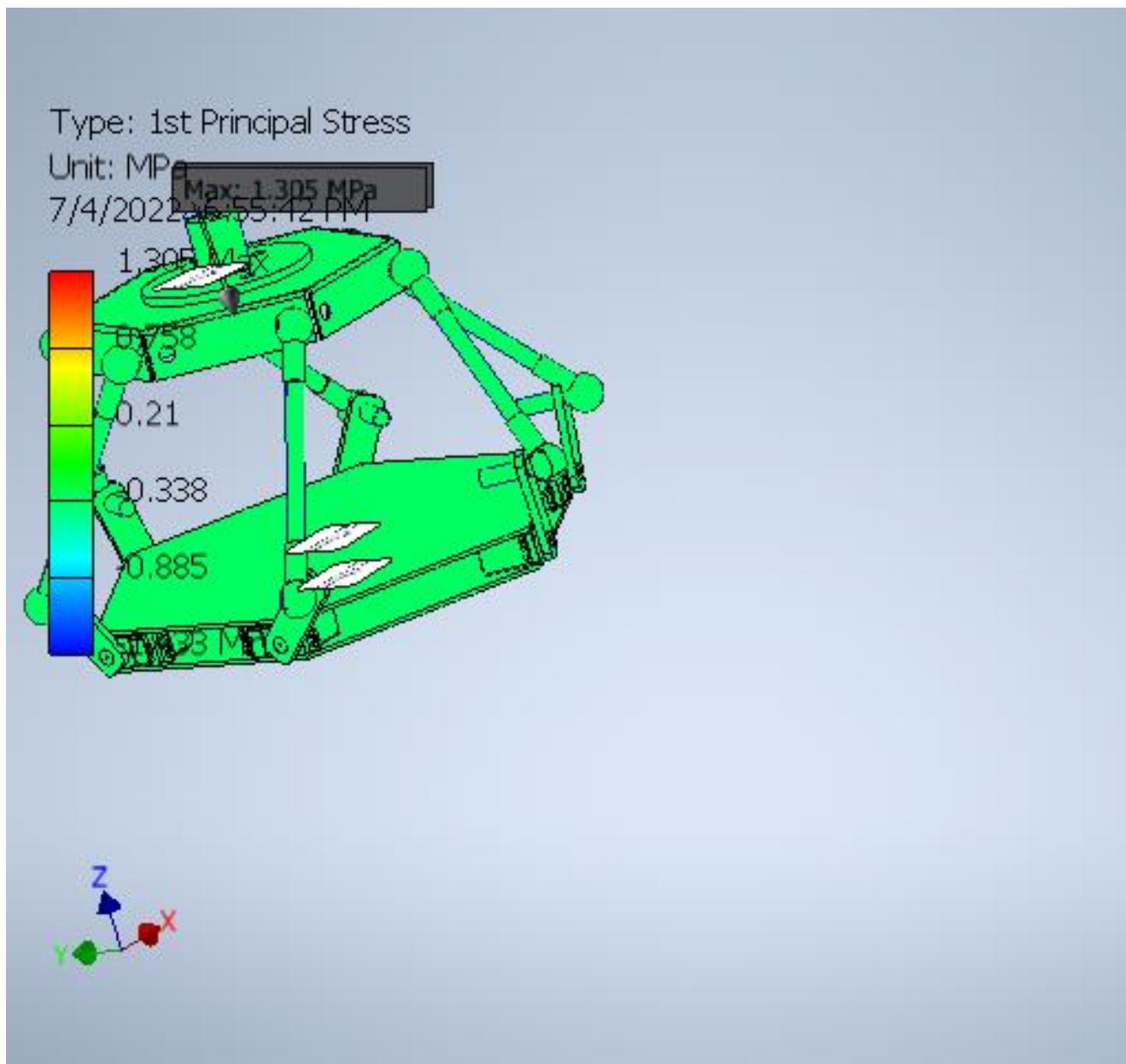
0.307

0 Min

Min: 0 MPa



**1st Principal Stress**



Type: 1st Principal Stress

Unit: MPa

7/4/2022, 6:55:42 PM

1.305 Max

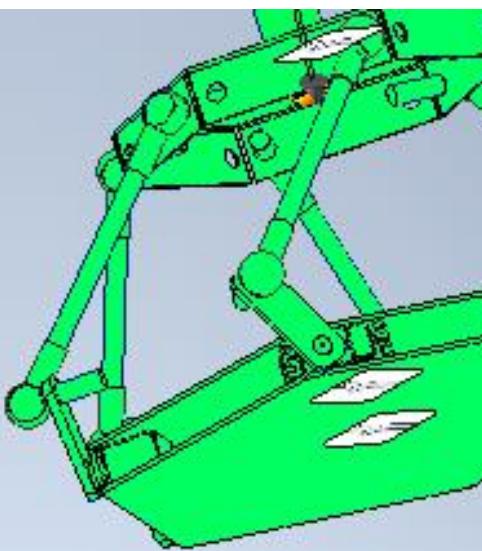
0.758

0.21

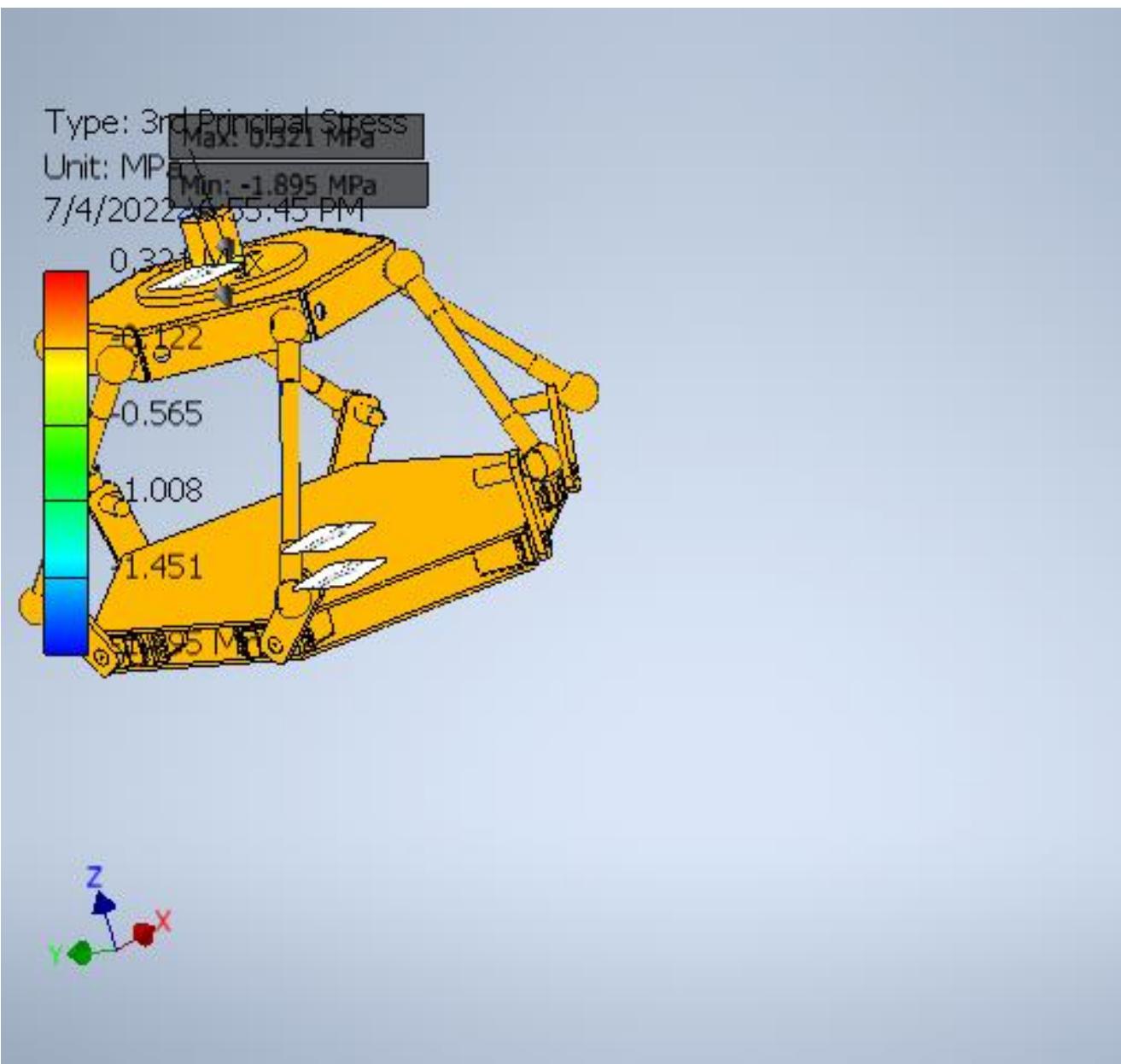
-0.338

-0.885

-1.433 Min



**3rd Principal Stress**



Type: 3rd Principal Stress

Unit: MPa

7/4/2022, 6:55:45 PM

0.321 Max

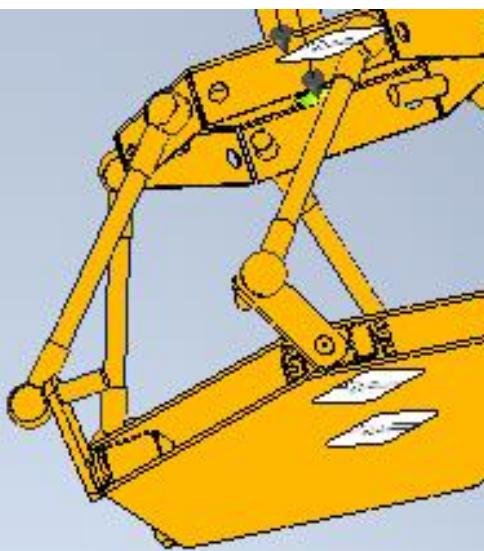
-0.122

-0.565

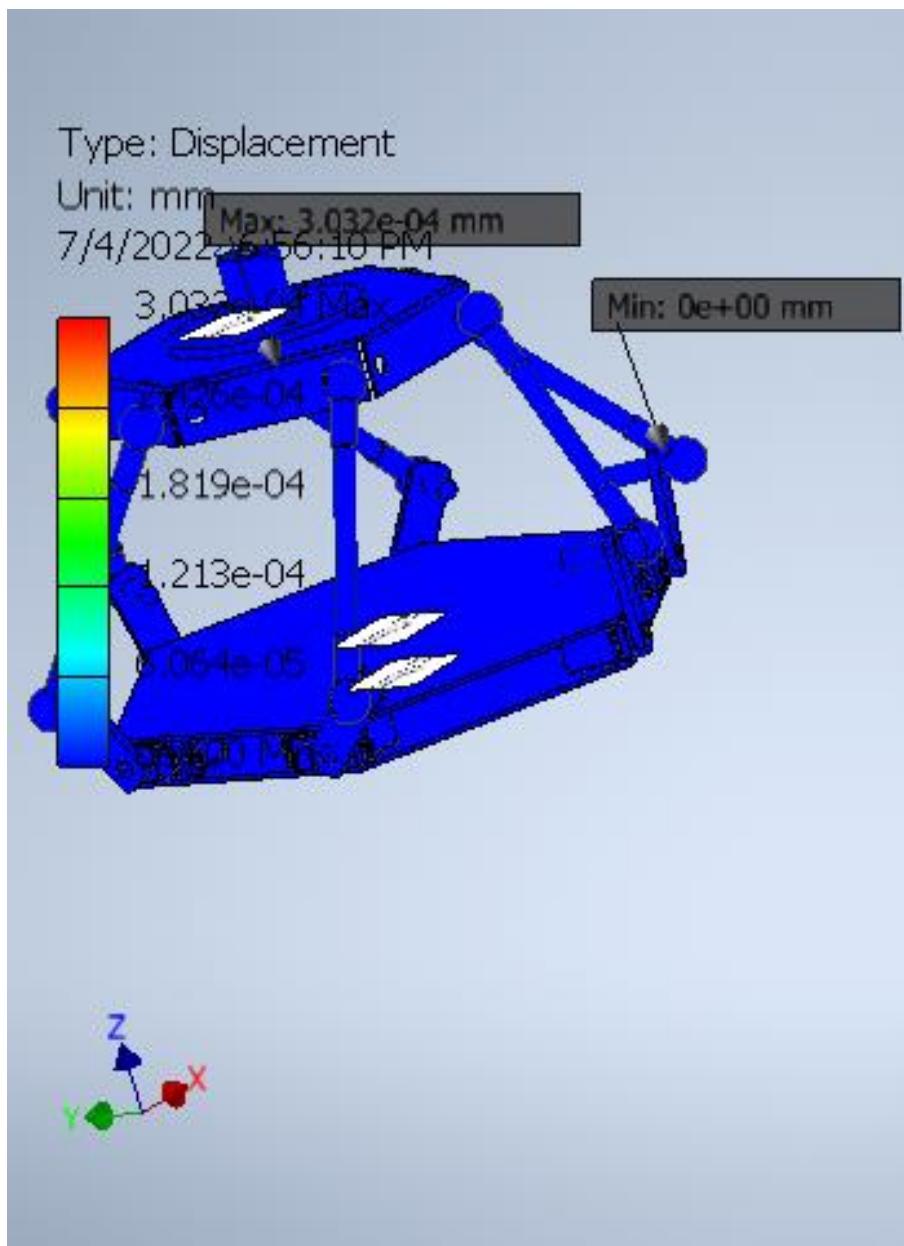
-1.008

-1.451

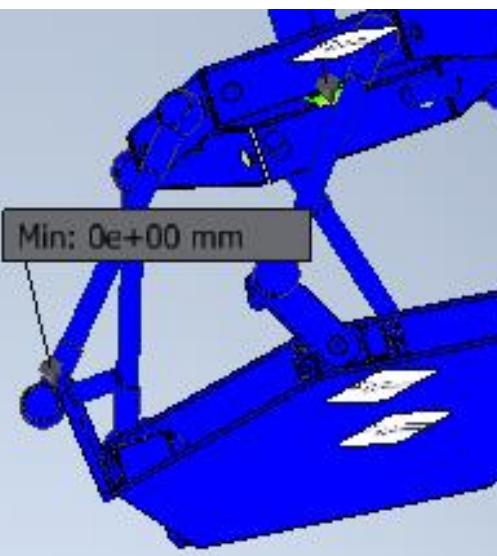
-1.895 Min



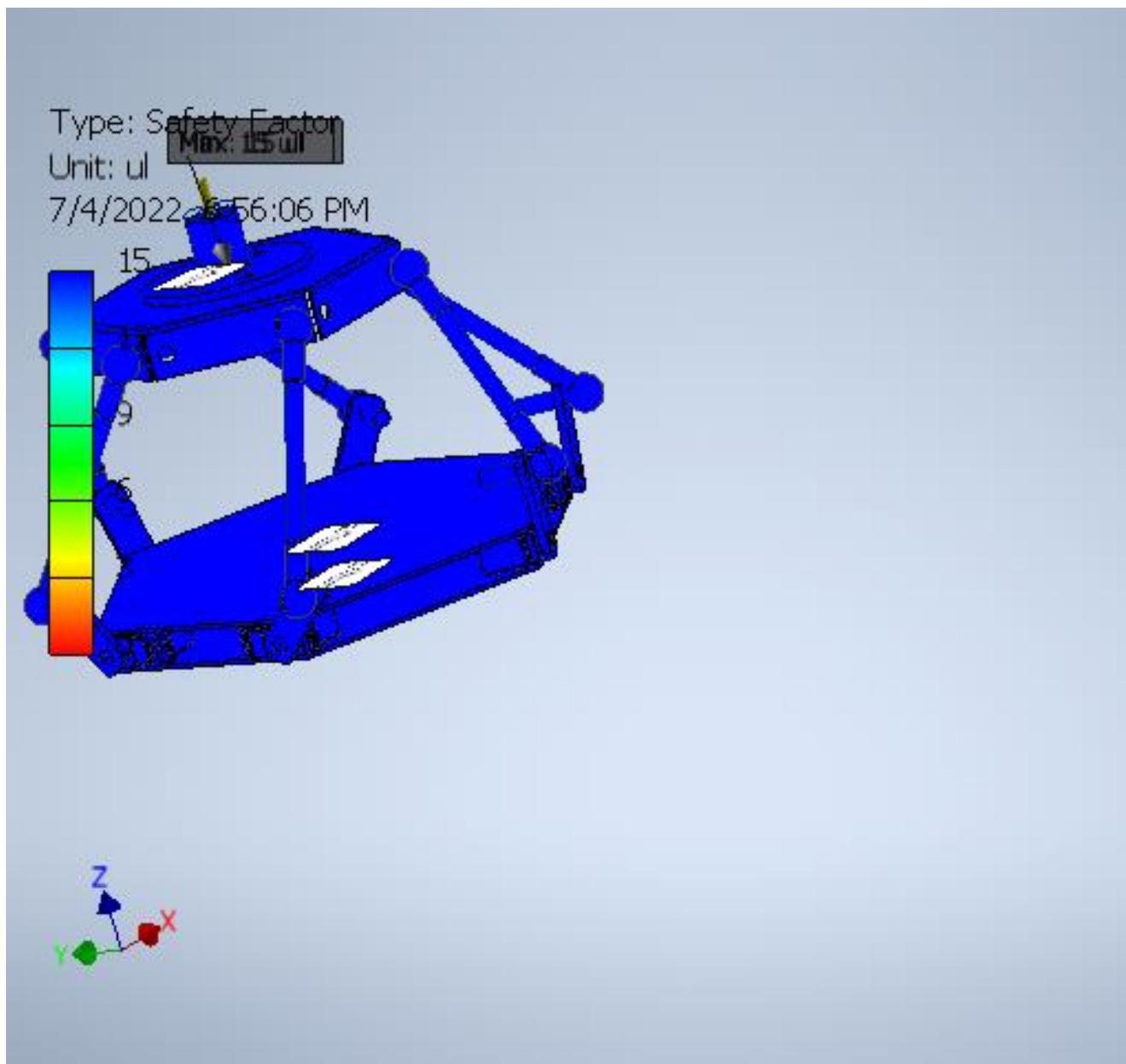
**Displacement**



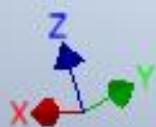
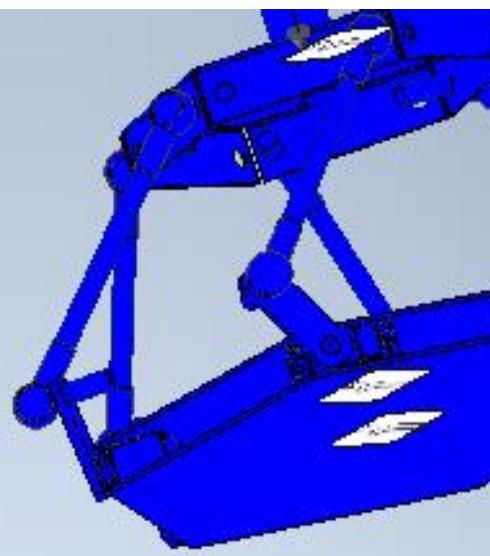
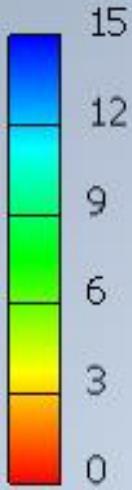
Type: Displacement  
Unit: mm  
7/4/2022, 6:56:10 PM  
3.032e-04 Max  
2.426e-04  
1.819e-04  
1.213e-04  
6.064e-05  
0e+00 Min



