Engineering Mechanics 130

Final Project

SONY PS3 Controller

Submitted By: Caroline D. Eco

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12/21/2016

OBJECTIVE:

1. To discuss my analysis of the casing of a SONY PS3 controller
2. To show an assembled view and an exploded view
3. To discuss the challenges I faced in creating the models
4. To share how I overcame these challenges

DETAILS:

A PS3 Controller is Designed to Satisfy the Following:
1. To hold 17 buttons for control
2. Have curvatures that will accommodate a user's grip in a comfortable manner

The Top Shell Casing
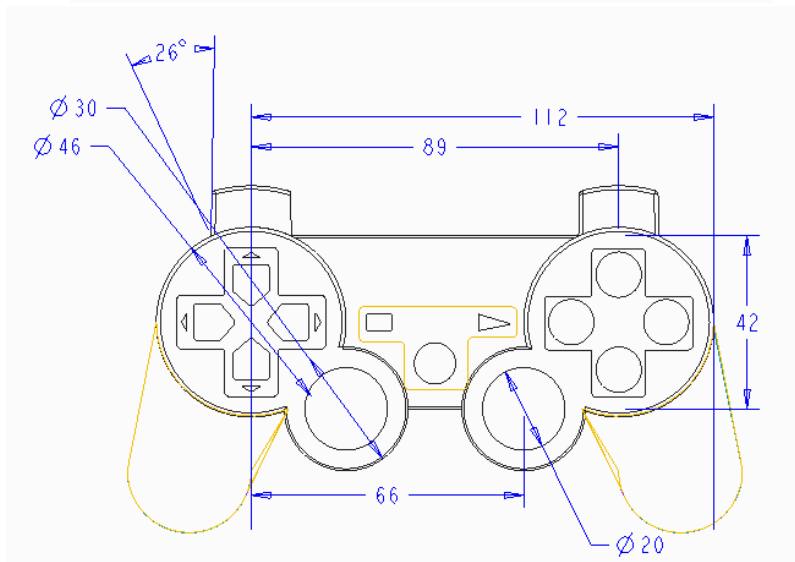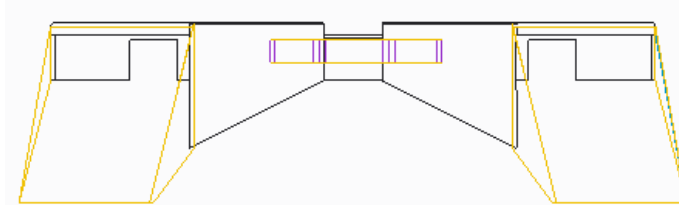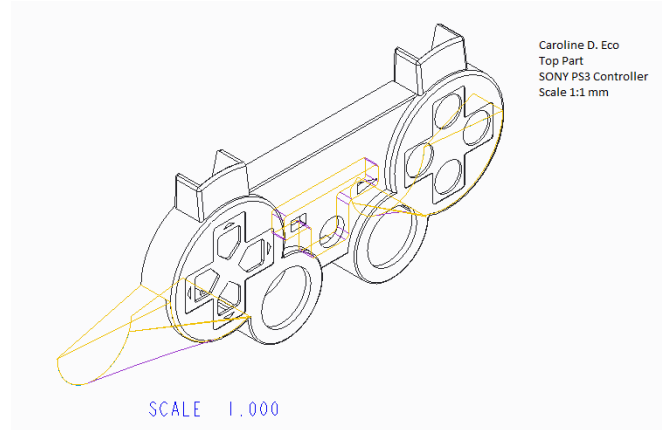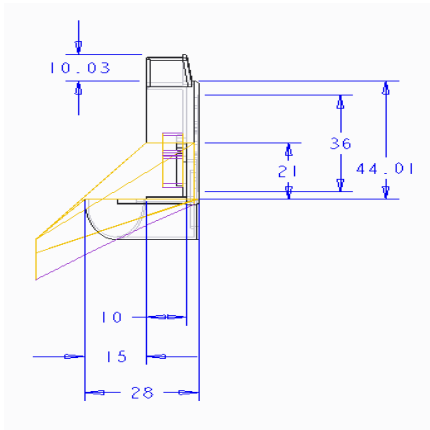
Caroline D. Eco
Top Part
SONY PS3 Controller
Scale 1:1 mm

SCALE 1.000

Procedure:

1.) I started this part by sketching a rectangle of 42 mm x 89 mm. I then extruded this with a depth of 10 mm. I
gave this part the title, "MID_SECTION".

2.) I sketched the right primary cylinder coincident to the right hand side of MID_SECTION, 21 mm from the
right-bottom-point, with a diameter of 46 mm. I gave this part the title, "RIGHT_PRIM_CYL".

3.) I extruded this cylinder with a depth of 13 mm. The same procedure was followed for the left primary
cylinder.

4.) On the MID_SECTION, I extruded the rectangle (4 mm x 6 mm), the triangle (4 mm x 8 mm) and the circle
(diam. of 10) with depths of 15 mm. I rounded their inner edges with 0.05 mm.

5.) I sketched the secondary outer cylinders (diam. of 30 mm), suspended to the Right Datum Plane by 23 mm
and 66 mm, respectively. I extruded them by 28 mm.

6.) I sketched the secondary inner cylinders (diam. of 20 mm), suspended to the Right Datum Plane by 23 mm
and 66 mm, respectively. I extruded them by 1 mm.

7.) I selected all the sections I have created and used the Shell function, shelling out the body by 1 mm.

8.) I sketched two crosses with the dimensions of 36 mm x 36 mm x 11.5 mm. The tips of the crosses, I rounded
by 1.1 mm. The inner concave edges, I rounded with 0.02 mm. The inner convex edges, I rounded by 0.35 mm.

