RDL JR

2025 Official Jr. Challenge AMG

MOONBASE

2025 MOONBASE - Jr. Official Field

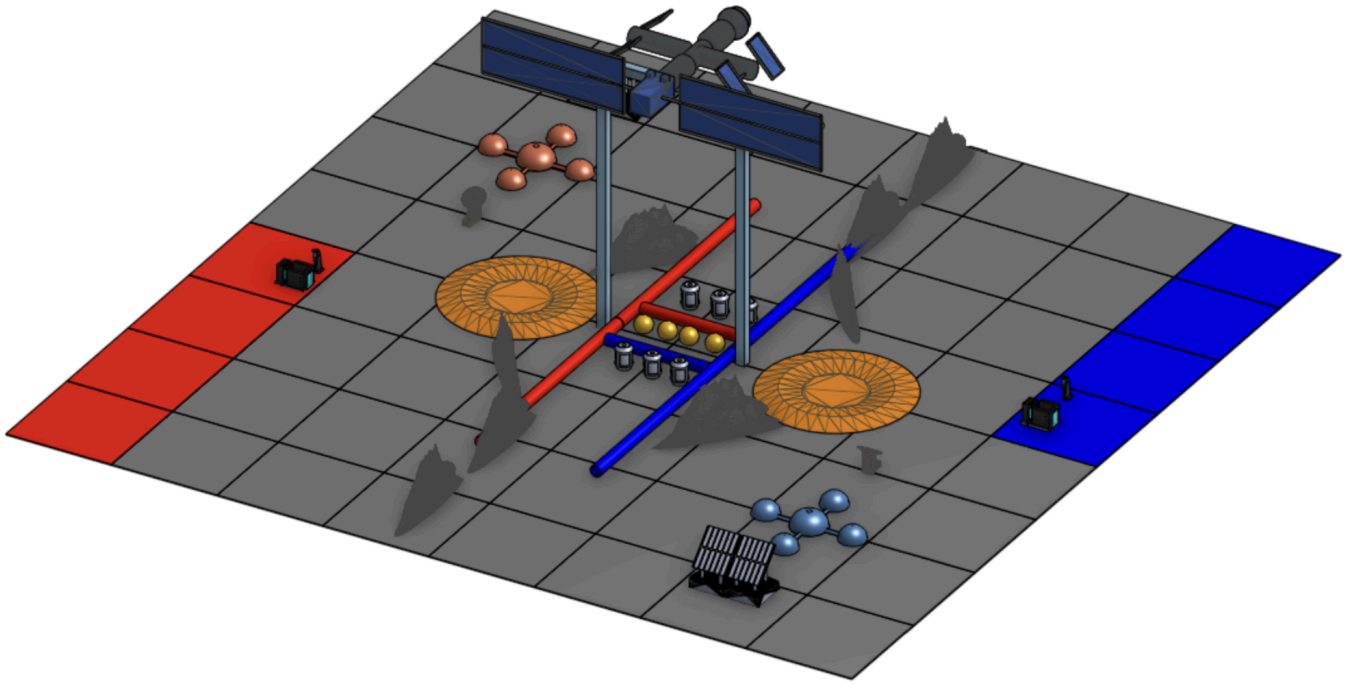

Fig. #1 RDL Jr. MOONBASE Field

Three Laws of Robotics

1. *A robot may not injure a human being or, through inaction, allow a human being to come to harm.*

2. *A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.*

3. *A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.*

~Isaac Asimov

And one more….

4. *A robot may not intentionally injure another robot unless the action or inaction conflicts with the First, Second, or Third Laws.*

~ Scooter Willis (Creator of RDL)

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Revisions Date	Page	Notes

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Introduction

Being creative and trying new things are really important to take the science, technology, engineering, or math (STEM) that we have now and make it better. Robot Drone League, or RDL, is made to give kids a way to be creative and try new things by making robots from scratch and drones, too! Kids are given the chance to make a connection between what they learn in the classroom to the real world. Working with robots in a competition with others is a great way to get kids to get better at math and science with hands-on learning. By doing RDL, kids can work on skills that they will need for the rest of their lives, like working well with others, thinking outside the box, working on a project from start to finish, and communicating with others. All of these skills are needed to be in the next group of inventors in the world. Moonbase, made by STREAMWORKS, is designed to give kids a lifelong excitement for learning new things, along with the idea of working in education. To work in these areas, you need to think outside the box to find the solution.

For additional information, please contact:

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CEO | STREAMWORKS

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STREAMWORKS

Autonomous Measurements Guide

Overview

RDL Jr. 2025 Challenge: MOONBASE

RDL Jr. Autonomous Measurements Guide – 2025 MOONBASE Challenge

Autonomous Period

At the beginning of a 5-minute match, the first 60 seconds are considered the autonomous period. Human control of the robot or drone is not allowed. Teams are awarded points for autonomous movement of the robot or drone as depicted in the scoring table below. **NOTE: Drones and robots will not be reset during this time in the event of task failure.** Completing these tasks autonomously results in additional points during the autonomous period.

The RDL Jr. Autonomous Measurements Guide is designed to help teams prepare their robots and drones for the 2025 MOONBASE Challenge by providing an illustrative overview of the competition field layout. Using the official MOONBASE drawings, teams can plan and program autonomous mission functions that require precision in navigation, positioning, and task execution.

These illustrative drawings serve as a visual planning tool, showing approximate dimensions, placements of field elements, and key mission task locations such as the Lunar Gateway spacecraft, supply drop zones, and resource collection points. They allow teams to pre-program movement paths, sensor activation sequences, and payload delivery maneuvers before arriving at an event.

It is critical to note that all measurements provided in the guide are *approximate* and may vary slightly between regional and national events. Variations may occur due to venue-specific setups, material tolerances, and field assembly differences. Therefore, autonomous routines should be programmed with built-in flexibility and sensor-based adjustments rather than relying solely on fixed distances.

How to Use the MOONBASE AMG Illustrative Drawings

1. Review Field Layouts
   Study the drawings to understand the spatial relationships between key mission elements. Identify start positions, task areas, obstacles, and scoring zones.

2. Map Autonomous Paths
   Use the approximate dimensions to plan robot and drone travel routes. Integrate waypoints, turns, and positioning cues based on the illustrative diagrams.

3. Incorporate Sensor Feedback
   Program your systems to use onboard sensors (ultrasonic, photoelectric, GPS, vision, etc.) to refine positioning during missions and adjust for minor discrepancies between the drawings and the real field.

4. Build Adjustable Code
   Create routines with variables that can be fine-tuned once precise on-site measurements are taken.

5. Verify On-Site
   Extra consideration will be made at all events to ensure teams have adequate time to take precise measurements on the actual competition field before matches begin. This on-site calibration is essential to achieving consistent autonomous performance.

By combining the RDL Jr. Autonomous Measurements Guide with the 2025 MOONBASE illustrative drawings, teams can approach competition day with a strategic and adaptable plan—maximizing their mission success rate while staying prepared for real-world variances in the playing field.