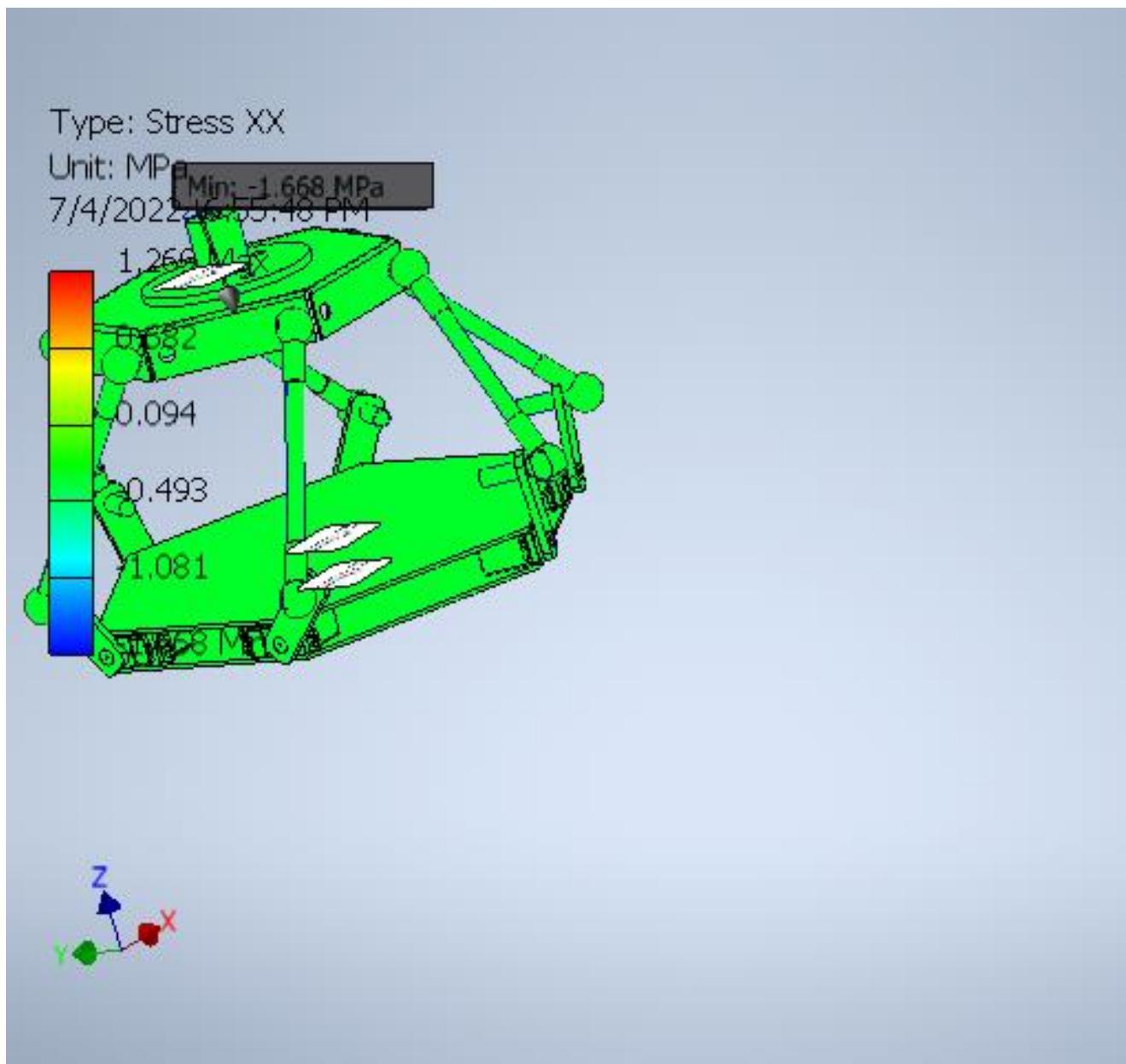
### Safety Factor



Type: Safety Factor  
Unit: ul  
7/4/2022, 6:56:06 PM



**Stress XX**



Type: Stress XX  
Unit: MPa  
7/4/2022, 6:55:48 PM

1.269 Max

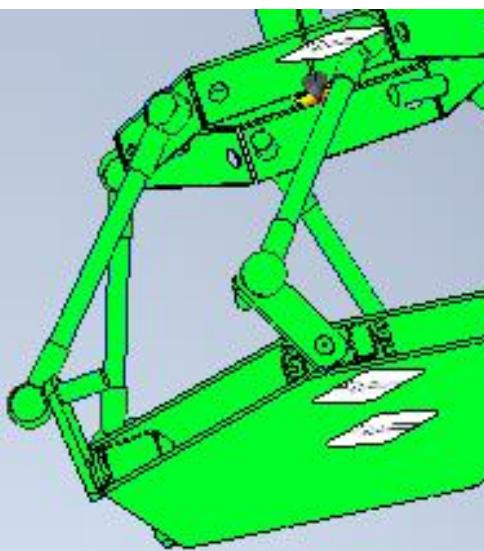
0.682

0.094

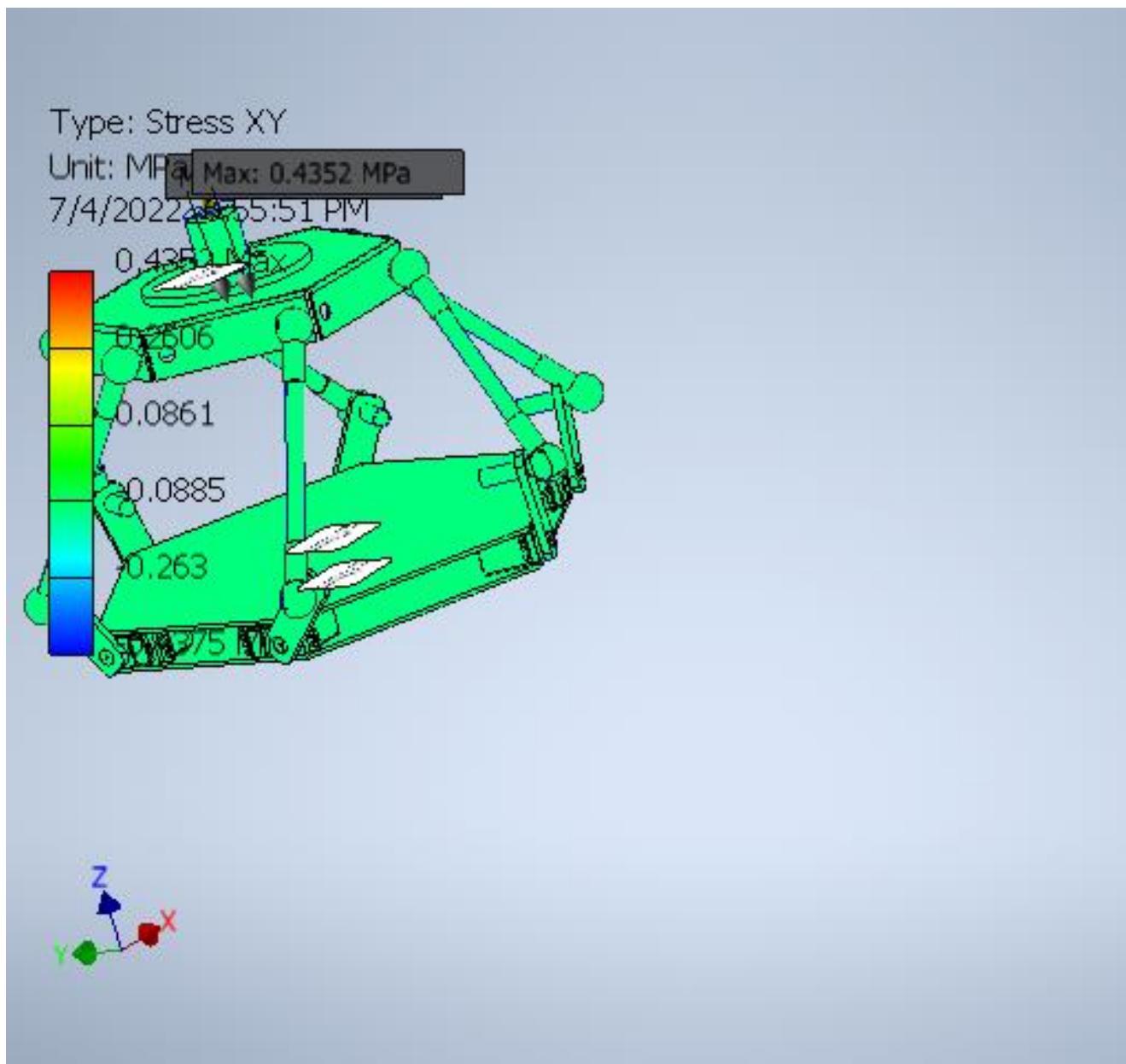
-0.493

-1.081

-1.668 Min



**Stress XY**



Type: Stress XY  
Unit: MPa  
7/4/2022, 6:55:51 PM

0.4352 Max

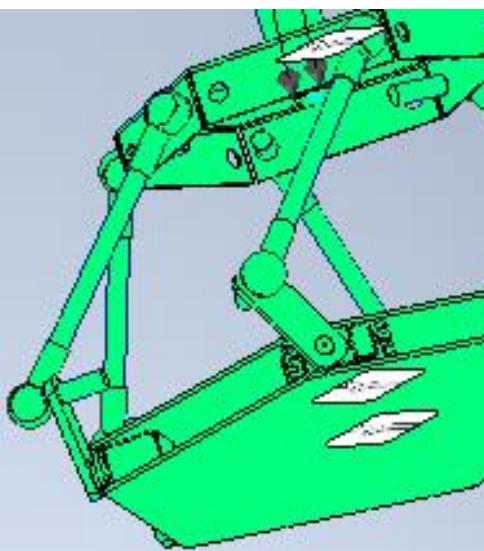
0.2606

0.0861

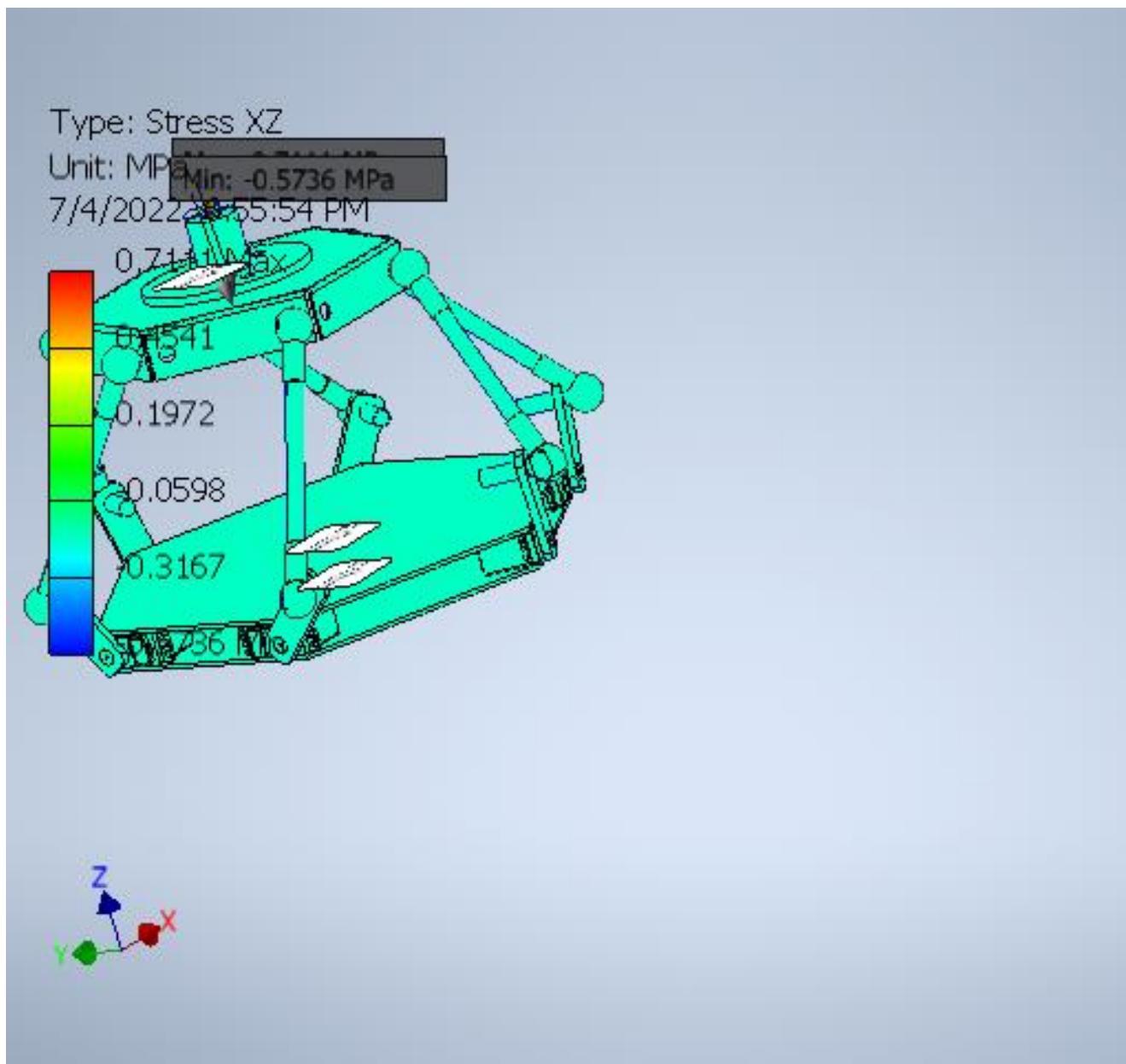
-0.0885

-0.263

-0.4375 Min