9.) Inside the left cross, I created a triangle and patterned it by four, each separated by 90 degrees. I rounded
the inner edges and the outer edges of the triangles by 0.01 mm and 0.02 mm.

10.) Inside the left cross, I created a pentagon and pattered it by four, each separated by 90 degrees. I rounded
the inner and outer edges by 0.01 mm.

11.) I rounded all the edges of the MID_SECTION, the two primary cylinders and the two secondary cylinders by
0.5 mm.

12.) Inside the right cross, I created a circle and patterned it by four, each separated by 90 degrees.

13.) On the surface of the secondary inner cylinder, I extruded two circles with a diam. of 20 mm and a depth of
5 mm.

14.) I extruded two triangles on DTM5 in order to create the chopped section of the controller.

15.) Each triangle has a dimension of 15 mm x 30 mm. Both triangles were extruded with a depth of 30 mm.

16.) On DTM10*, I extruded two semi-circles with radii of 17 mm in order to remove the parts of the secondary
cylinders that are in the MID_SECTION.

17.) On DTM7*, I sketched the top which was to be the left tip of the controller. I revolved
this sketch twice by 25 degrees on the left and the right, to create a one solid left tip. I extruded both sides of
the tip with a 26-degree triangle and a depth of 20 mm. The same procedure was followed for the right tip. All
outer edges were rounded by 1 mm.

18.) I sketched two arcs with radii of 23 mm on DTM2*.

19.) On DTM4*, I sketched two semi-circles with radii of 15 mm.

20.) I blended both parts as surfaces.

21.) To make the blend perfect, I created DTM11* and sketched a line that I will blend with the same arc with
radii of 23 mm.

22.) On DTM9*, I sketched rectangles of 16.96 mm x 24.08 mm. I then revolved this by 180 degrees to remove
the materials that lie inside the body.

23.) DTM13* was created for the purpose of blending the left and right hand-sides of the blends.

24.) DTM14* was created for the purpose of sketching rectangles that would remove excess material on the
MID_SECTION.

25.) On DTM7*, I sketched a rectangle (10 mm x 15 mm). I revolved this part 14 degrees to the left and to the
right to remove material and to create a slots for buttons.

The Datum Planes on the Top Part:
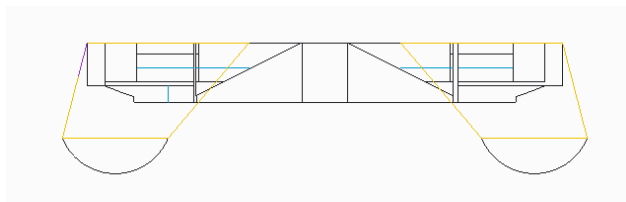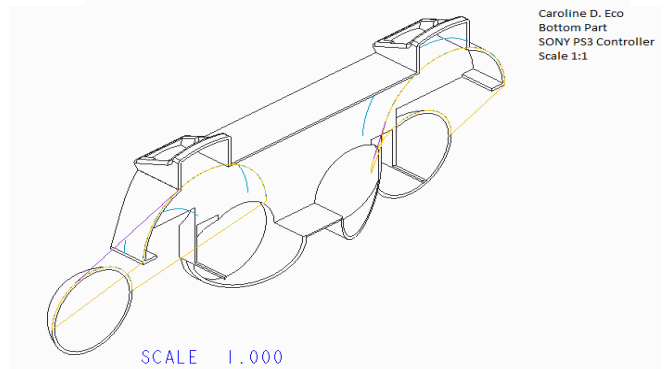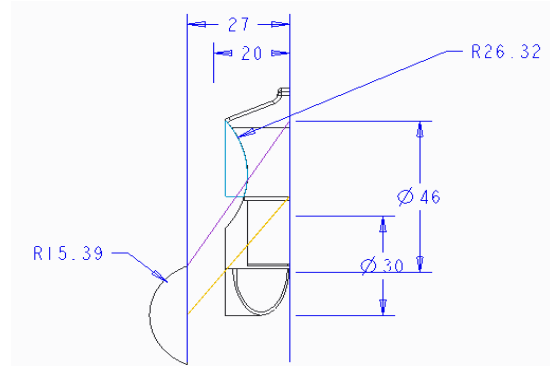with their titles, references and offset values, respectively.

DTM1: CURVE:F5(SKETCH)	0		DTM8: DTM7:F53	89
DTM2: DTM1:F7	3		DTM9: TOP:F2	21
DTM3: RIGHT:F1	10		DTM10: DTM1:F7	25

DTM4: DTM2:F8	40		DTM11: DTM7:F53	9
DTM5: SURF:F14(PROTRUSION)	TANGENT 0		DTM12: DTM7:F53	80
DTM6: DTM1:F7	2		DTM13: EDGE:F76 & 77	
THROUGH				
DTM7: CURVE:F52(SKETCH_7)	THROUGH 0		DTM14: TOP:F2	
THROUGH				

The Bottom Part Casing:
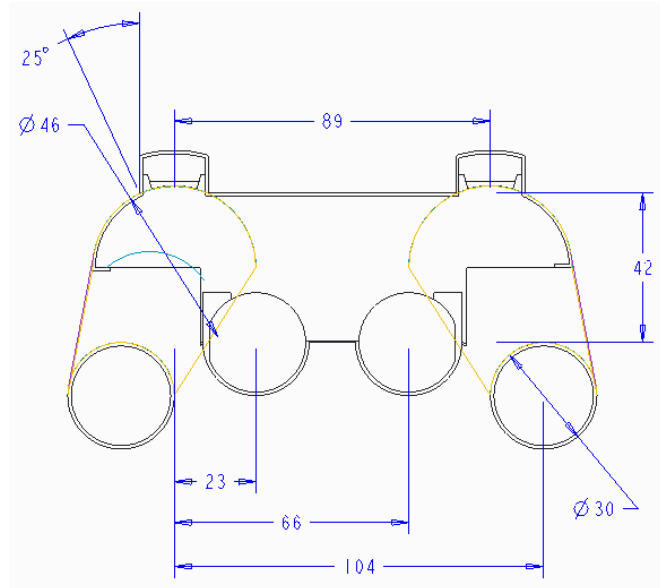
Caroline D. Eco
Bottom Part
SONY PS3 Controller
Scale 1:1

SCALE 1.000

PROCEDURE:

1.) I started this part by sketching a rectangle of 42 mm x 89 mm. I then extruded this with a depth of 10 mm. I
gave this part the title, "MID_SECTION".