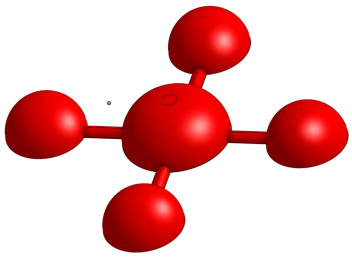
Need STL files for 3D printing game elements or need clarification or have additional questions regarding these drawings and dimensions?

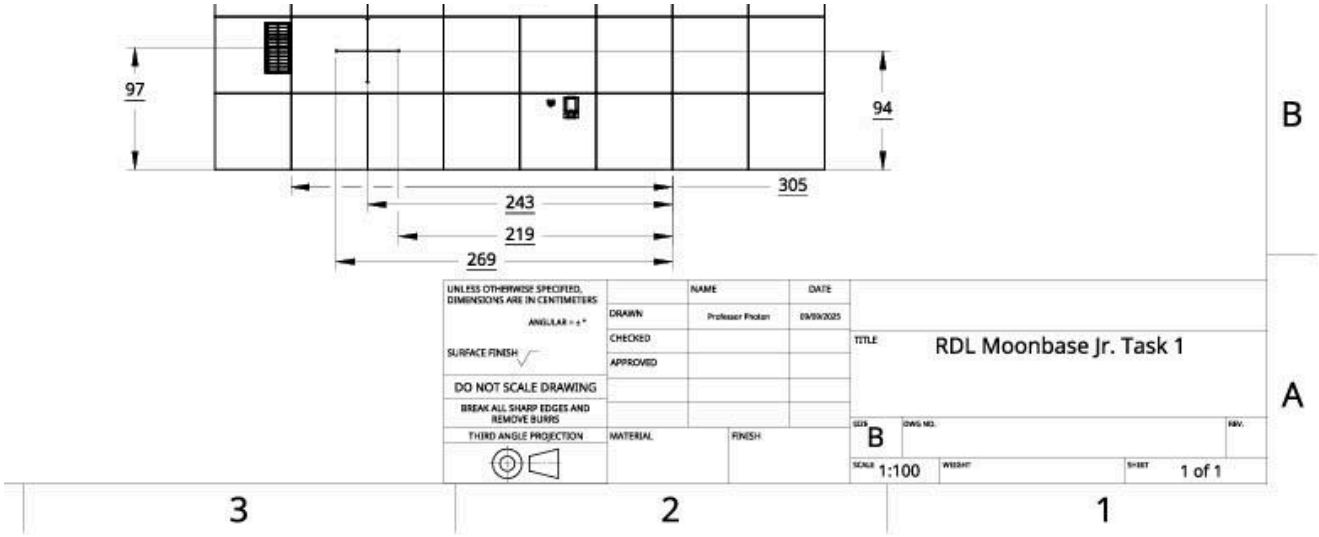
Happy to Help!

Please email **Ian Crews** at ian@streamworkseducation.org with your request.

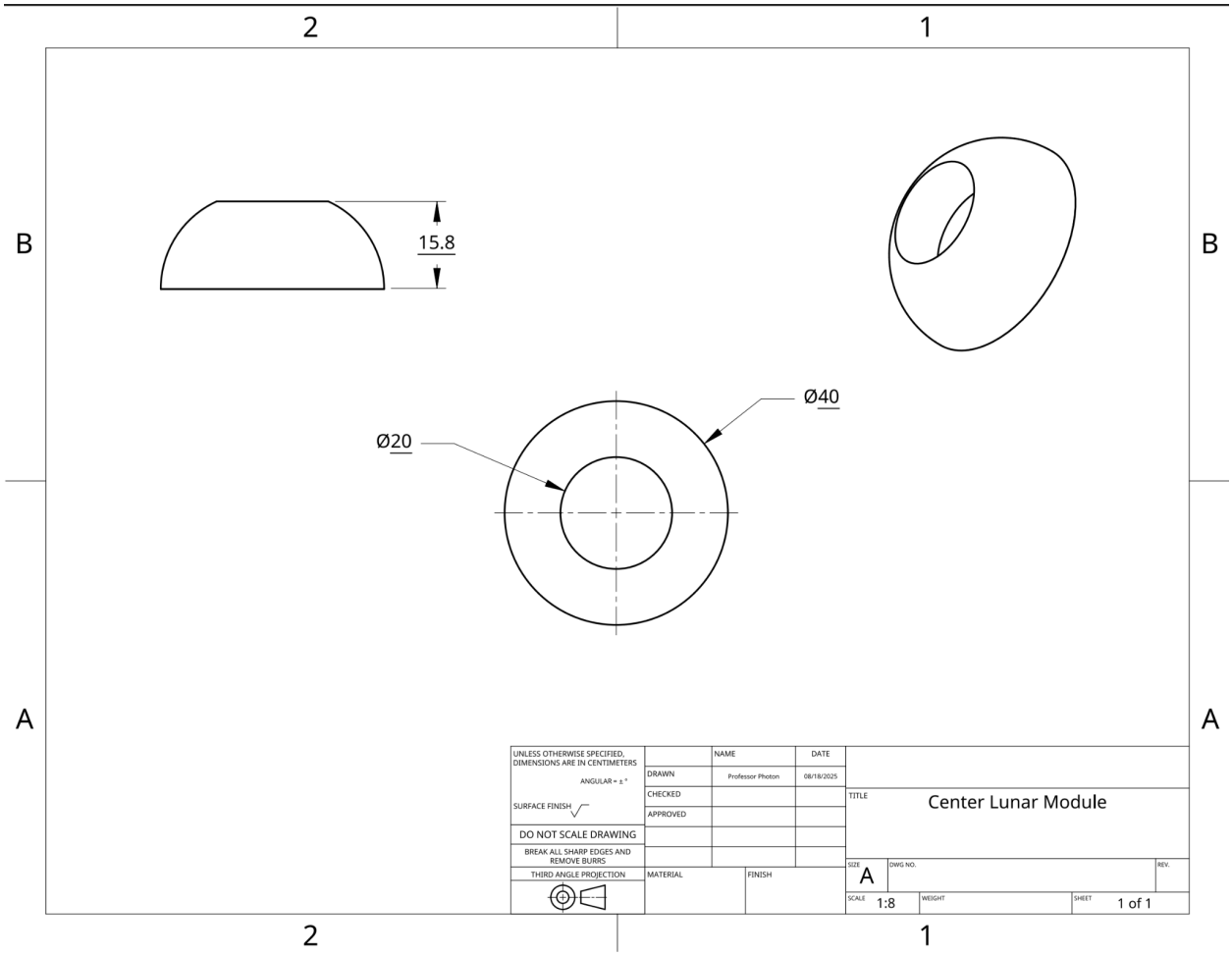
Habitat Modules

Mission Task #1 : "Assemble MOONBASE Habitat Modules"; Solar Panels, and Communications Satellite