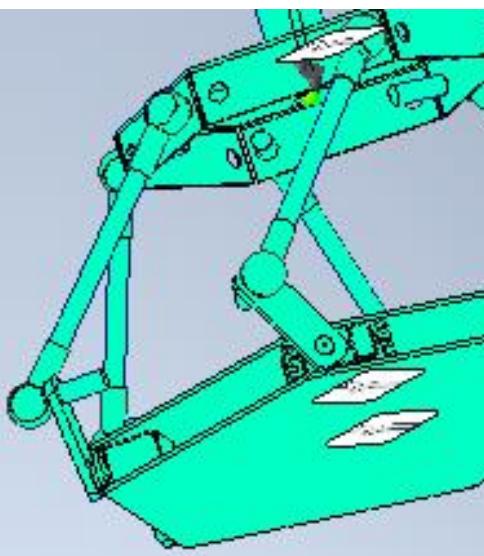
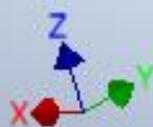


**Stress XZ**

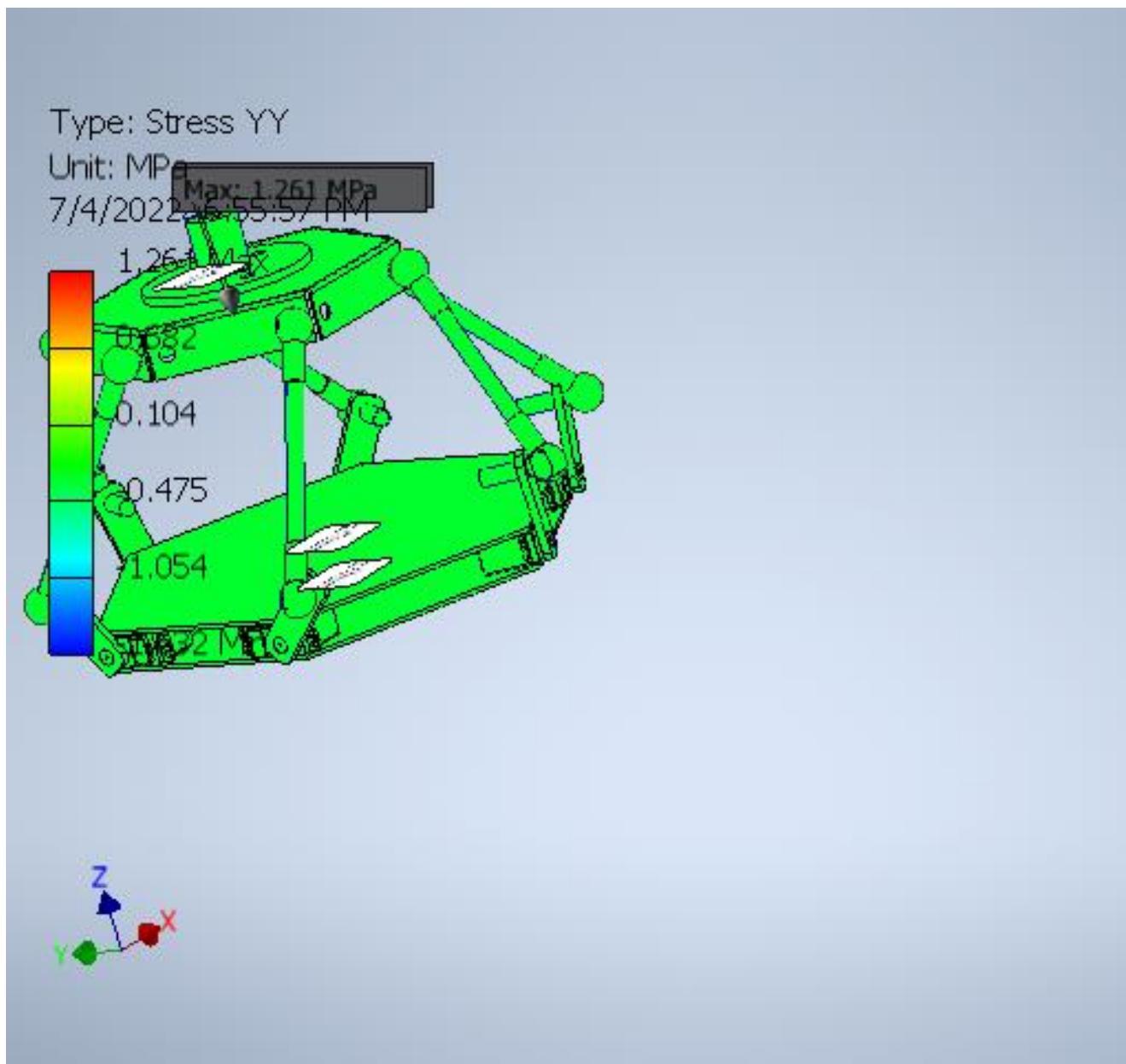


Type: Stress XZ  
Unit: MPa  
7/4/2022, 6:55:54 PM

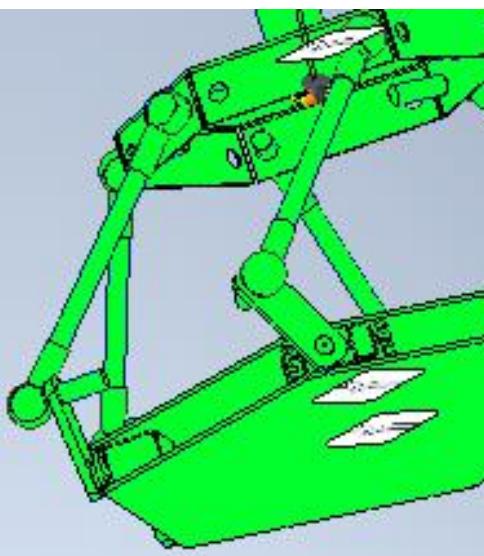
0.7111 Max  
0.4541  
0.1972  
-0.0598  
-0.3167  
-0.5736 Min



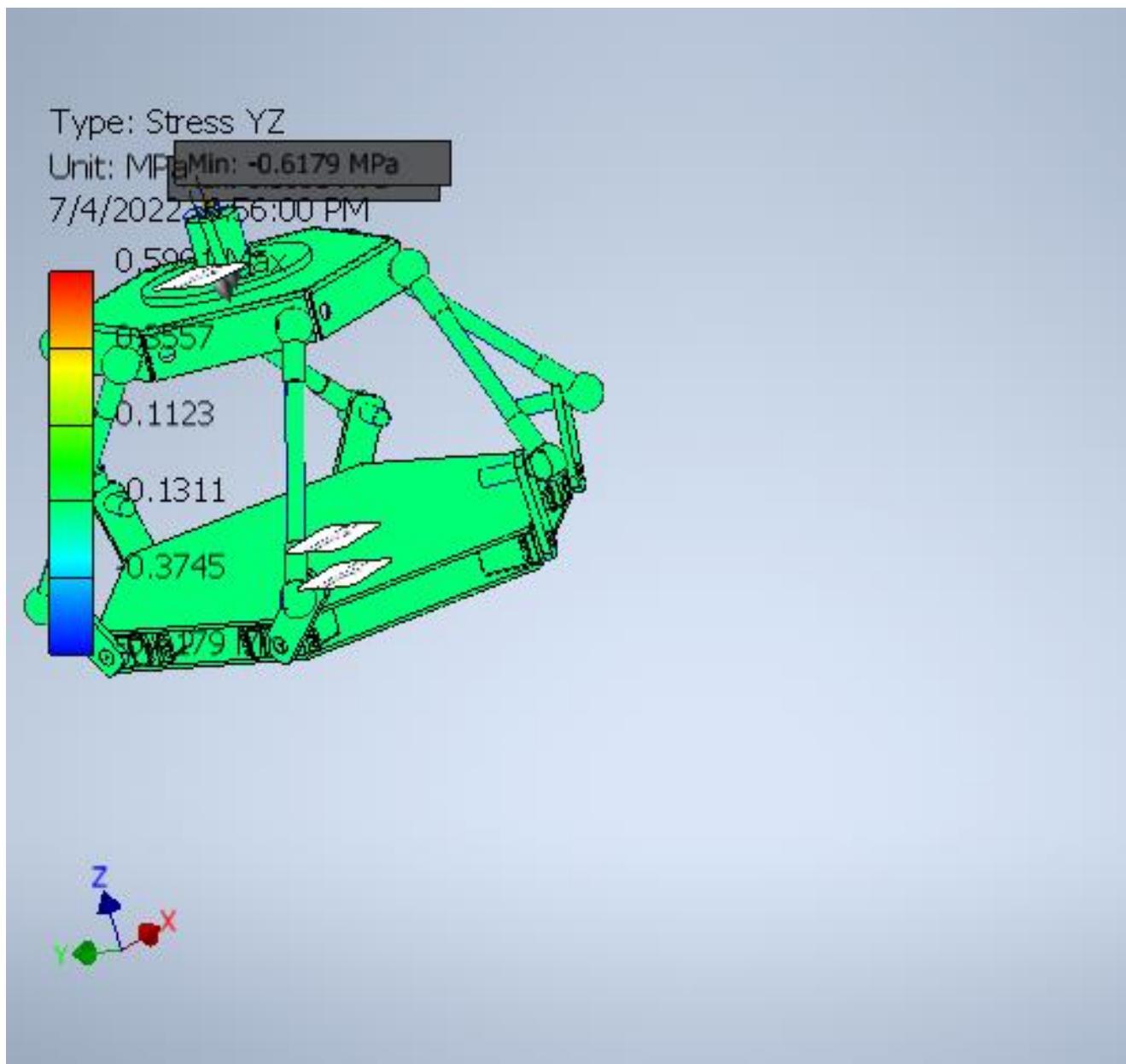
**Stress YY**



Type: Stress YY  
Unit: MPa  
7/4/2022, 6:55:57 PM  
1.261 Max  
0.682  
0.104  
-0.475  
-1.054  
-1.632 Min

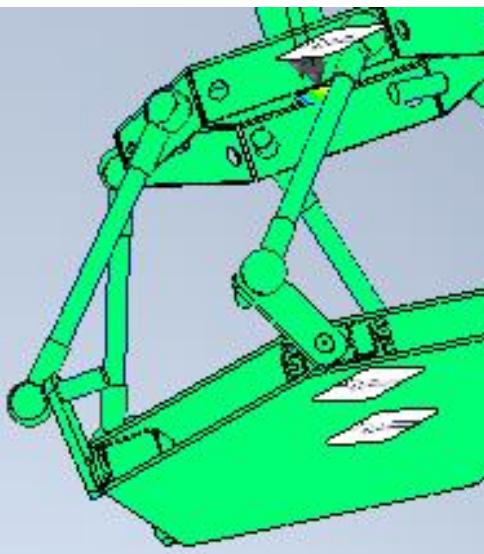
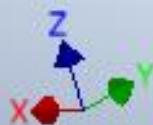