2.) I sketched the two primary cylinders coincident to the right hand side of MID_SECTION, 21 mm from the
right-bottom-point, with a diameter of 46 mm.

3.) I extruded these cylinders with a depth of 17 mm. The same procedure was followed for the left primary
cylinder.

4.) I sketched the secondary outer cylinders (diam. of 30 mm), suspended to the Right Datum Plane by 23 mm
and 66 mm, respectively. I extruded them by 17 mm.

5.) I extruded two triangles on DTM5 in order to create the chopped section of secondary cylinders.

6.) Each triangle has a dimension of 15 mm x 30 mm. Both triangles were extruded with a depth of 29 mm.

7.) On the FRONT datum plane, I sketched the top which was to be the left tip of the controller. I repeated this
step on DTM4*. I revolved this sketch twice by 25 degrees to the left and to the right, to create solid tips. I

extruded both sides of the tip with a 26-degree triangle and a depth of 20 mm. All outer edges were rounded by
1 mm.

8.) On DTM6*, I sketched two circles with a diam. of 30 mm.

9.) On the RIGHT datum plane, I sketched two arcs with radii of 23 mm.

10.) On DTM6*, I sketched two semi-circles with radii of 15 mm.
.

11.) I blended both parts as surfaces

12.) On the FRONT datum plane, I sketched a rectangle (10.03 mm x 17 mm) coincident to the side of the
cylinder. This is to create the slot for the buttons. I revolved this sketch 25 degrees to the left and to the right.

13.) I repeated this step on the right tip.

14.) I extruded the two circles on DTM6* (with the radii of 30 mm) by 10 mm.

15.) On DTM7*, I sketched a semi-circle with a radius of 25.91 mm, located 27.81 mm to the right of the top
plane.

16.) On DTM9*, I sketched an arc of 16.25 mm x 10 mm.

17.) I revolved this sketched 360 degrees to create the round edge at the bottom of the controller casing.

18.) Step 16 and 17 was repeated on DTM10*.

19.) On DTM9*, I sketched an arc of 15.39 mm x 9 mm.

20.) I revolved this sketched 360 degrees to create shell at the bottom of the controller casing.

21.) Step 19 and 20 was repeated on DTM10*.

22.) On DTM4*, I sketched a rectangle of 10.3 mm by 17 mm. I revolved this sketch 25 degrees to the left and to
the right.

23.) On the RIGHT datum plane, I extruded four triangles (25 degrees) with a depth of 20 mm.

24.) I extruded the sketch on DTM7* by 150 mm.

25.) On DTM7*, I sketched a trapezoid of 3.28 mm x 13.88 mm x 9.37 mm. I extruded this sketch by 200 mm.

26.) I rounded all the edges by a radius of 1 mm and 2.15 mm.

27.) On the FRONT datum plane, right where the tip is at, I sketched a rectangle of 15.36 mm by 9 mm. I
repeated this step on DATM4*. I revolved this part 14 degrees to the left and to the right to remove material
and to create a slots for buttons.

28.) On DTM13*, I sketched rectangles of 14 mm x 16.72 mm, coincident to the TOP datum plane.

29.) I revolved this by 360 degrees to create the shell of the two secondary cylinders.

30.) On the RIGHT datum plane, I sketched two arcs (r: 23 mm x 22 mm). I extruded these arcs by 17 mm to
remove the parts of the cylinder inside the casing.