1. Biosphere Module (Large) -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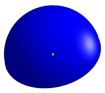
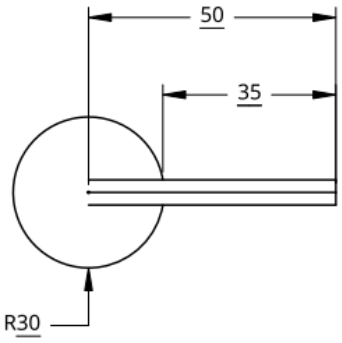
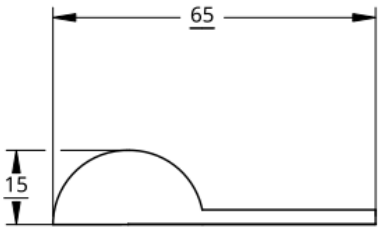
2. Exterior Biosphere Modules (Smalls) 





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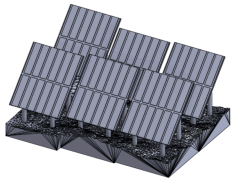
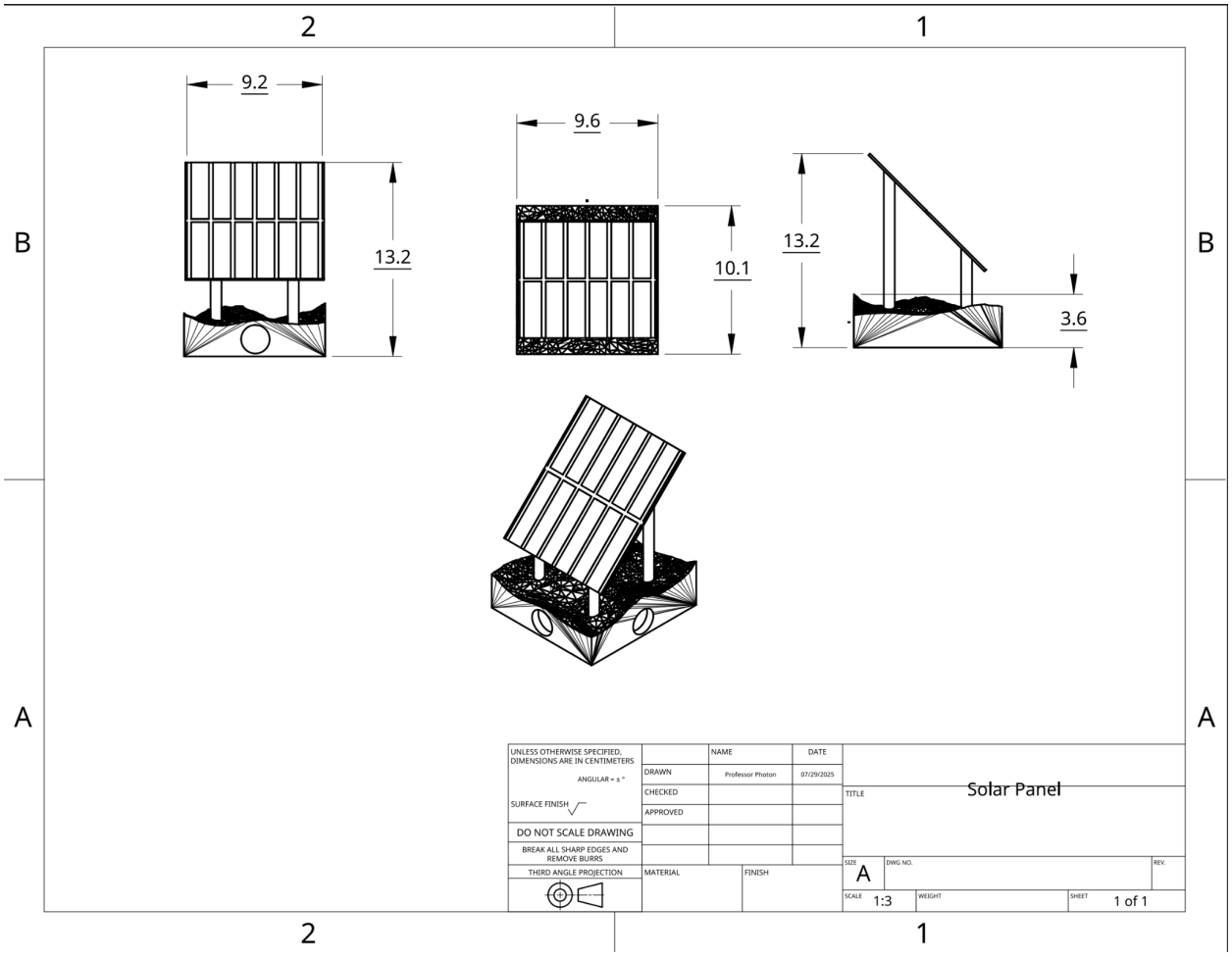
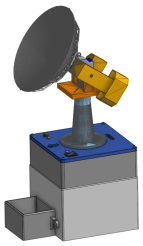
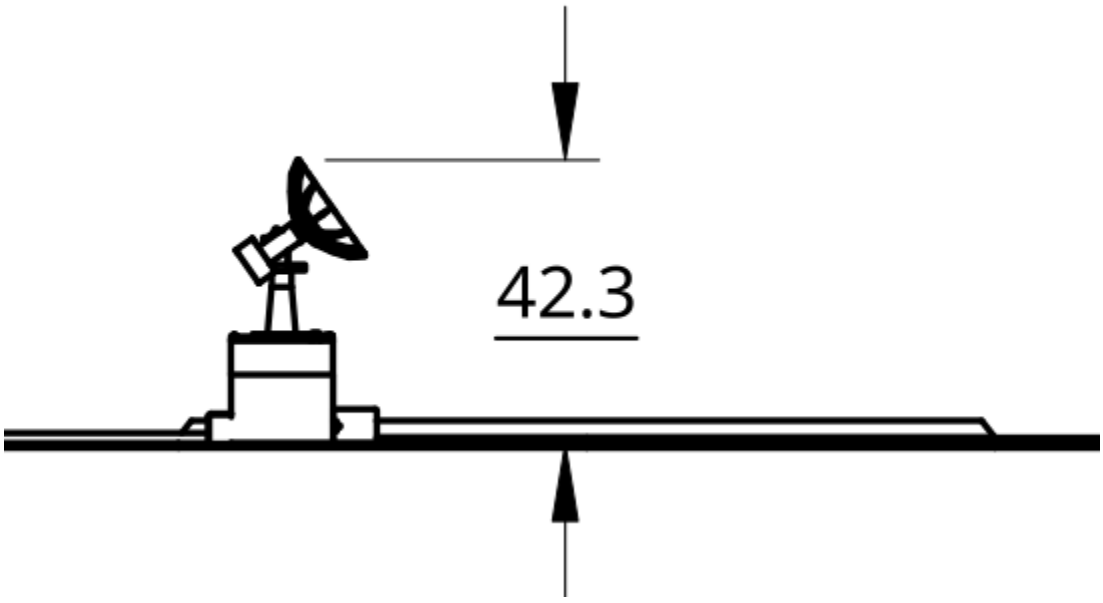
3. Solar panels array