**Stress YZ**

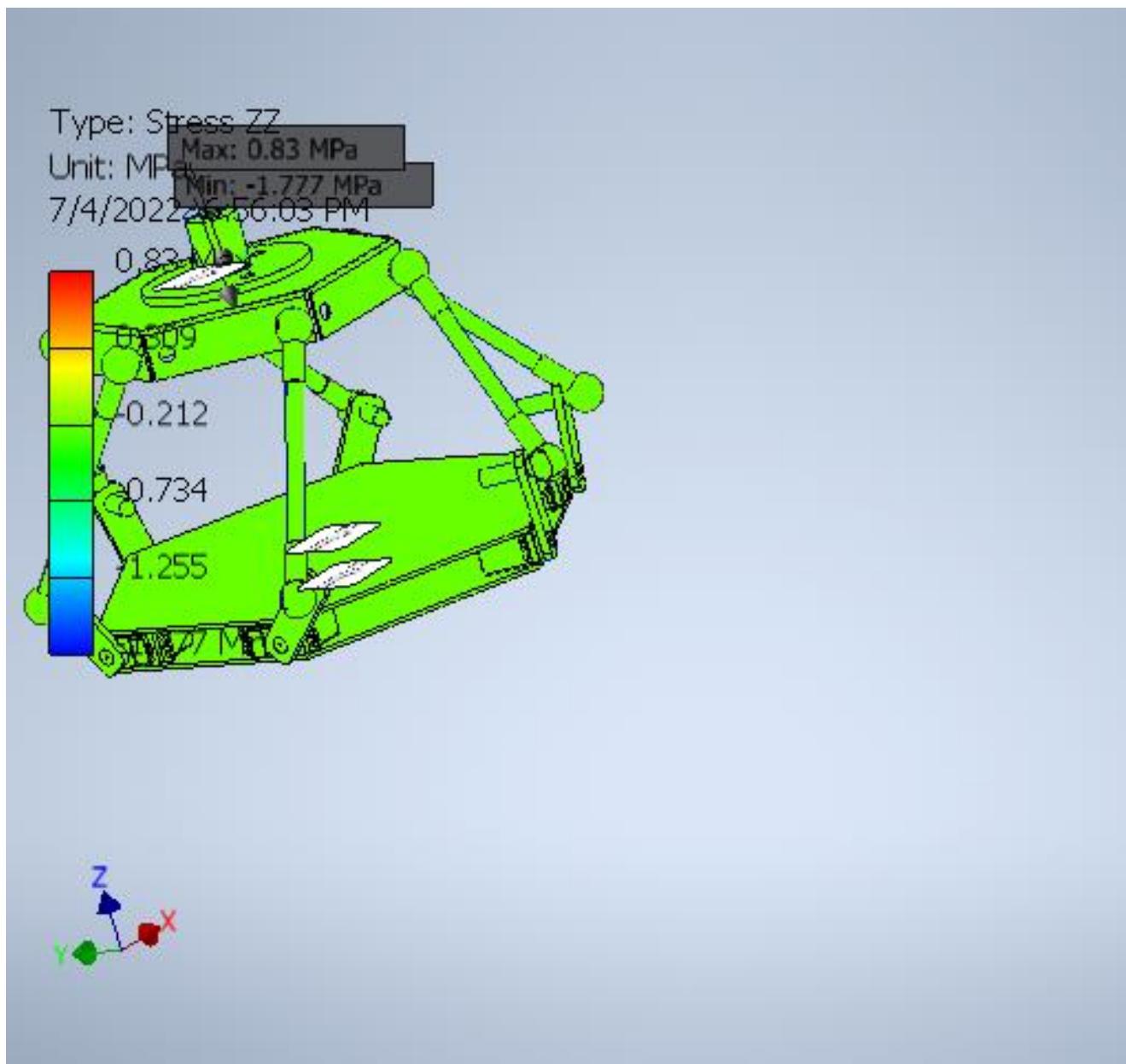


Type: Stress YZ  
Unit: MPa  
7/4/2022, 6:56:00 PM

0.5991 Max  
0.3557  
0.1123  
-0.1311  
-0.3745  
-0.6179 Min

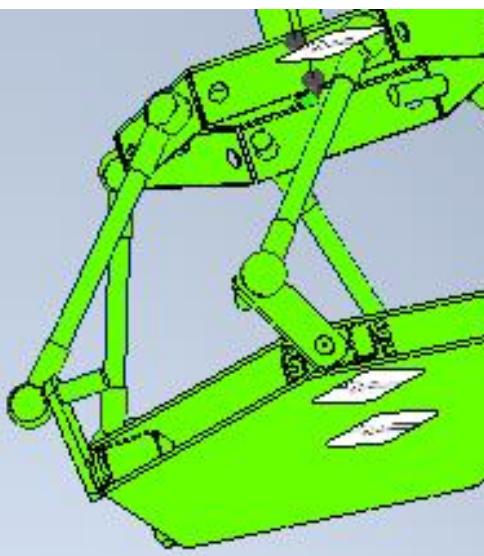
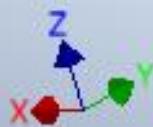


**Stress ZZ**

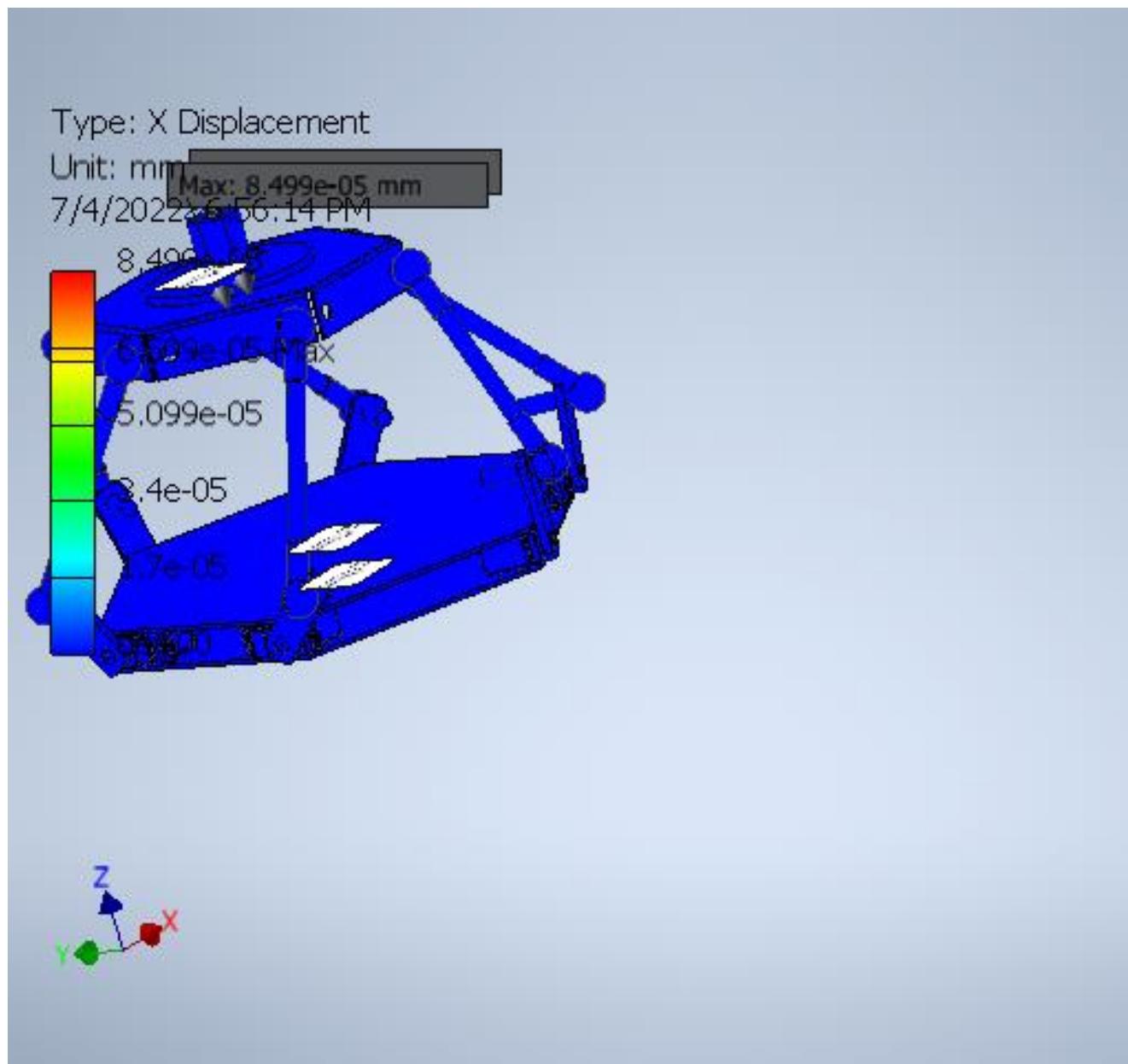


Type: Stress ZZ  
Unit: MPa  
7/4/2022, 6:56:03 PM

0.83 Max  
0.309  
-0.212  
-0.734  
-1.255  
-1.777 Min



**X Displacement**



Type: X Displacement

Unit: mm

7/4/2022, 6:56:14 PM

8.499e-05

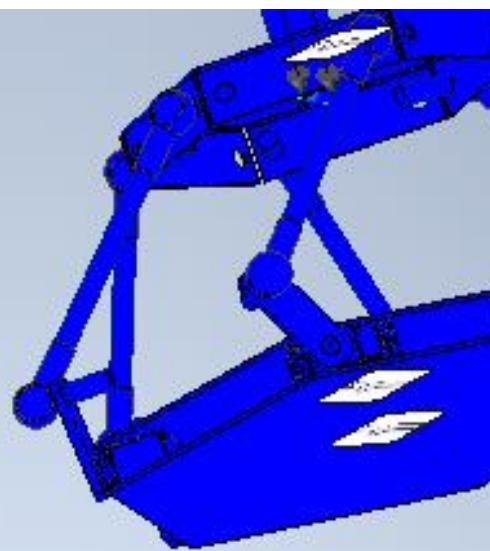
6.509e-05 Max

5.099e-05

3.4e-05

1.7e-05

0e+00

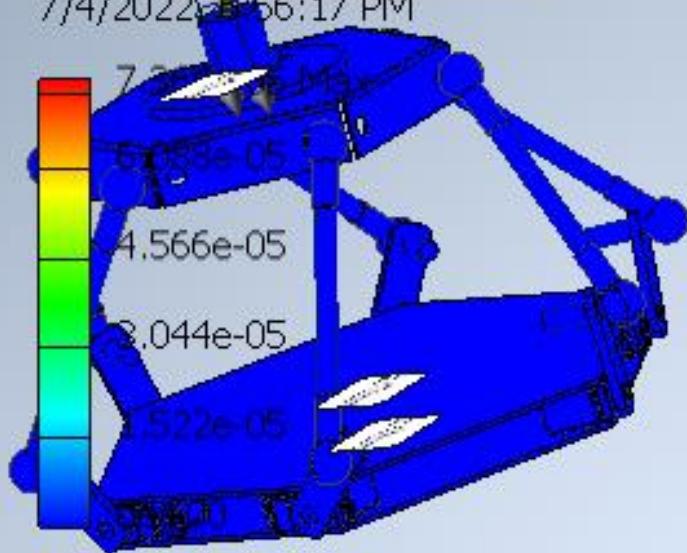


**X Displacement**

Type: Y Displacement

Unit: m Max: 7.61e-05 mm

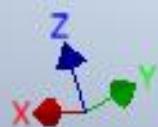
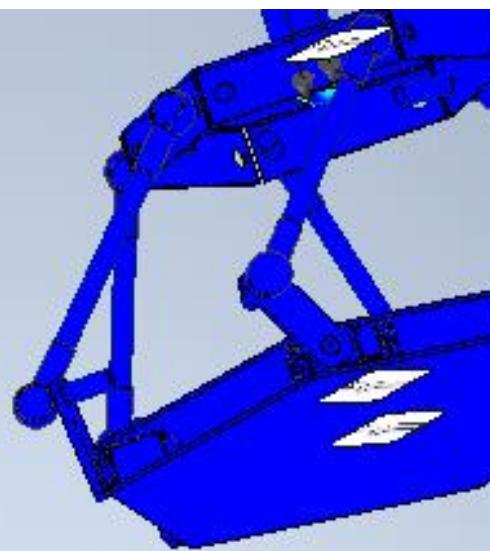
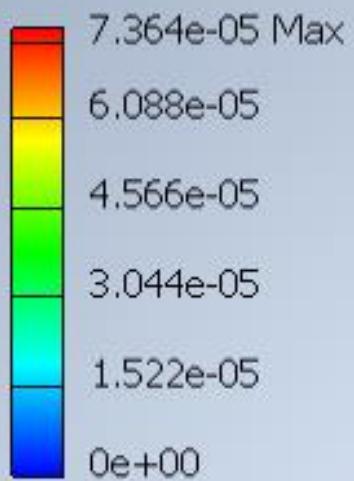
7/4/2022 2:56:17 PM