The Datum Planes on the Bottom Part:
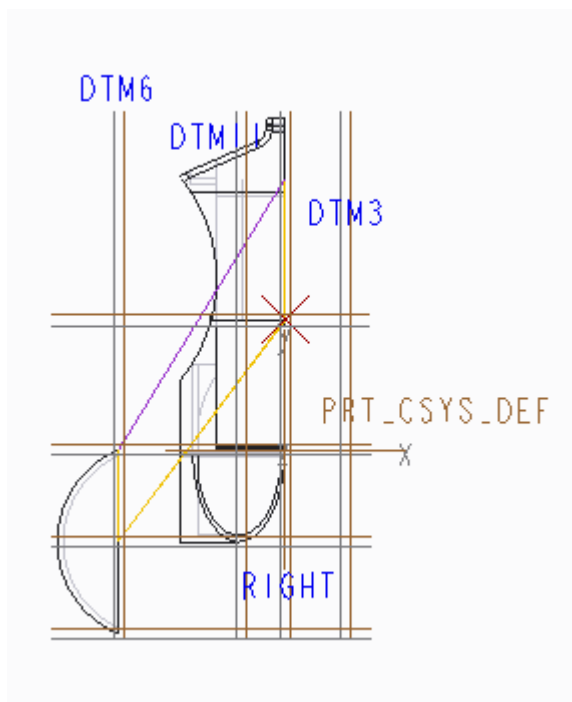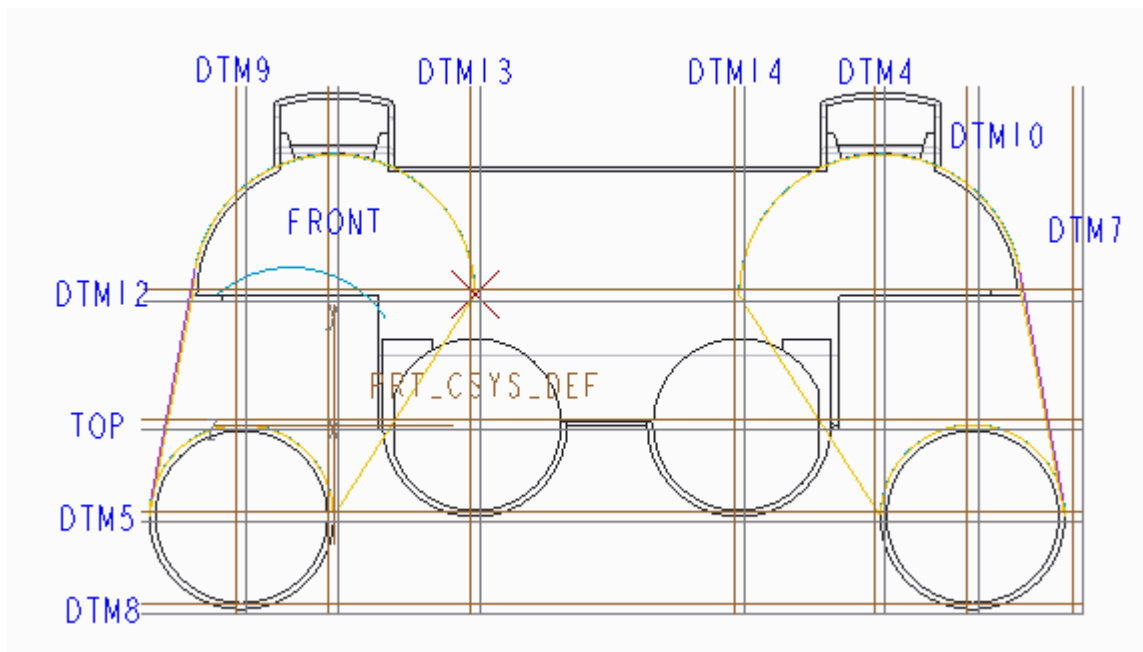with their titles, references and offset values, respectively.

DTM3: RIGHT:F1	10	DTM9: FRONT:F3	15
DTM4: FRONT:F3	89	DTM10: DTM4:F12	15
DTM5: TOP:F2	15	DTM11: RIGHT:F1	7
DTM6: RIGHT:F1	27	DTM12: TOP:F2	21
DTM7: DTM4:F12	32	DTM13: FRONT:F3	23
DTM8: DTM5:F13	15	DTM14: DTM13:F63	43

The Top Part in Details
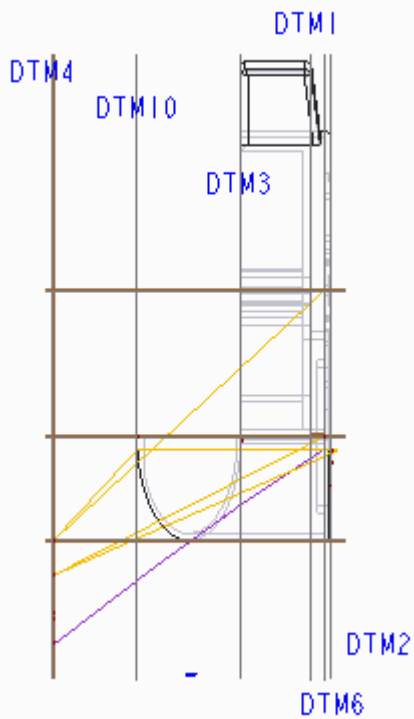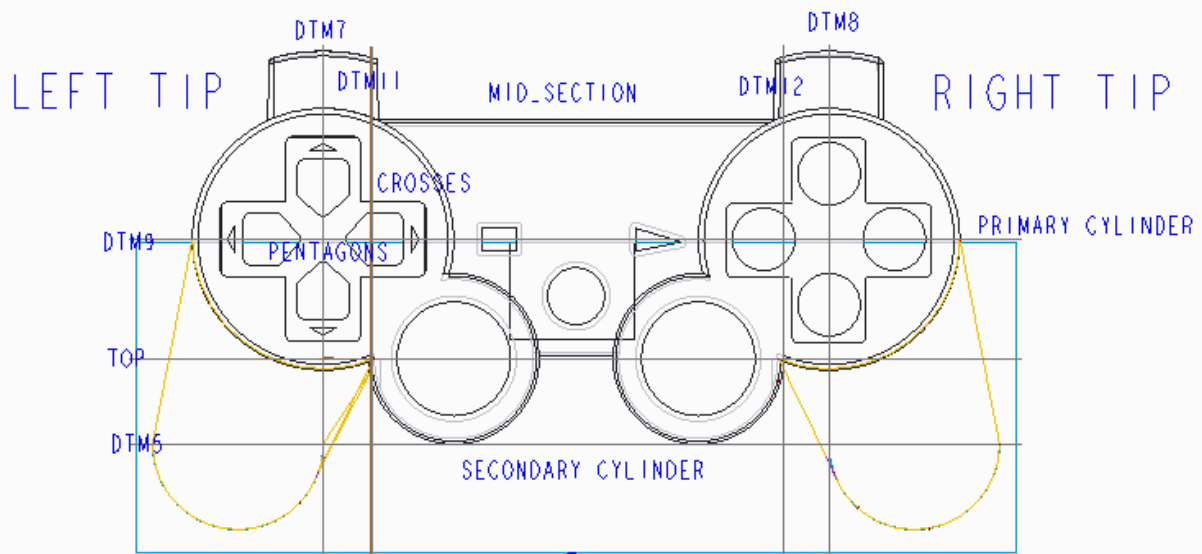
The Bottom Part in Details