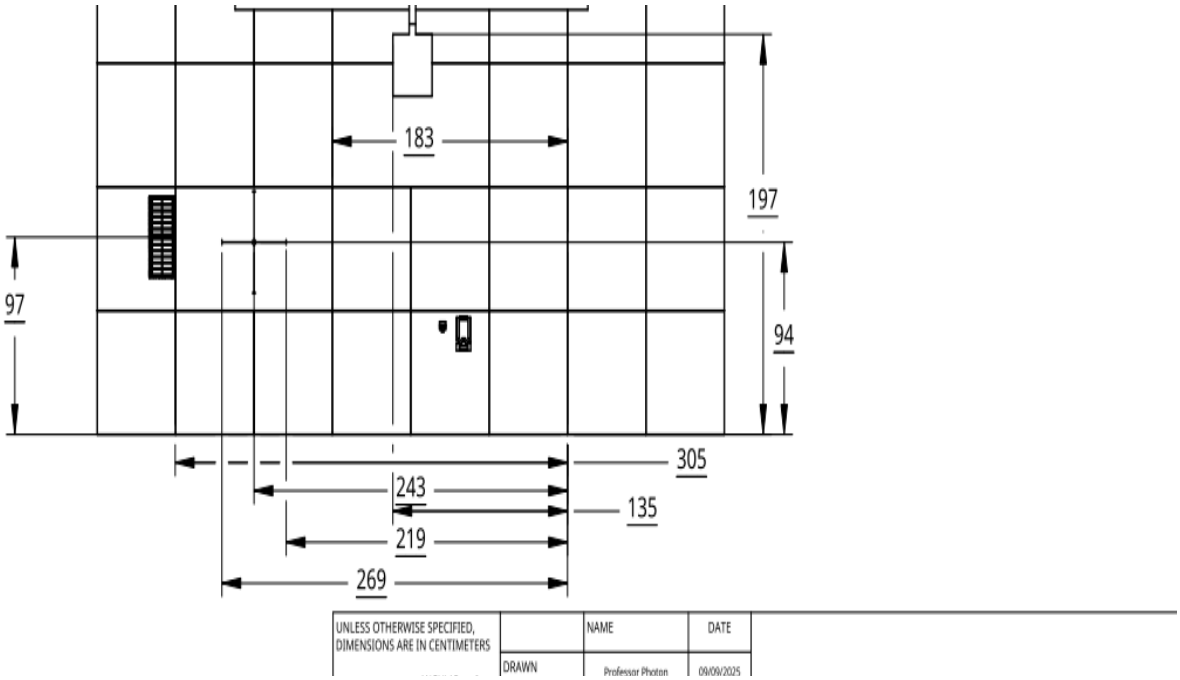


4. Communications Satellite





Mission Task #2 : "Establish Electrical Power and Secure Communications Link"



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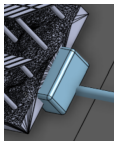
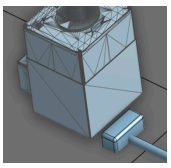
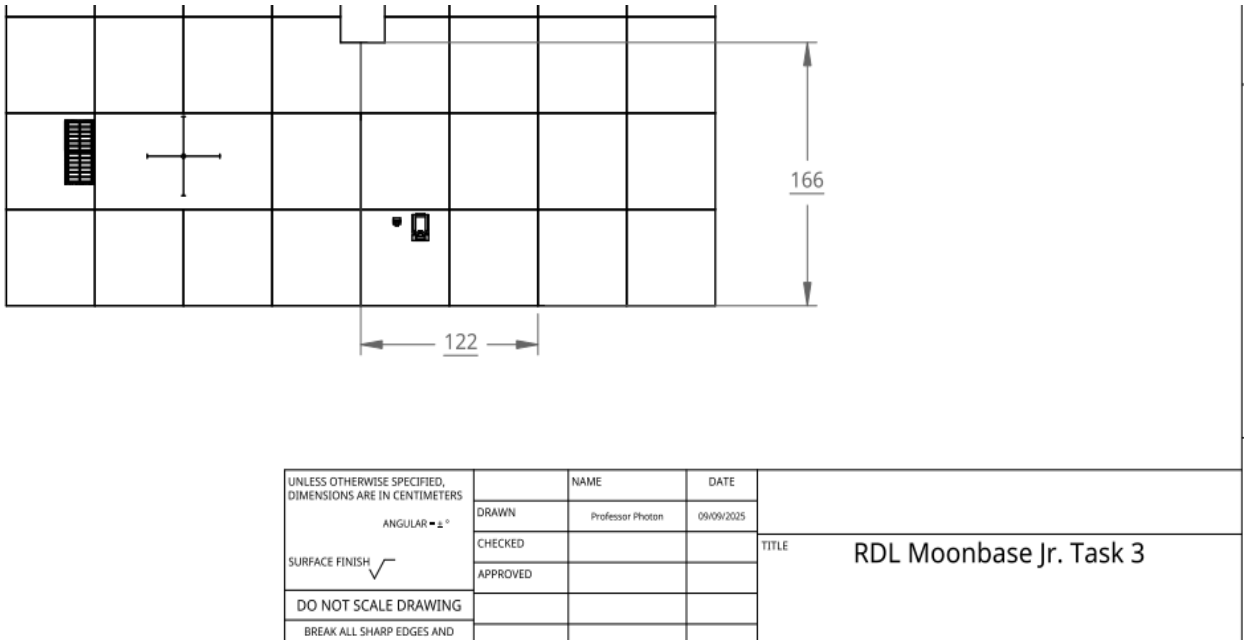