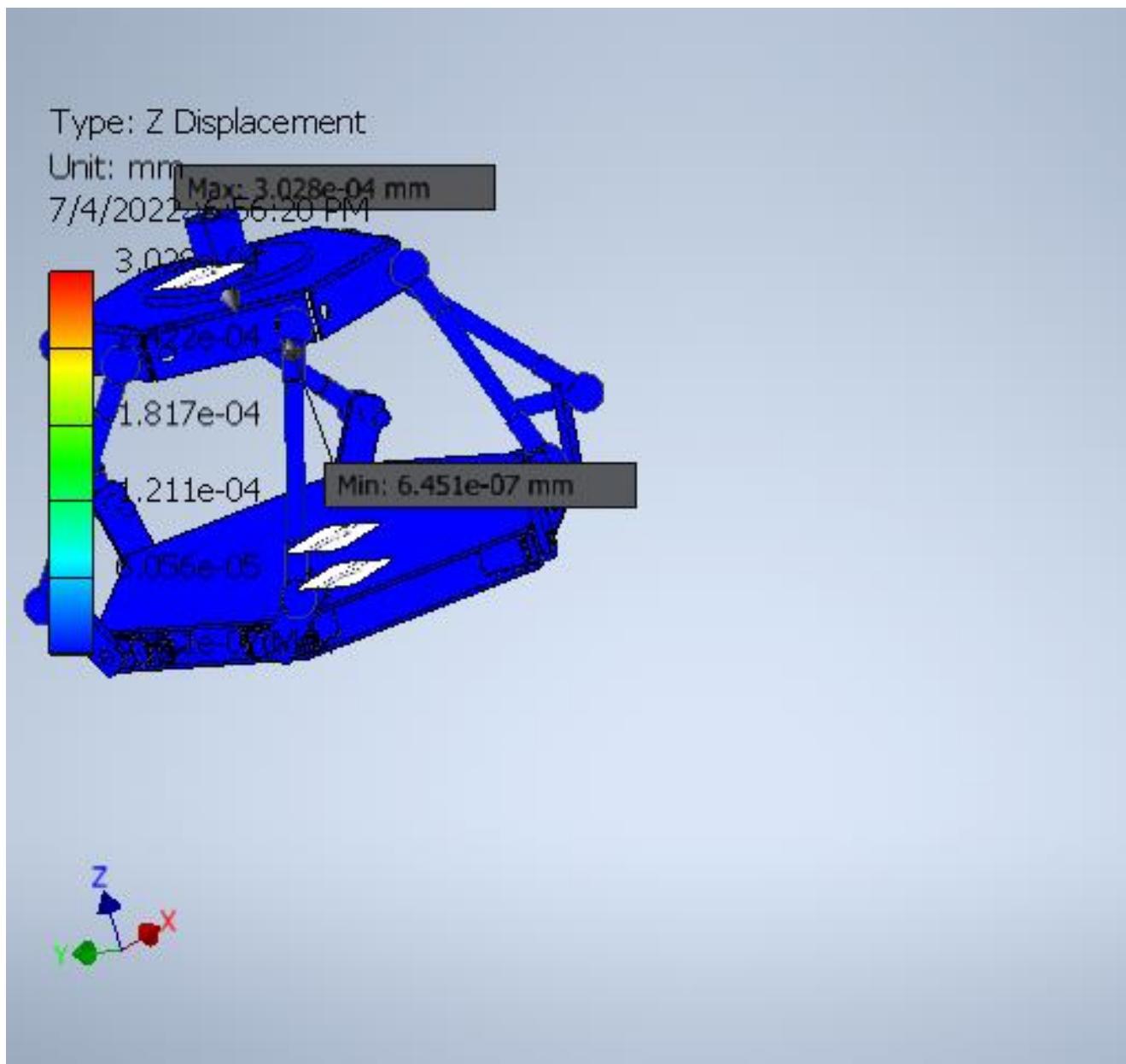
Type: Y Displacement

Unit: mm

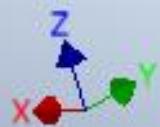
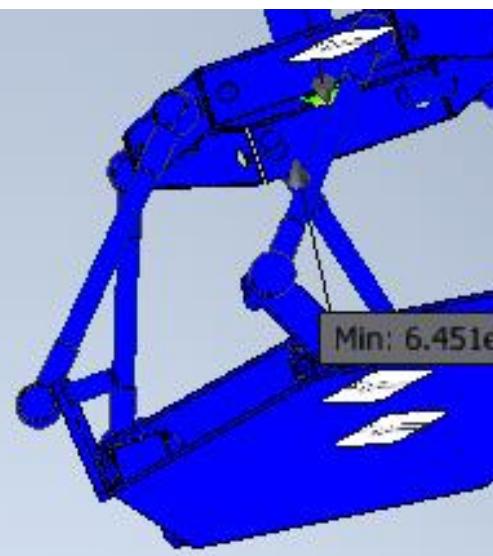
7/4/2022, 6:56:17 PM



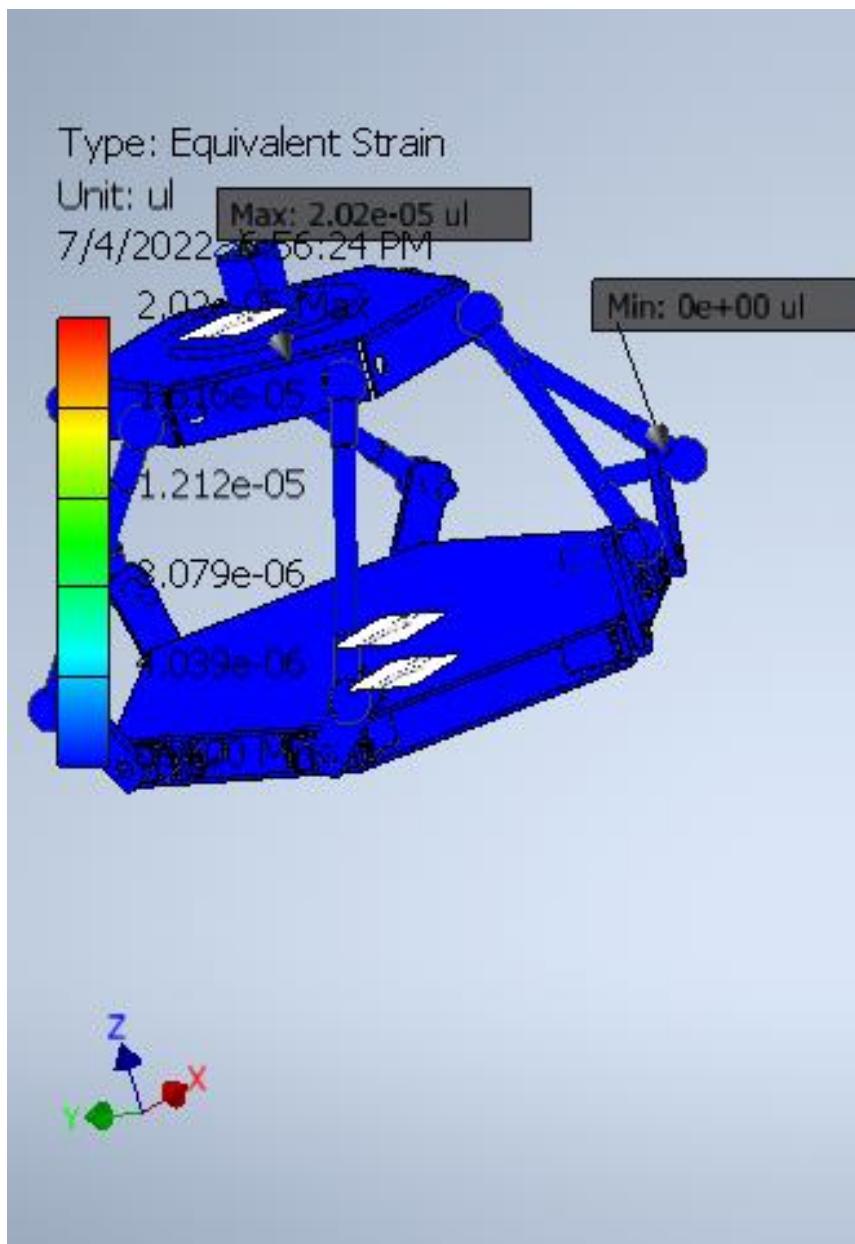
**Z Displacement**



Type: Z Displacement  
Unit: mm  
7/4/2022, 6:56:20 PM  
3.028e-04  
2.422e-04  
1.817e-04  
1.211e-04  
6.056e-05  
6.451e-07 Max



**Equivalent Strain**



Type: Equivalent Strain

Unit:  $\mu\epsilon$

7/4/2022, 6:56:24 PM

2.02e-05 Max

1.616e-05

1.212e-05

8.079e-06

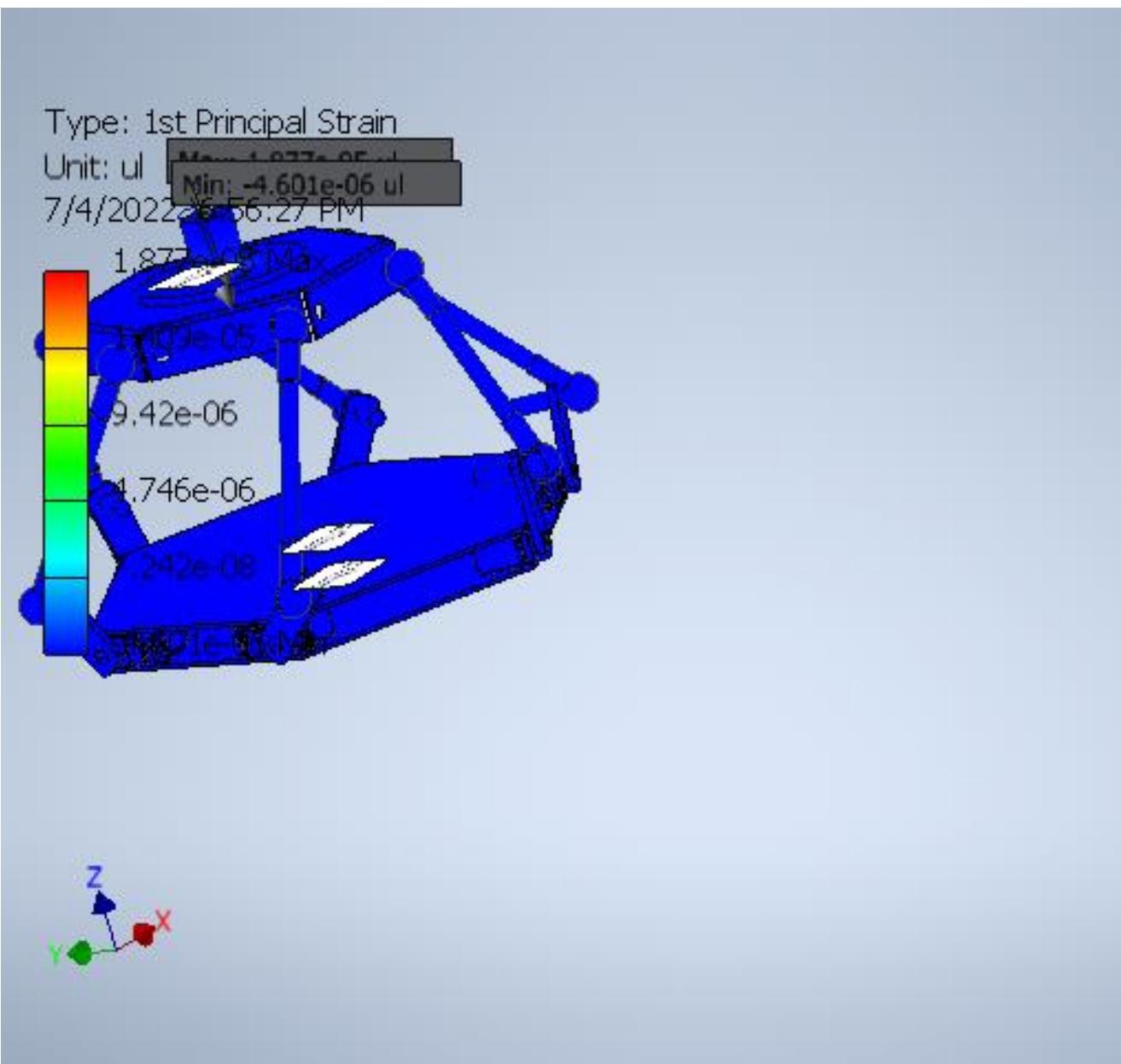
4.039e-06

0e+00 Min

Min: 0e+00  $\mu\epsilon$



**1st Principal Strain**



Type: 1st Principal Strain

Unit: ul

7/4/2022, 6:56:27 PM

1.877e-05 Max

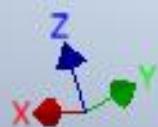
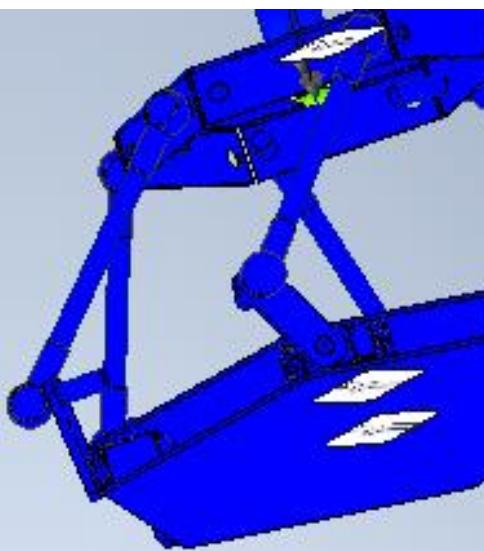
1.409e-05