DTM9   DTM13   DTM14   DTM4

FRONT

DTM10

DTM7

DTM12

PRT_CSYS_DEF

TOP

DTM5

DTM8

DTM6

DTM11

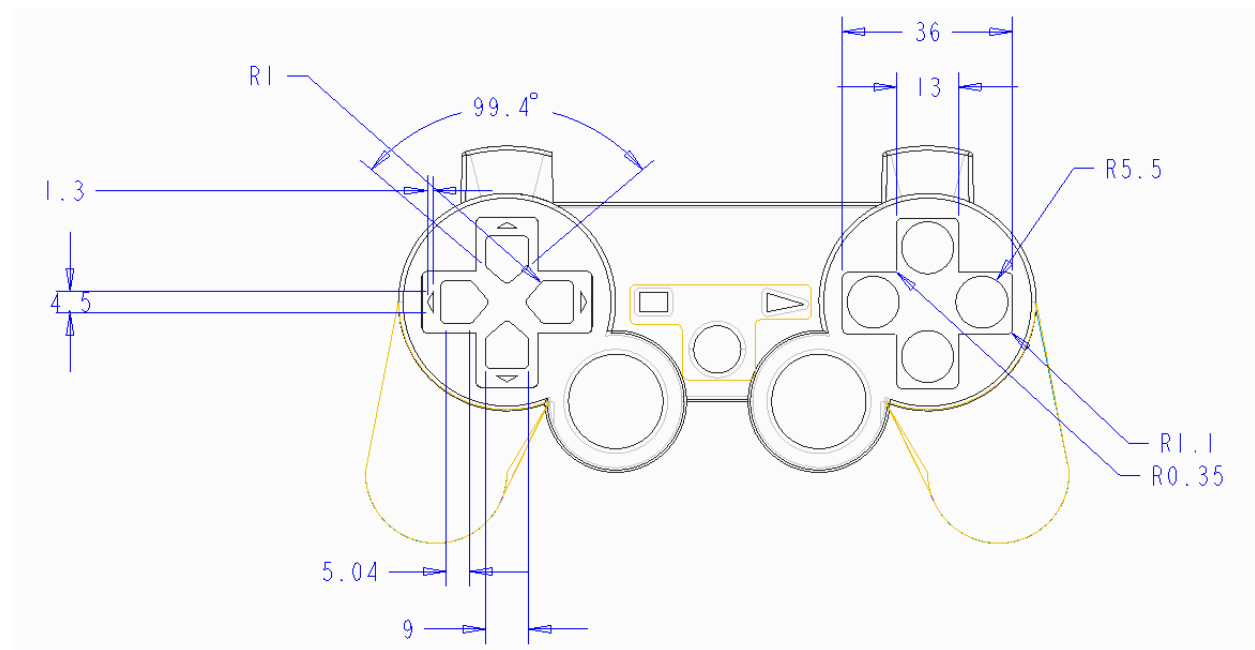DTM3

PRT_CSYS_DEF

RIGHT

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The Crosses, Patterned Pentagons, Patterned Circles and Patterned Triangles in Detail