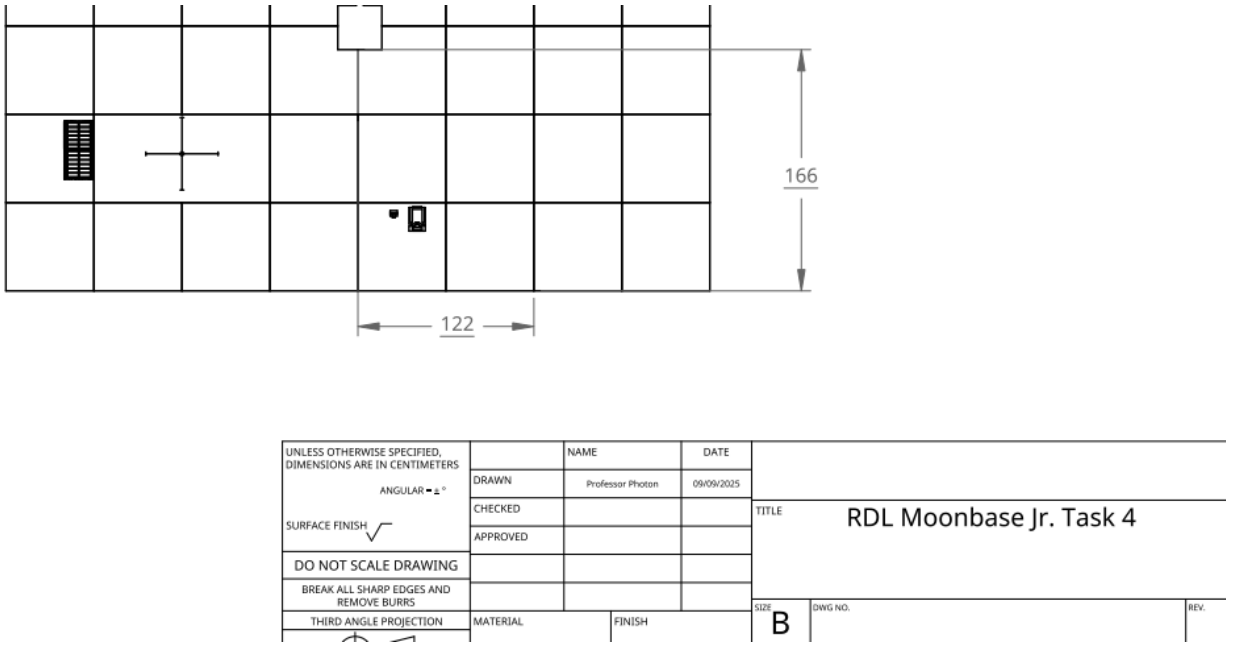
2. Communications Satellite Connector



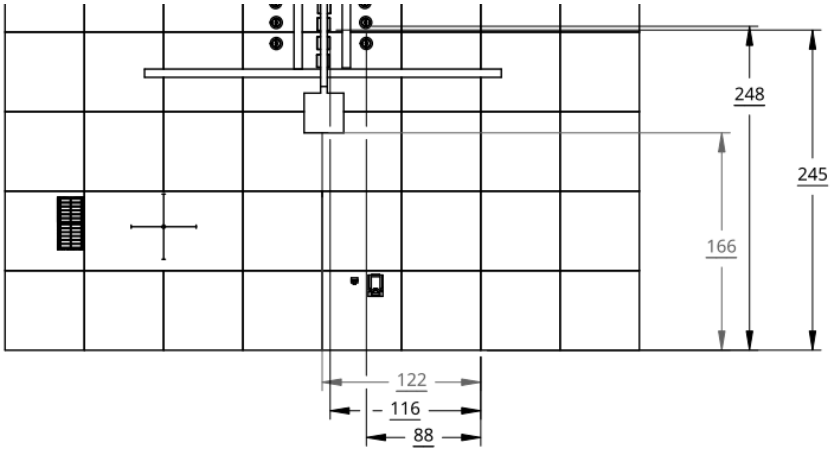
Mission Task #3 : "Aerial Survey and Exploration Site Marking"



Mission Task #4 : "Sensor / Tool Deployment"



Mission Task #5 : "Crater Mining and Lunar Cavern Exploration"



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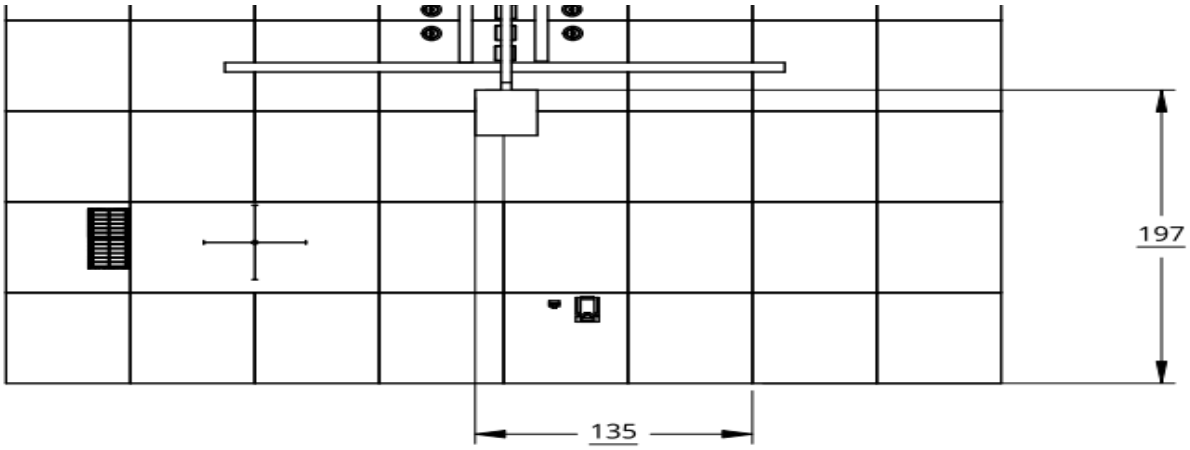
Mission Task #6 : "Lunar Gateway Spacecraft"