9.42e-06

4.746e-06

7.242e-08

-4.601e-06 Min



**3rd Principal Strain**

Type: 3rd Principal Strain

Unit:  $\mu\epsilon$  Min: -1.695e-05  $\mu\epsilon$

7/4/2022 3:56:31 PM



Type: 3rd Principal Strain

Unit:  $\mu\epsilon$

7/4/2022, 6:56:31 PM

4.14e-11 Max

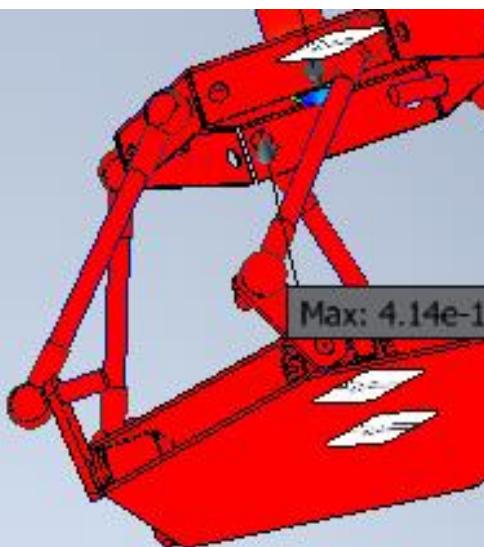
-3.391e-06

-6.781e-06

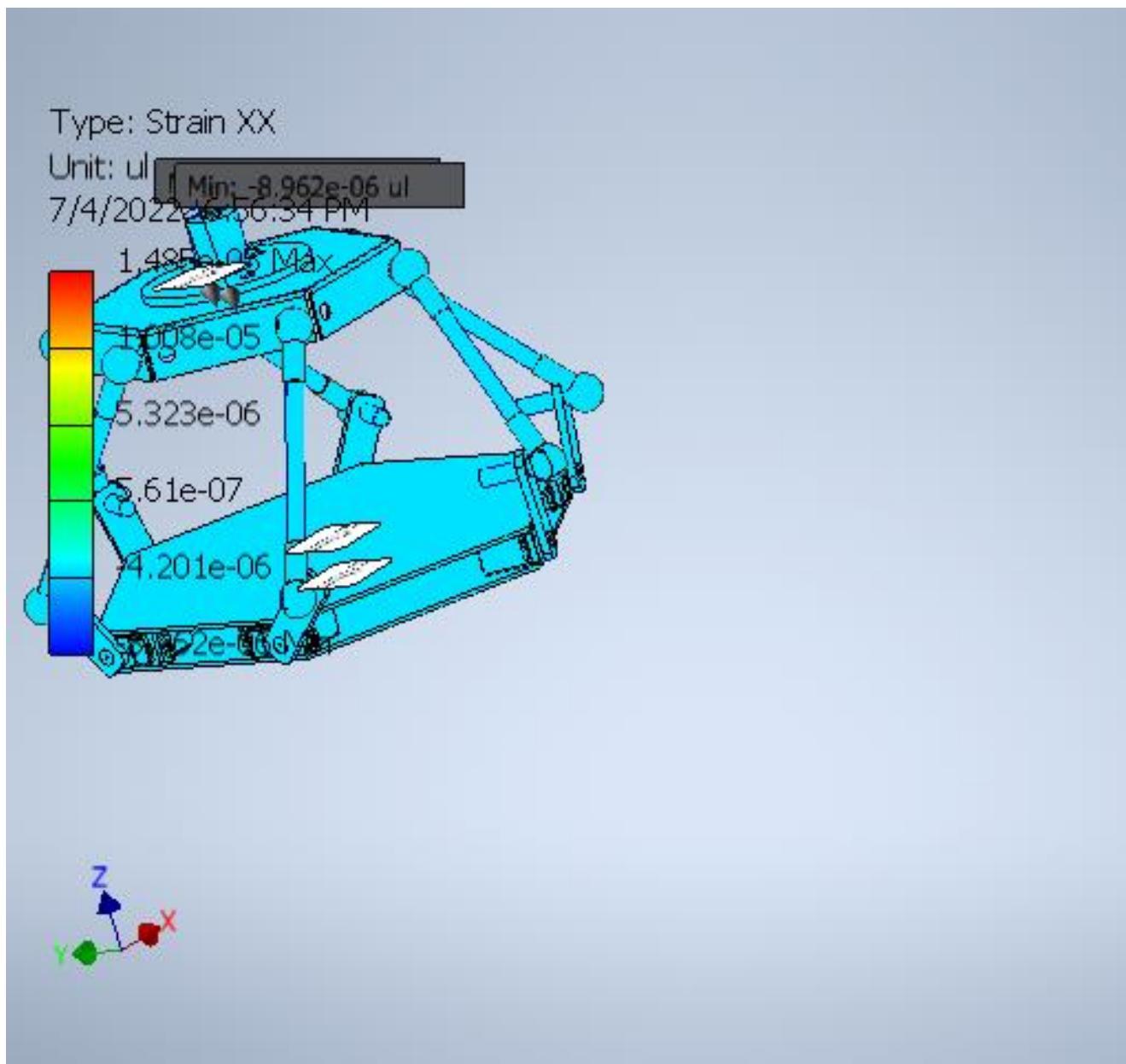
-1.017e-05

-1.356e-05

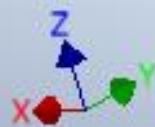
-1.695e-05 Min



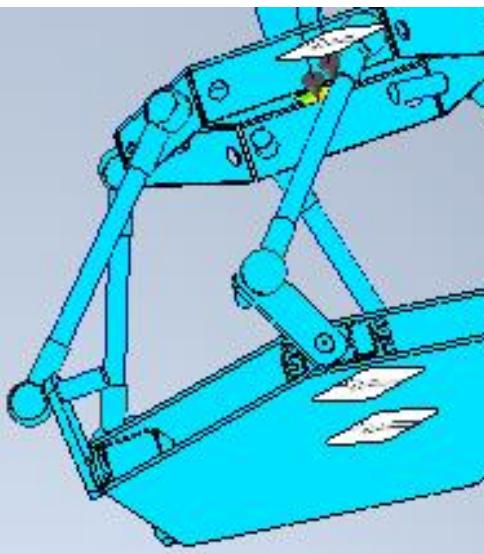
**Strain XX**

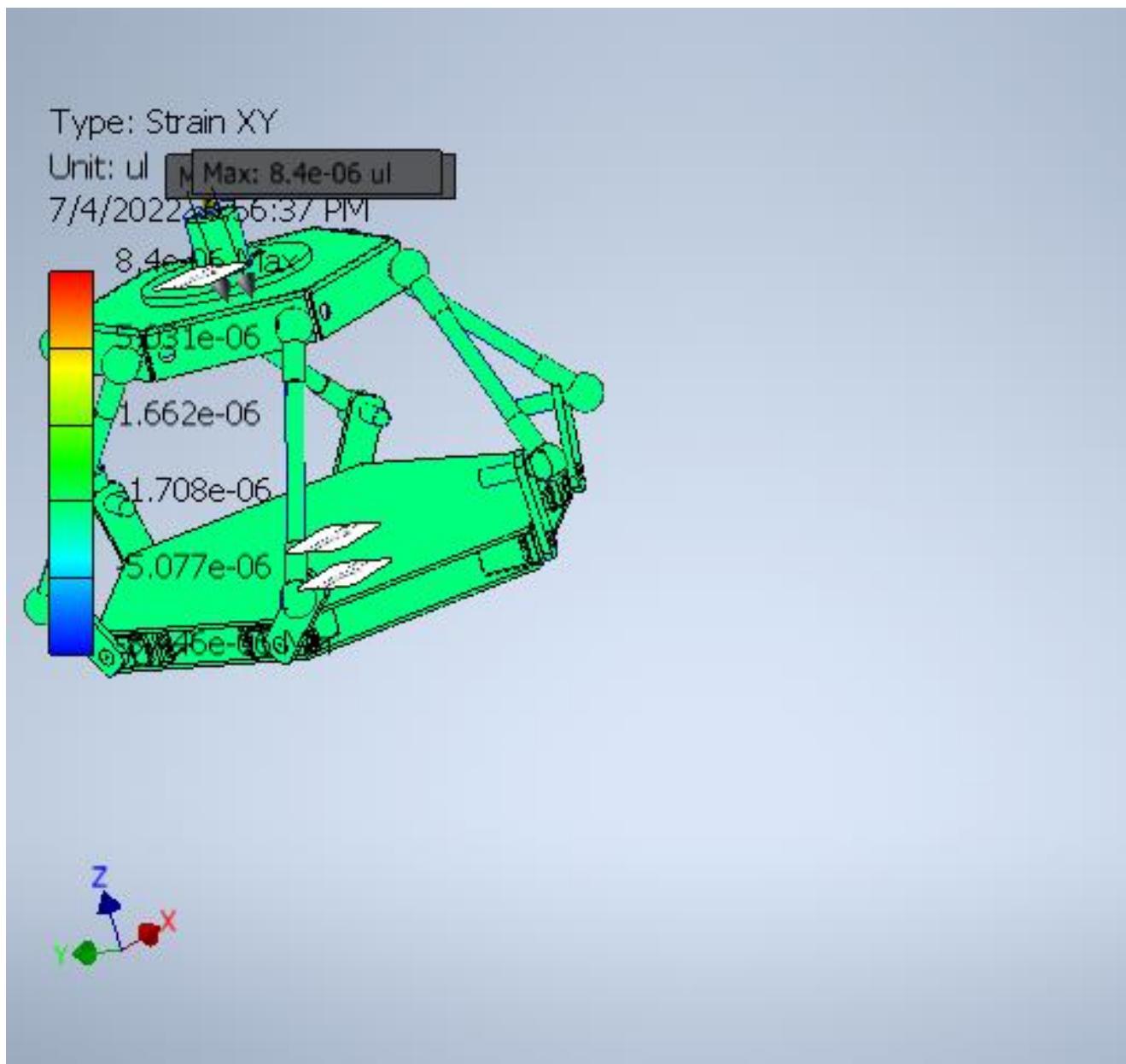


Type: Strain XX  
Unit:  $\mu\epsilon$   
7/4/2022, 6:56:34 PM  
1.485e-05 Max  
1.008e-05  
5.323e-06  
5.61e-07  
-4.201e-06  
-8.962e-06 Min

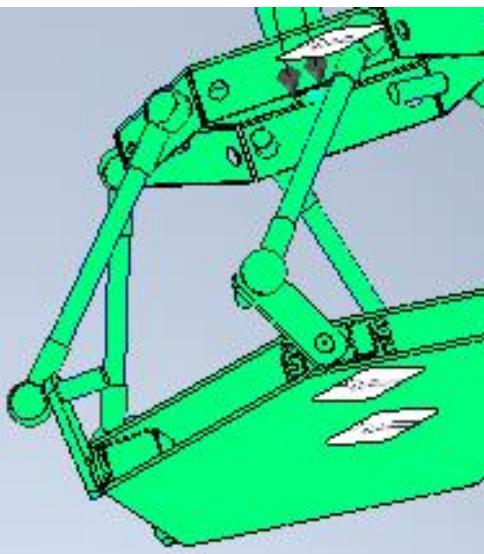
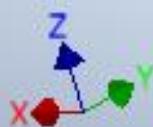


**Strain XY**

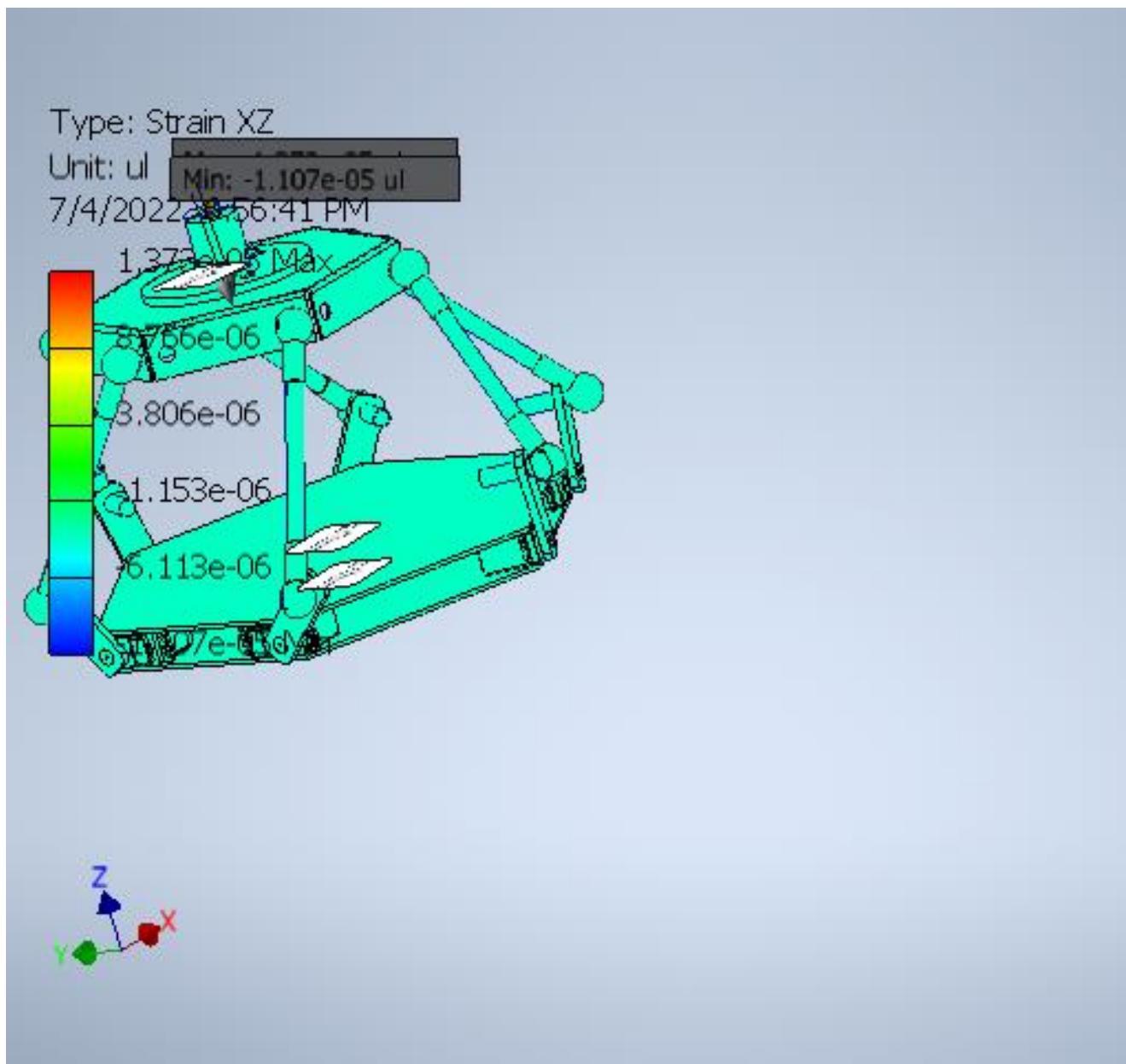




Type: Strain XY  
Unit:  $\mu\epsilon$   
7/4/2022, 6:56:37 PM  
8.4e-06 Max  
5.031e-06  
1.662e-06  
-1.708e-06  
-5.077e-06  
-8.446e-06 Min



**Strain XZ**



Type: Strain XZ

Unit:  $\mu\epsilon$

7/4/2022, 6:56:41 PM

1.373e-05 Max

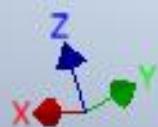
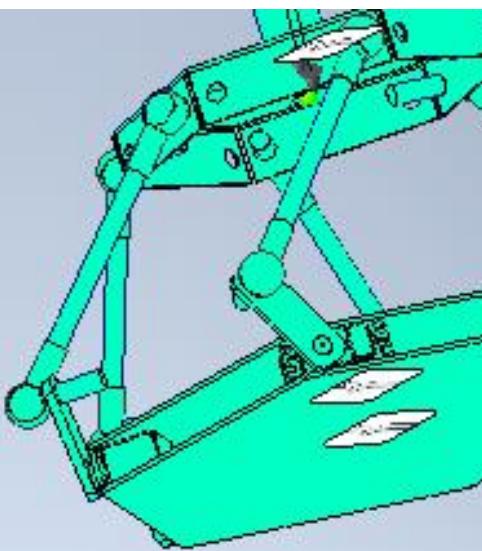
8.766e-06