with their respective fillet and round radii.
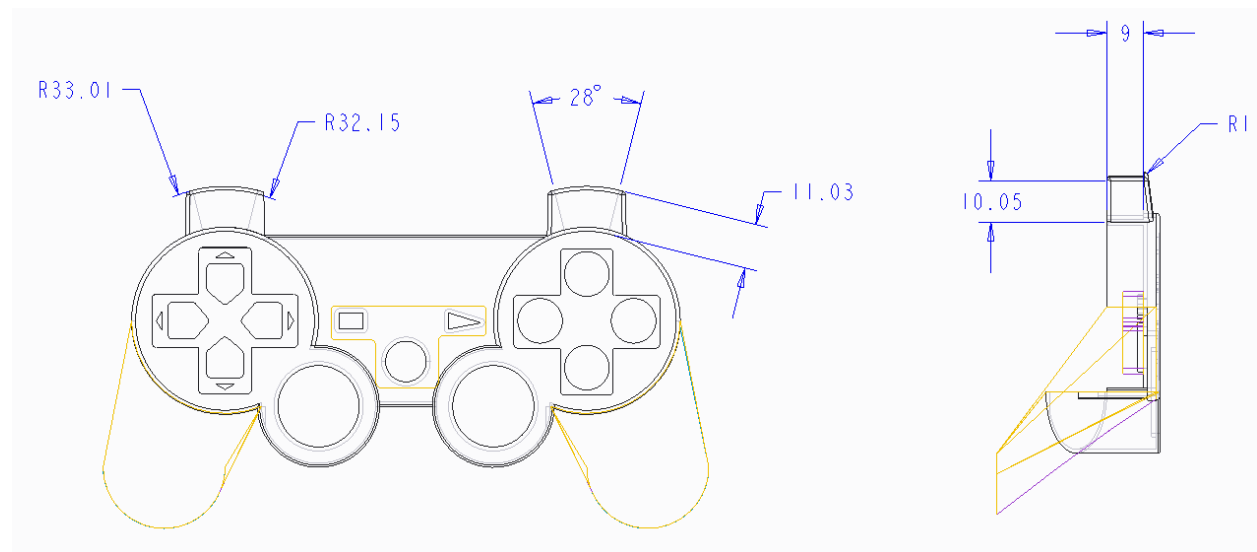
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The Left and Right Tips in Detail
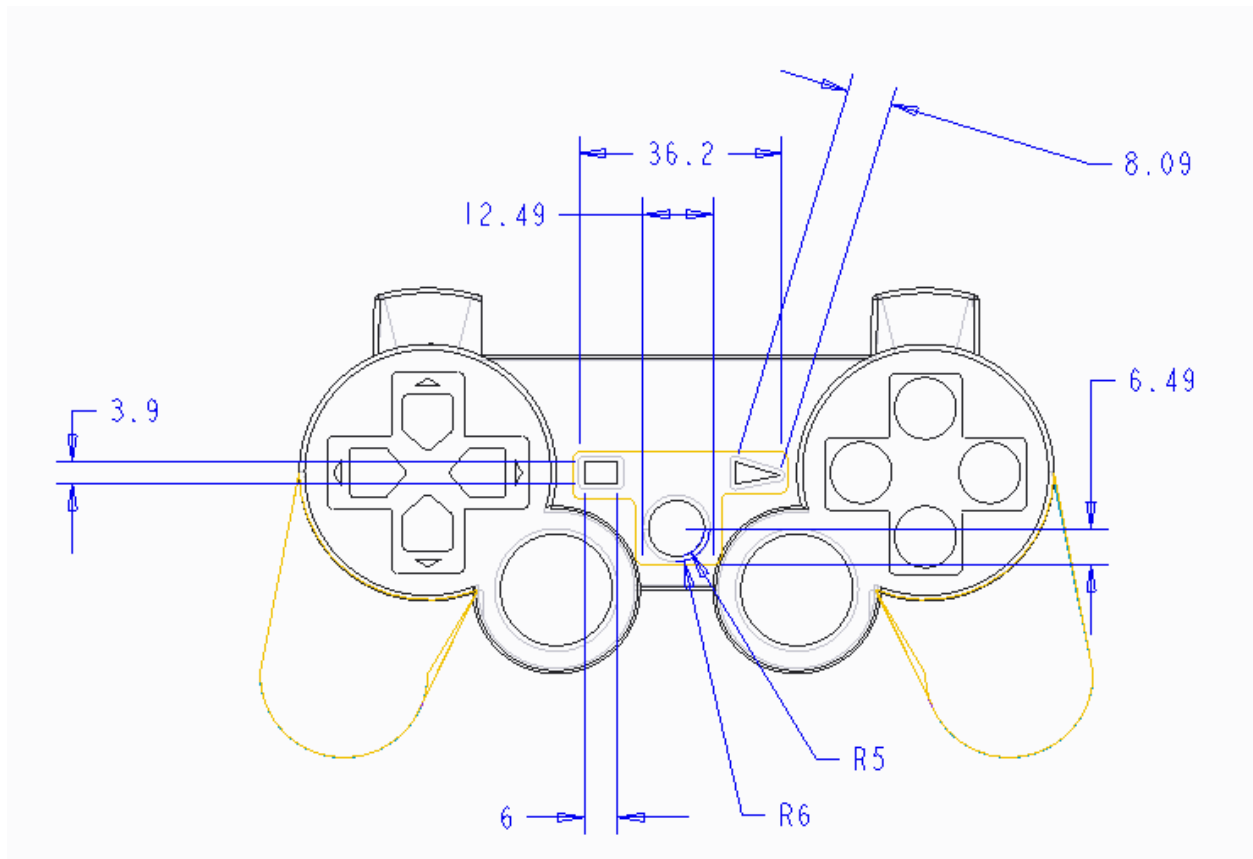
with their respective round radii.

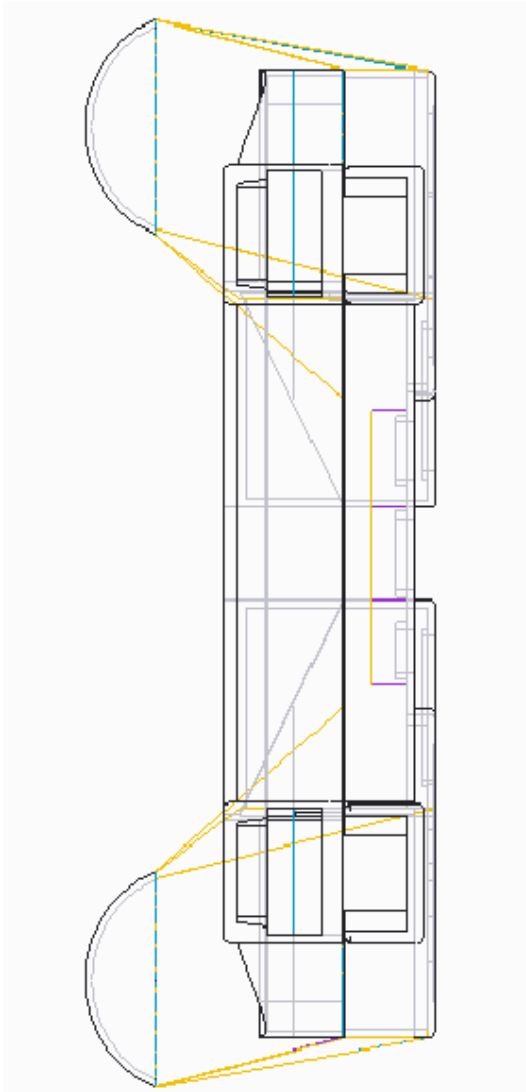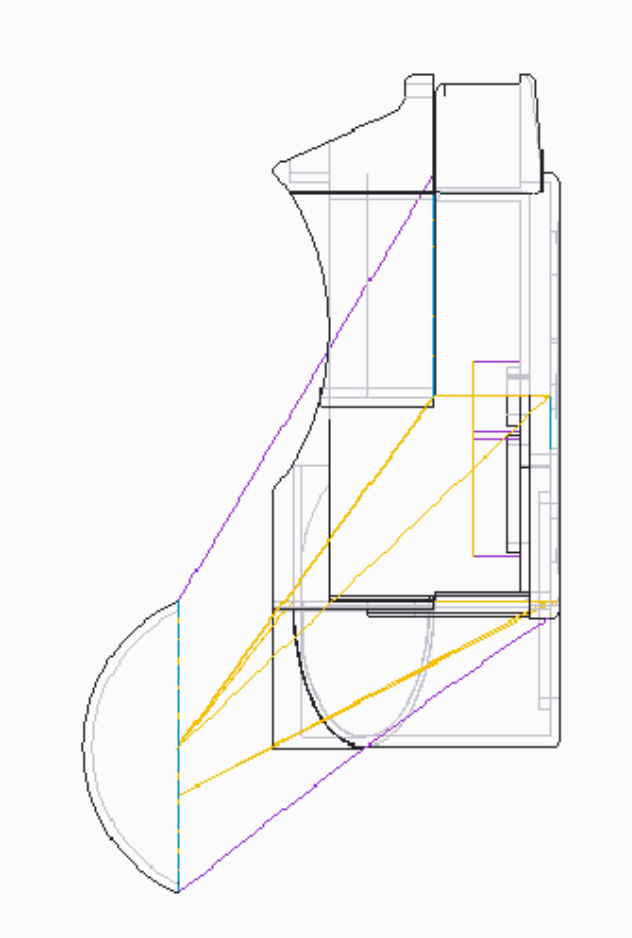Caroline D. Eco