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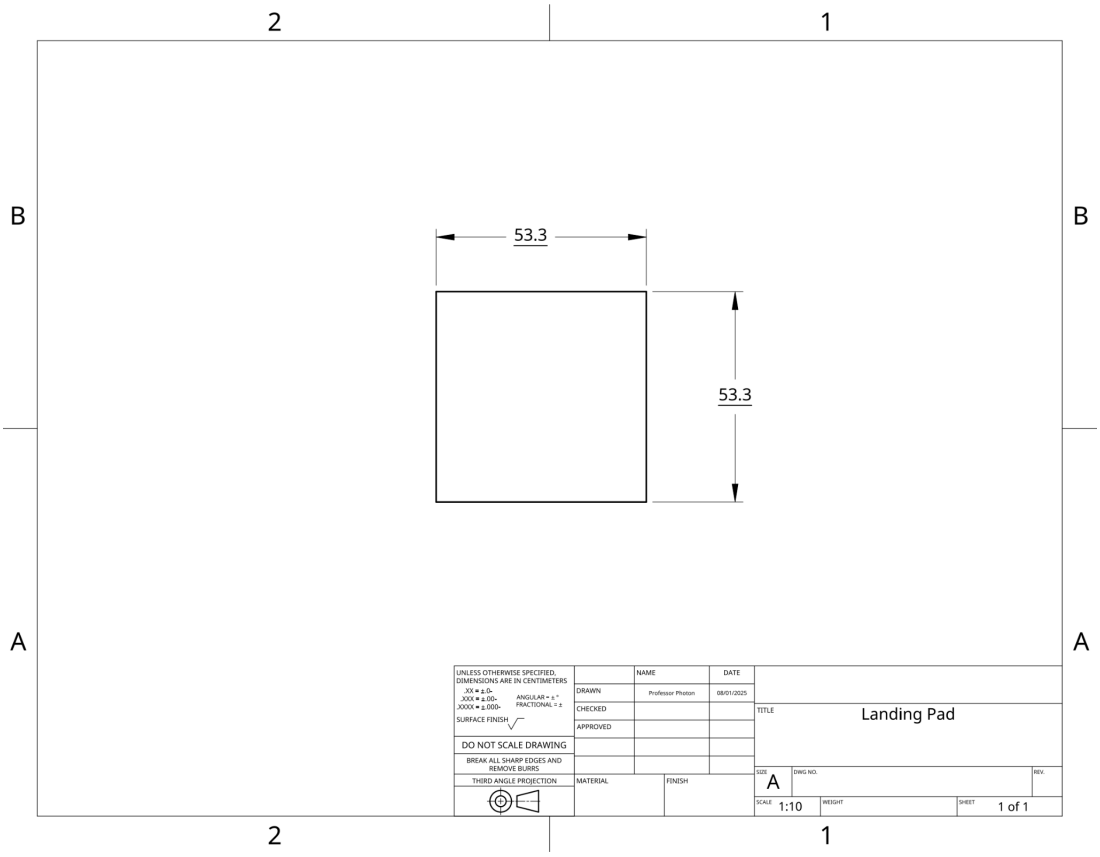
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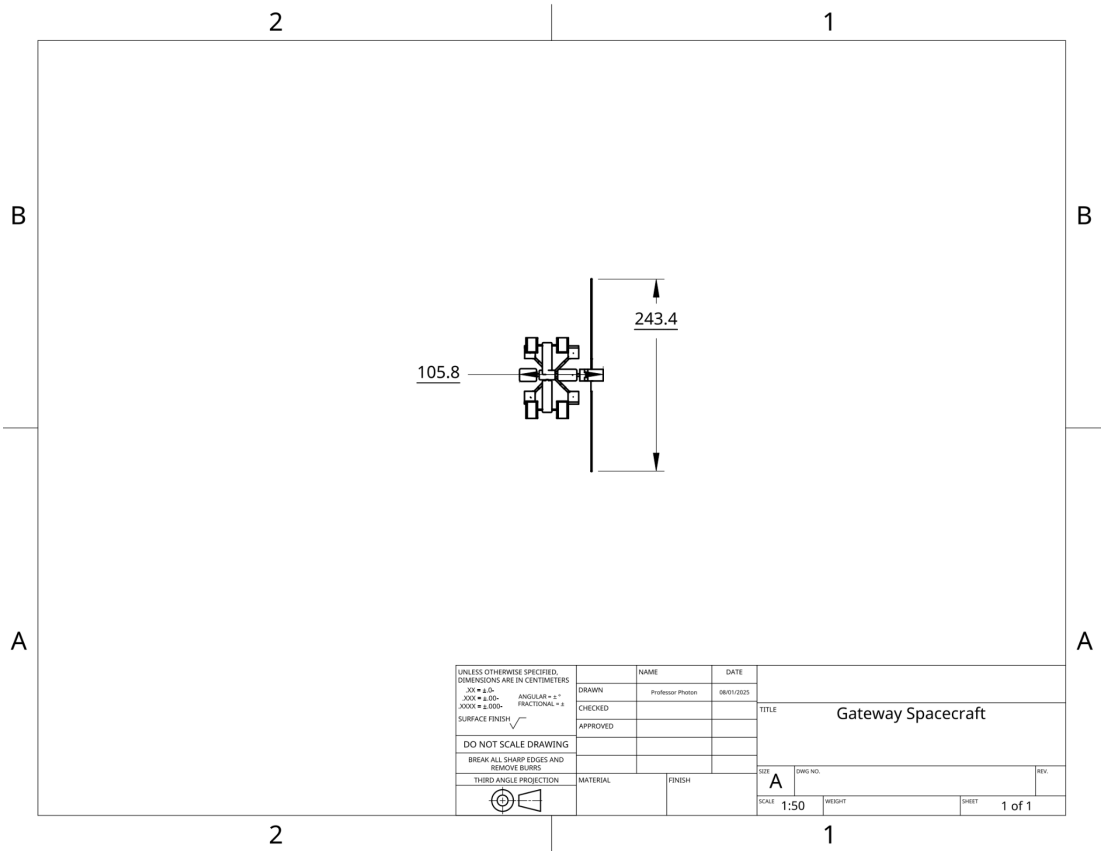
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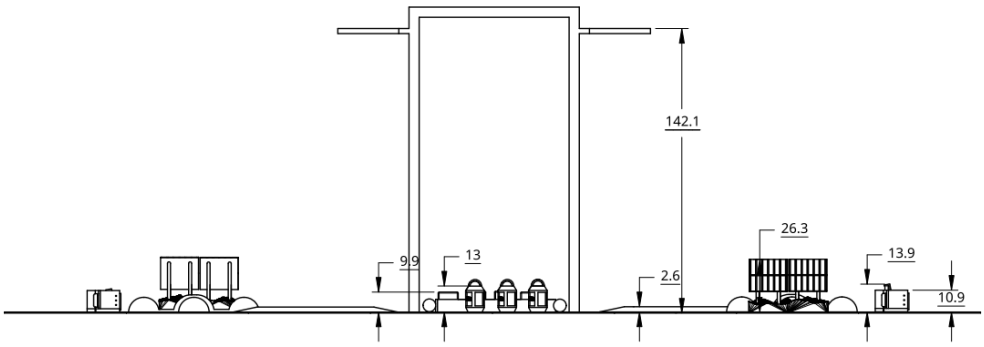

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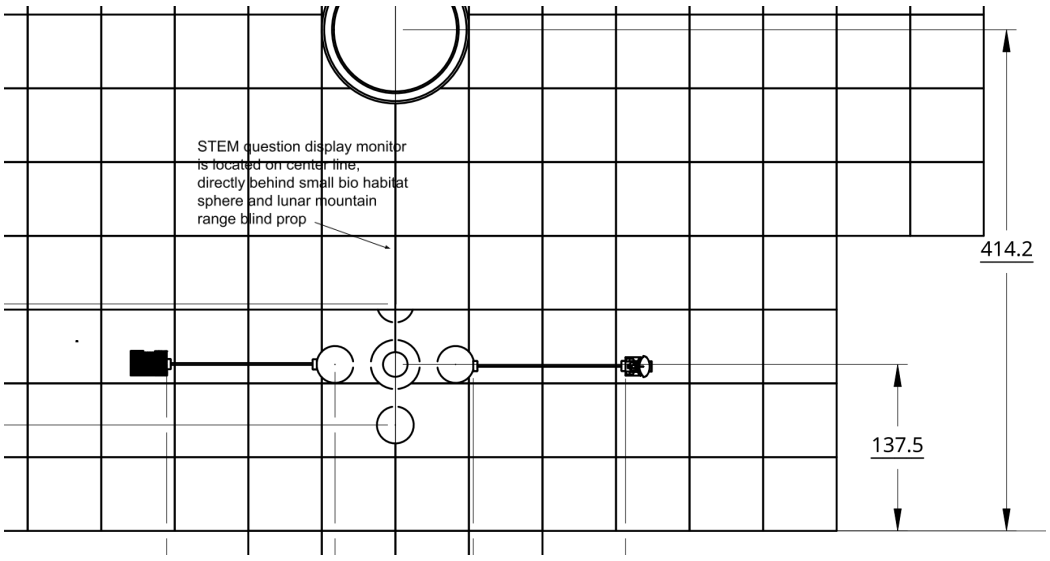
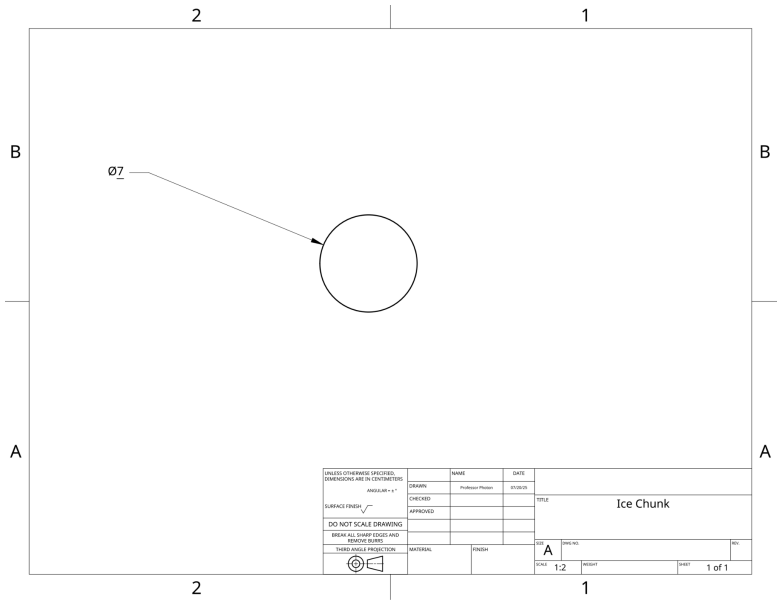
Mission Task #7 : "STEM Questions"