3.806e-06

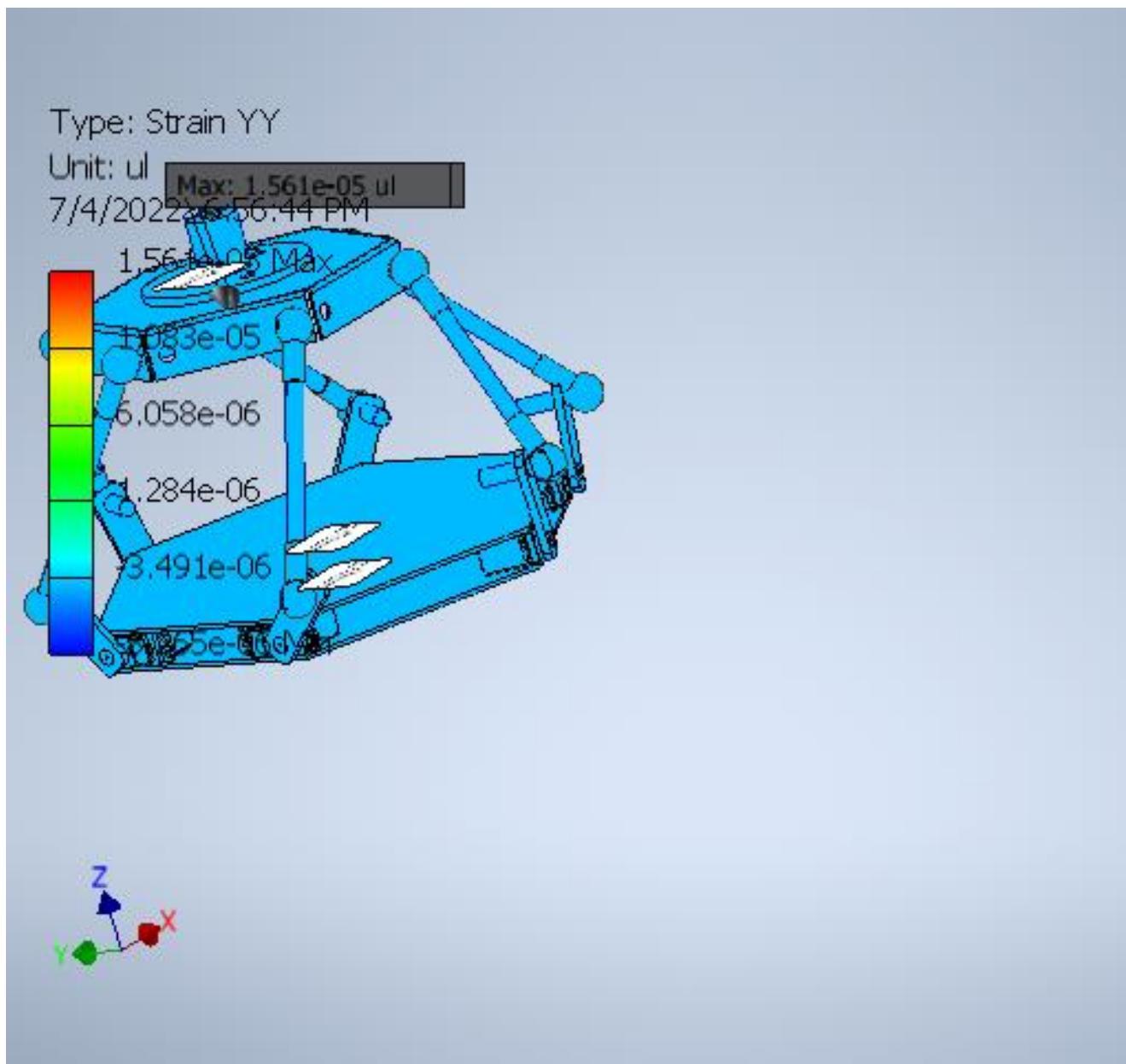
-1.153e-06

-6.113e-06

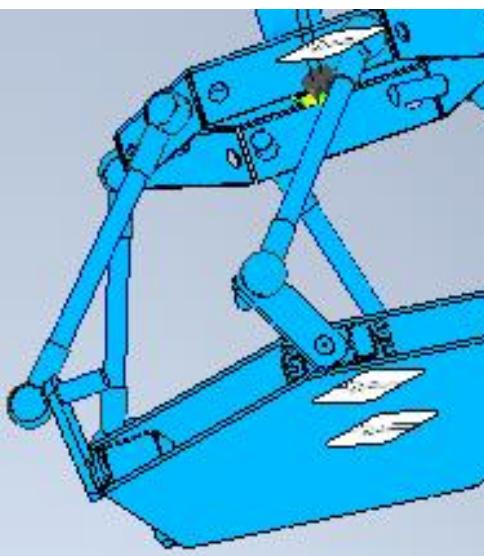
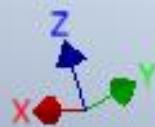
-1.107e-05 Min



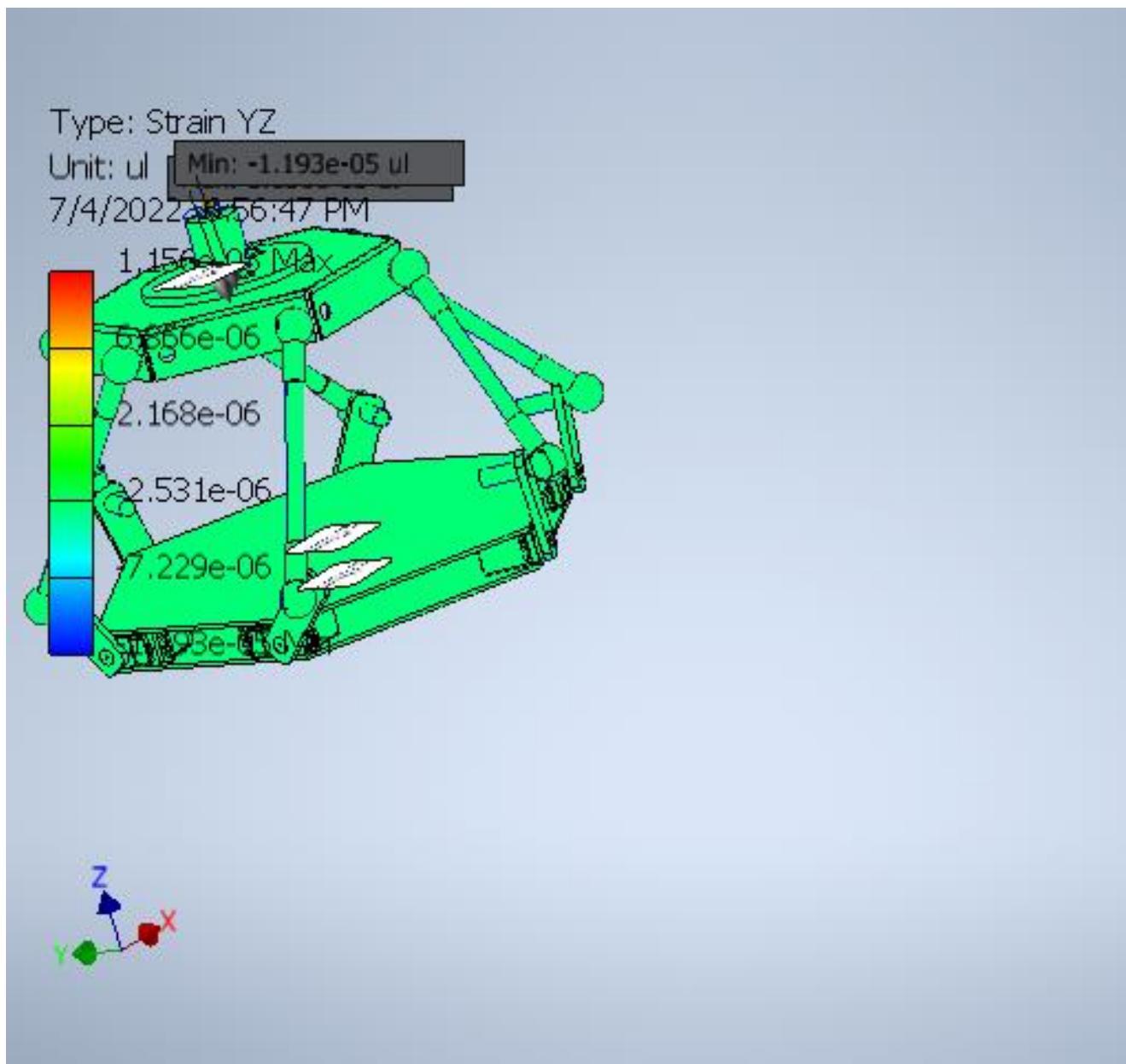
**Strain YY**



Type: Strain YY  
Unit:  $\mu\epsilon$   
7/4/2022, 6:56:44 PM  
1.561e-05 Max  
1.083e-05  
6.058e-06  
1.284e-06  
-3.491e-06  
-8.265e-06 Min



**Strain YZ**



Type: Strain YZ

Unit:  $\mu\epsilon$

7/4/2022, 6:56:47 PM

1.156e-05 Max

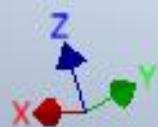
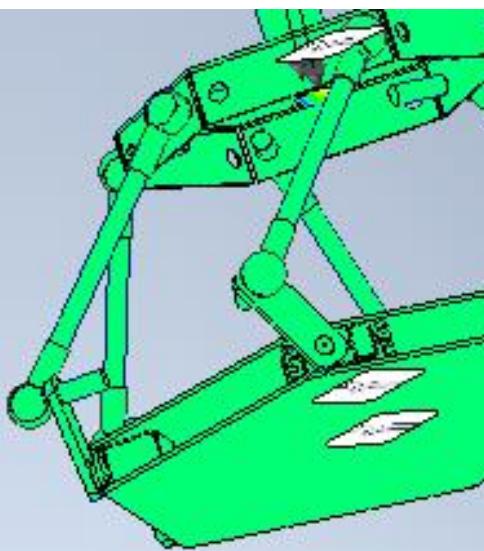
6.866e-06

2.168e-06

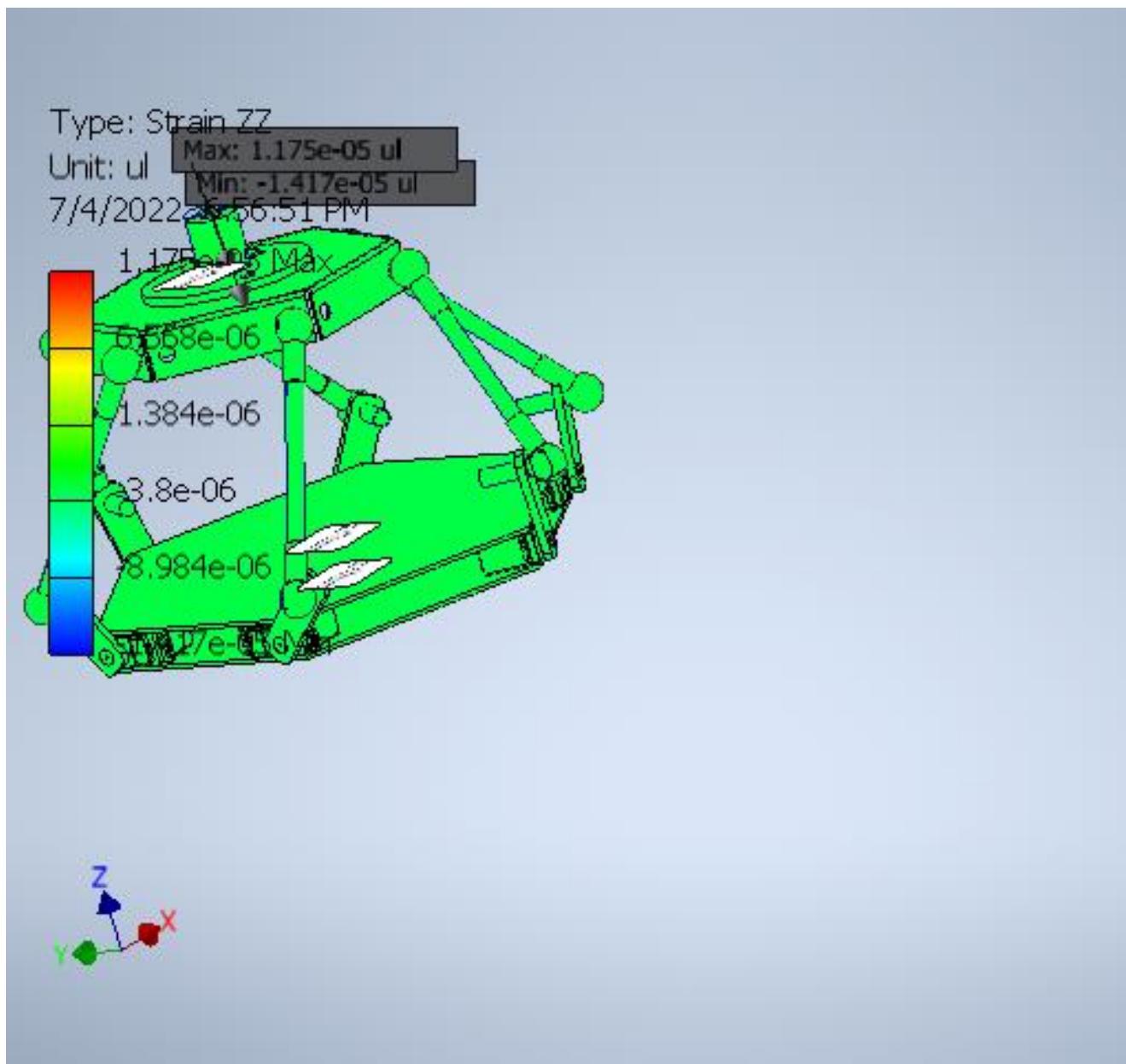
-2.531e-06

-7.229e-06

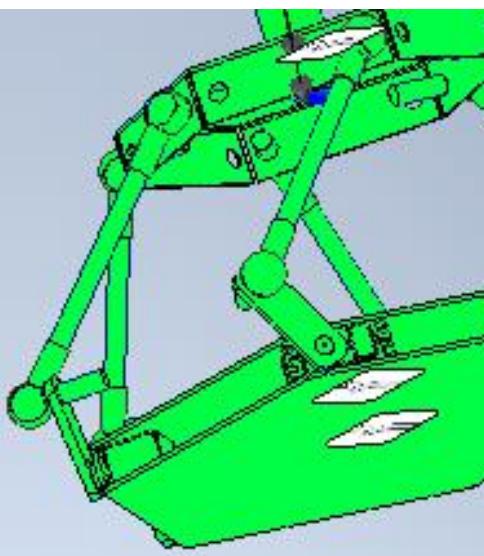
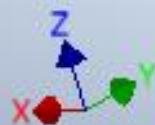
-1.193e-05 Min