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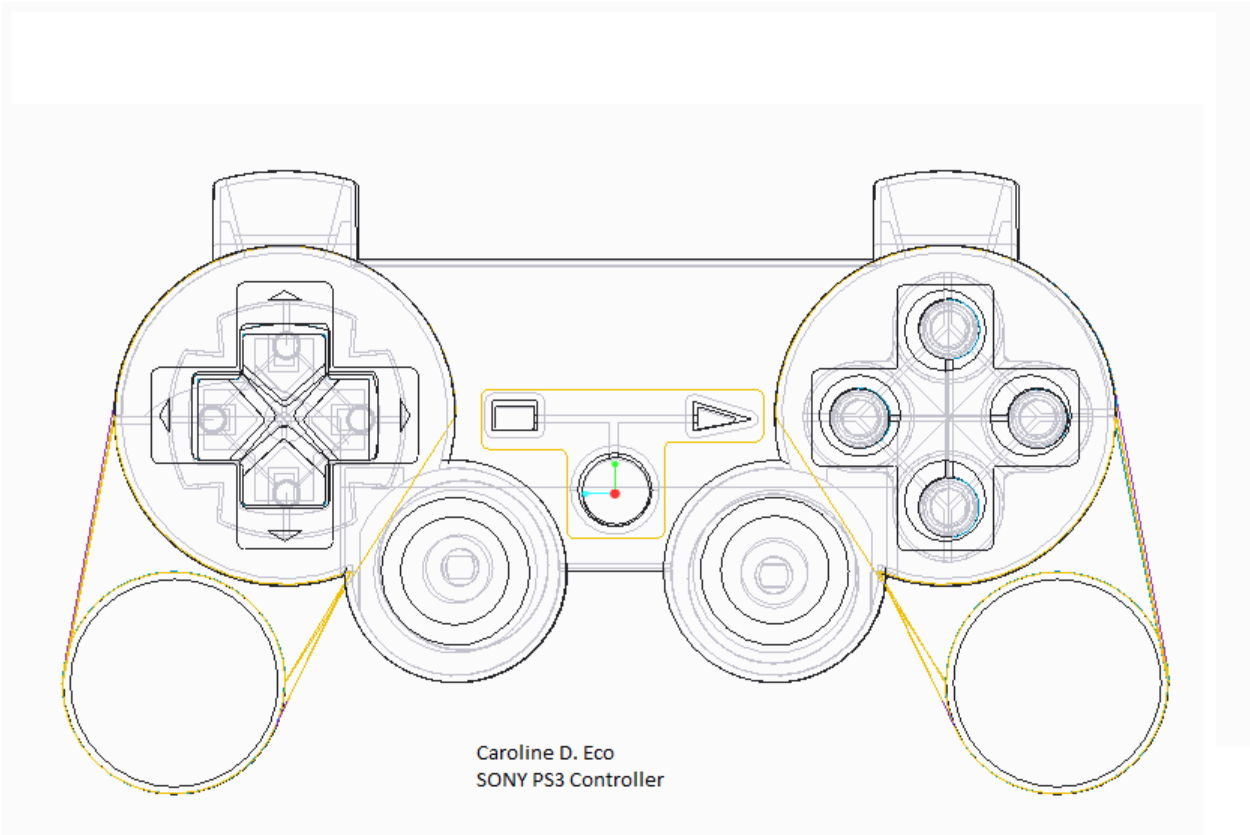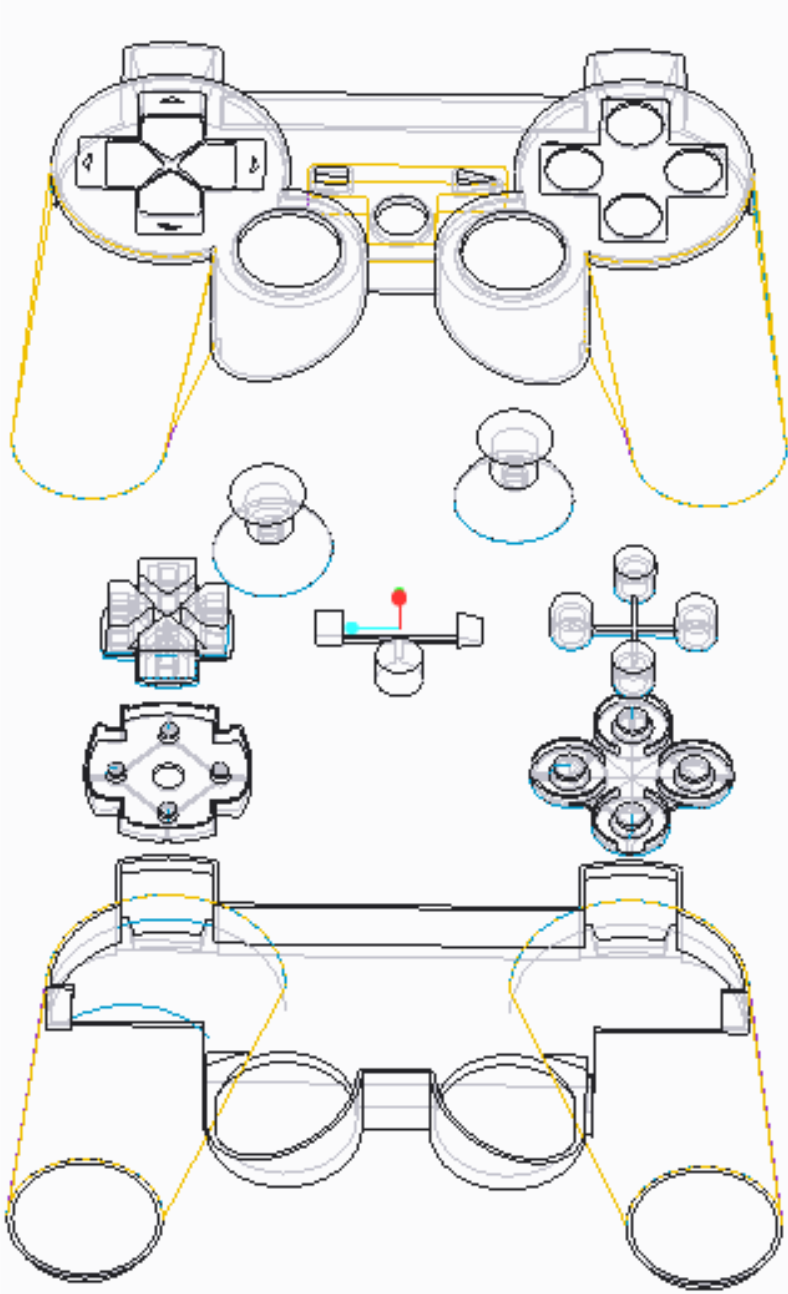The Rectangle, the Triangle and the Circle in the MID_SECTION in Detail