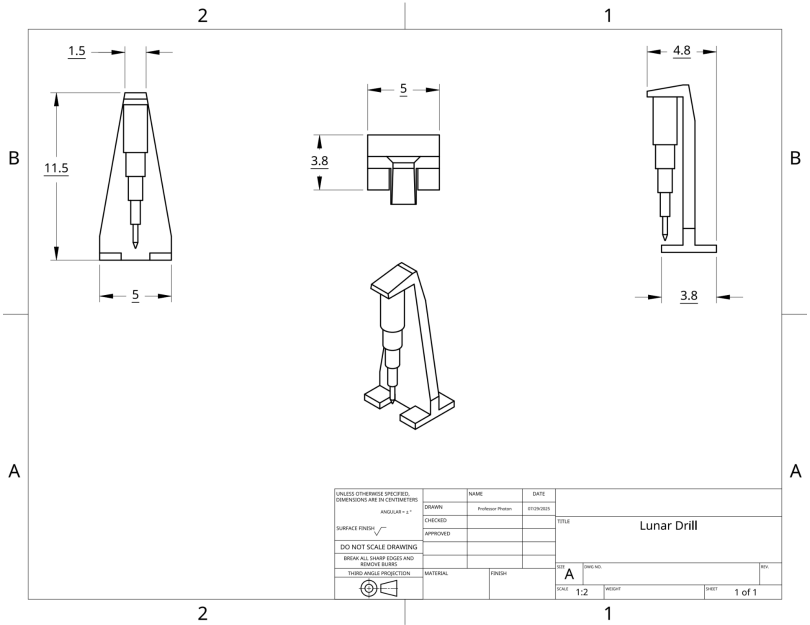


Game Elements

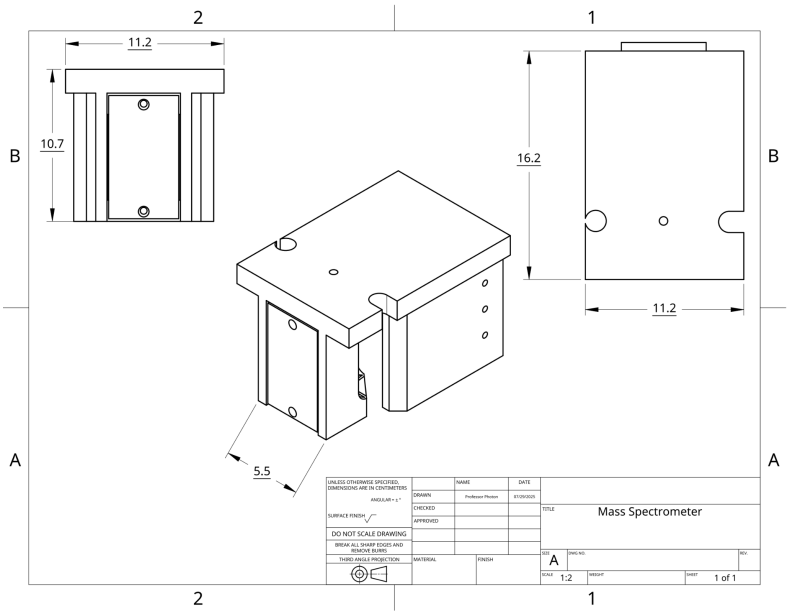
Ice (weight 21 grams)



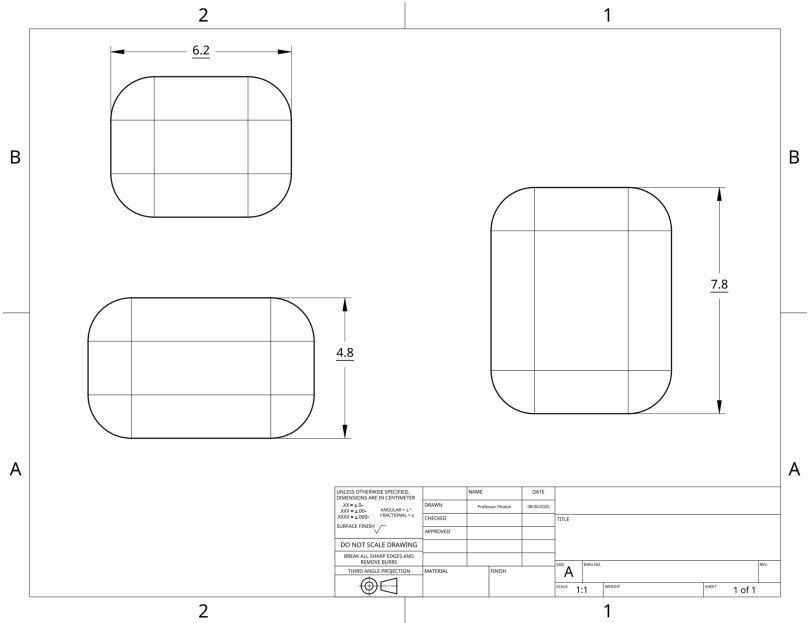
Space Drill
(weight 27 grams)



Mass Spectrometer
(weight 281 grams)