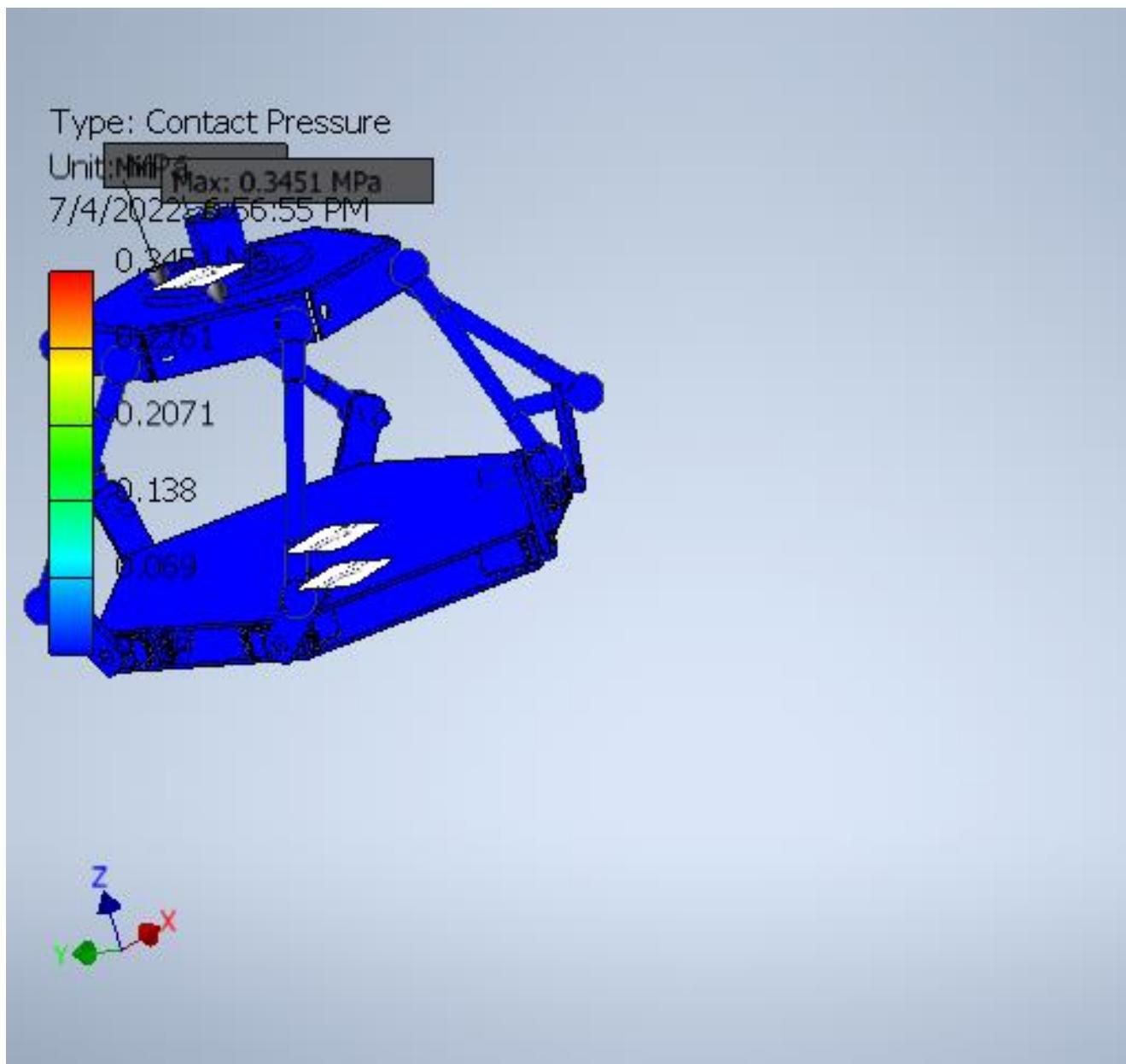
**Strain ZZ**



Type: Strain ZZ  
Unit:  $\mu\epsilon$   
7/4/2022, 6:56:51 PM  
1.175e-05 Max  
6.568e-06  
1.384e-06  
-3.8e-06  
-8.984e-06  
-1.417e-05 Min



**Contact Pressure**



Type: Contact Pressure

Unit: MPa

7/4/2022, 6:56:55 PM

0.3451 Max

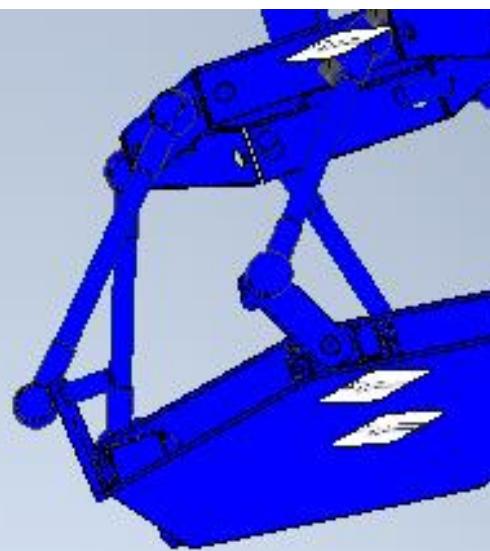
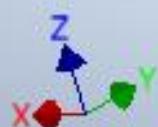
0.2761

0.2071

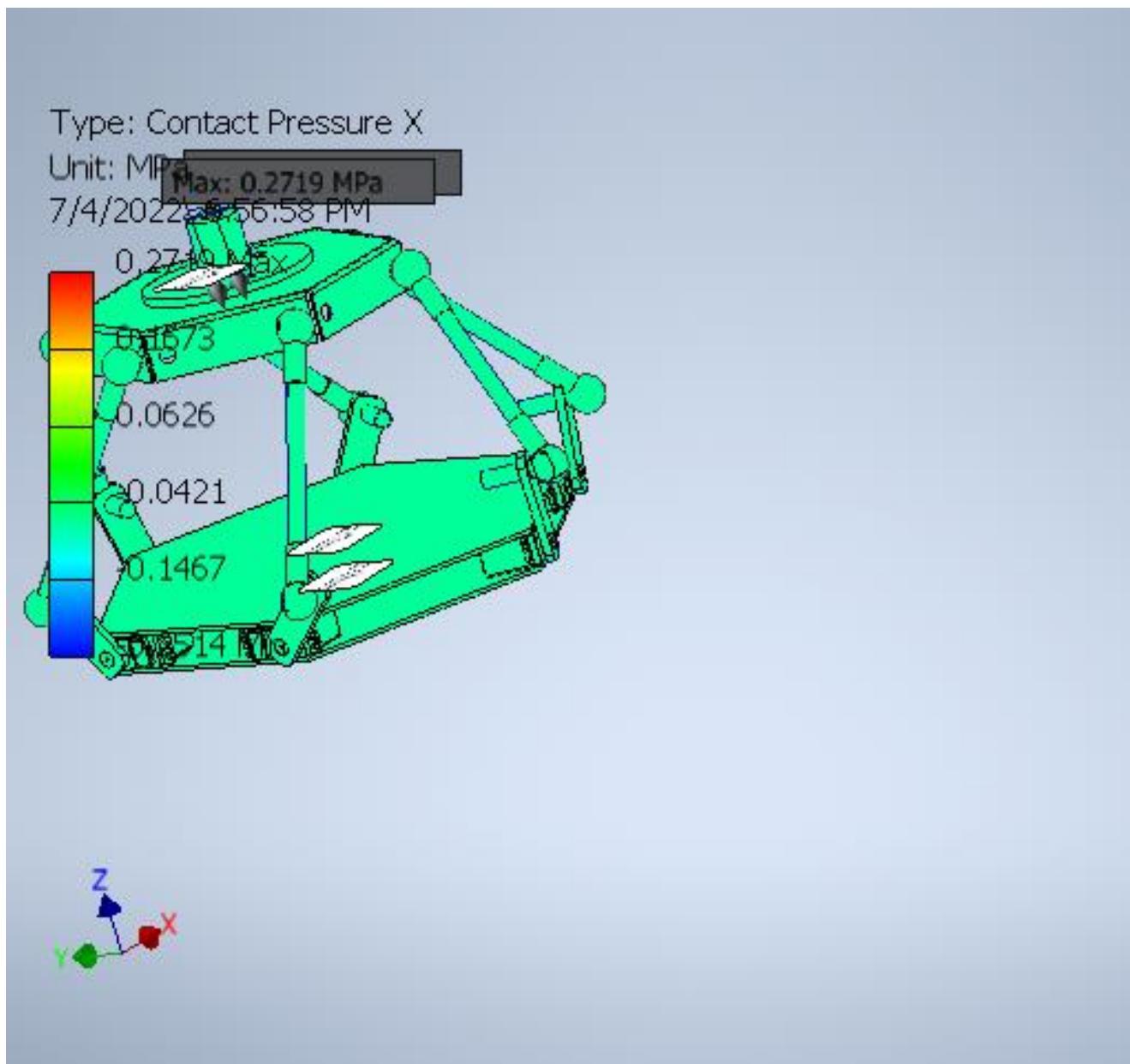
0.138

0.069

0 Min



**Contact Pressure X**



Type: Contact Pressure X

Unit: MPa

7/4/2022, 6:56:58 PM

0.2719 Max

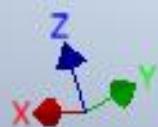
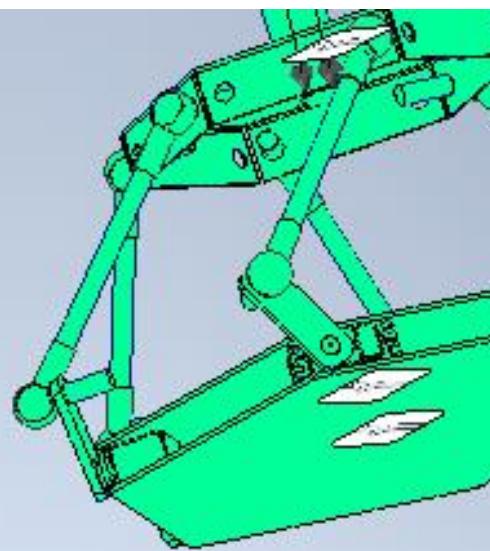
0.1673

0.0626

-0.0421

-0.1467

-0.2514 Min

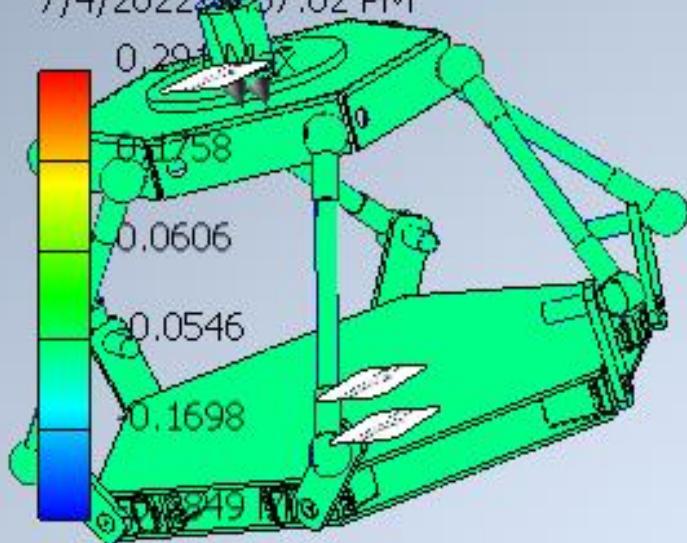


**Contact Pressure Y**

Type: Contact Pressure Y

Unit: MPa Max: 0.291 MPa

7/4/2022 3:57:02 PM



Type: Contact Pressure Y

Unit: MPa

7/4/2022, 6:57:02 PM

0.291 Max

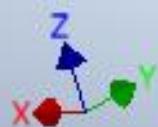
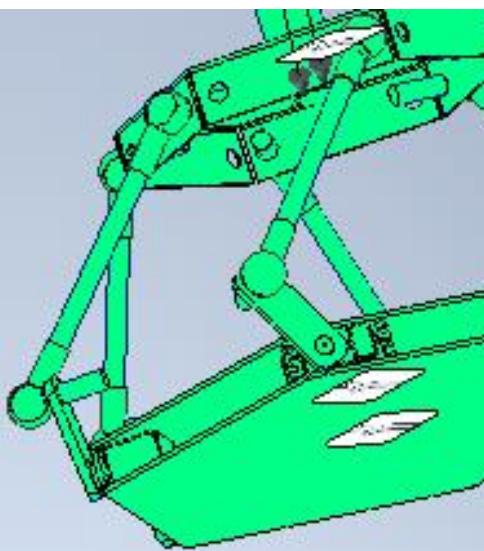
0.1758

0.0606

-0.0546

-0.1698

-0.2849 Min



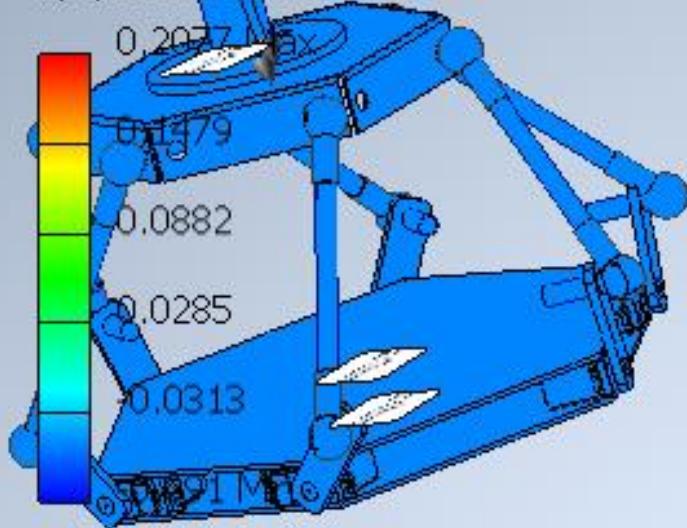
**Contact Pressure Z**

Type: Contact Pressure\_7

Unit: MPa

Min: -0.091 MPa

7/4/2022 5:57:05 PM



Type: Contact Pressure Z

Unit: MPa

7/4/2022, 6:57:05 PM

0.2077 Max

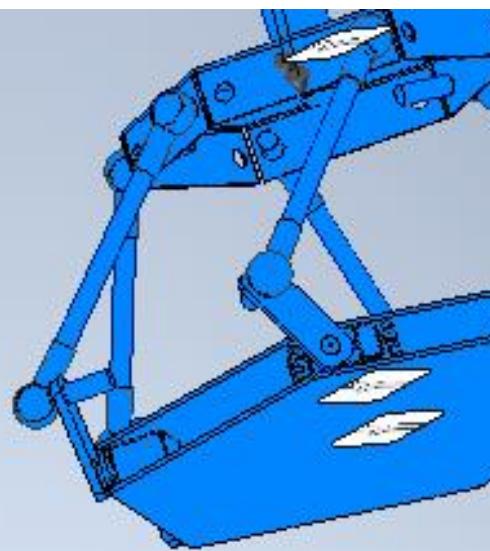
0.1479

0.0882

0.0285

-0.0313

-0.091 Min



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