Front and Top View:

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SONY PS3 Controller
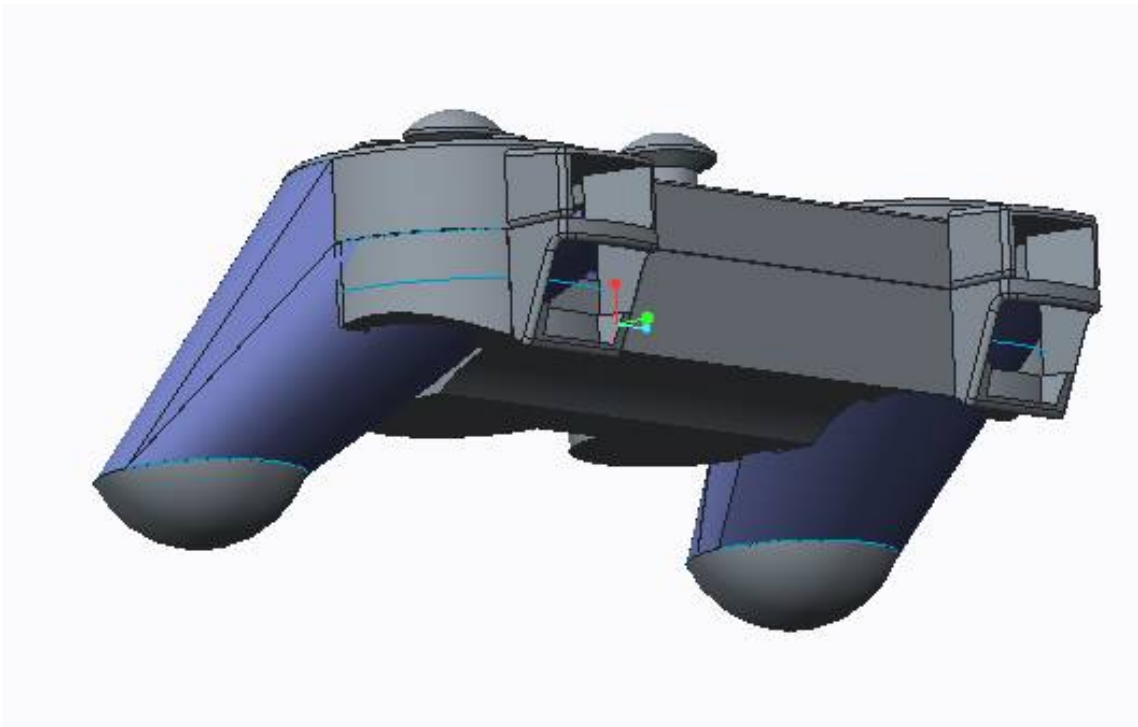Front and Top View

Front View:

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Exploded View:

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SONY PS3 Controller

Screenshots:

Screenshot:

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<u>Challenges and Frustrations</u>

From overcoming challenges along the way, I learned the following lessons:

1. Sketches and constraints that are incorrectly done prevent the Pattern function and prevent the pieces to regenerate.
2. The accuracy of datum planes and sketches are critical to blending.
3. The reference points are relevant even to the slightest detail.

<u>End Credits</u>

       Upon finishing this project I am confident to say that I am able to utilize Creo Parametric in making 3D Modeling for future use. This research and final project pushed the boundaries of my technical and creative skills. I dedicate this project to my brother, Andrew Eco, who was the owner of this console that I took apart and who was an avid gamer.

<u>Estimated Time of Completion:</u>

13 Hours.

Thank you Dr. Ardebili for teaching me Engineering Mechanics and for (still) accepting this project.

Happy Holidays!