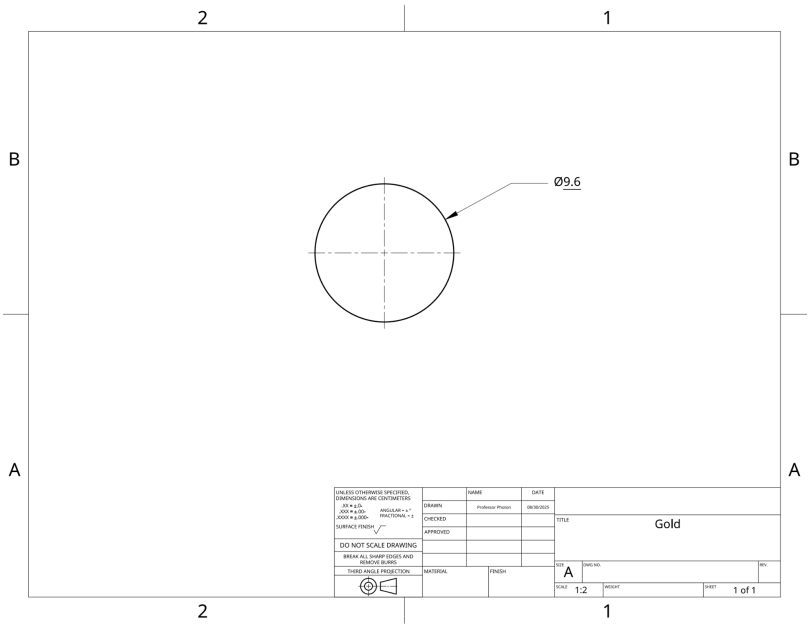


Moon Rock *
(weight 29 grams)



*Note: Actual moonrock game elements surface features are not smooth

Gold
(weight 181 grams)



Marker Beacon
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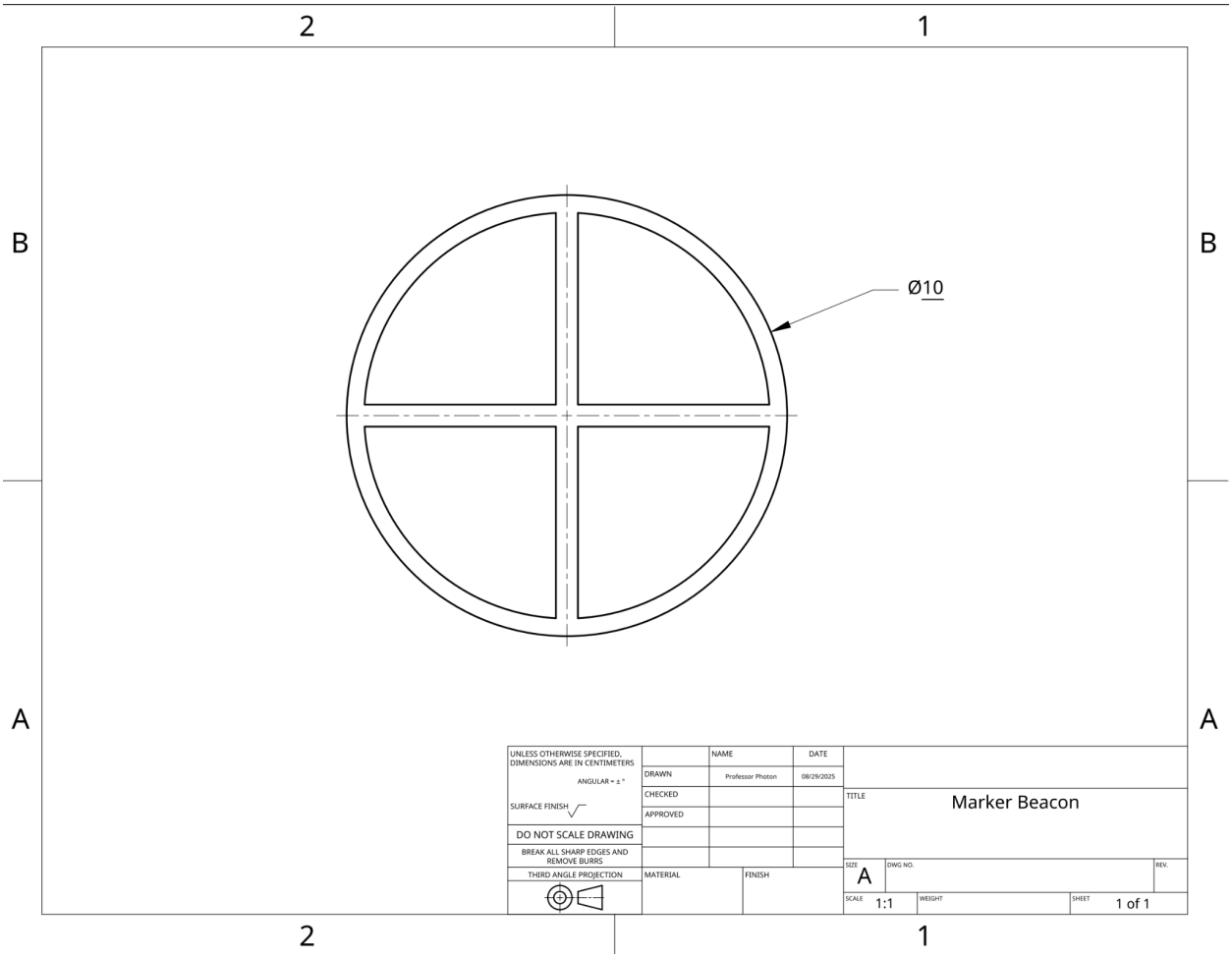
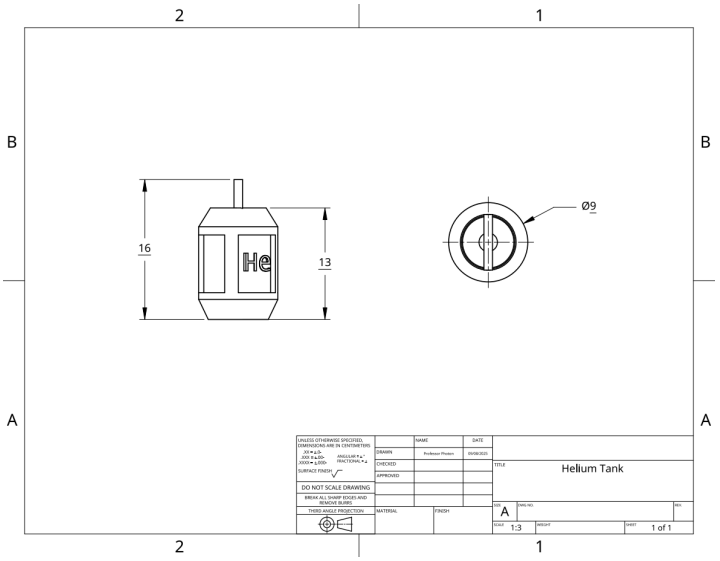


Helium Tank (5.5cm x 3cm diameter)
(weight 9 grams)



Micro Chip (2.5cm x 4.5cm)
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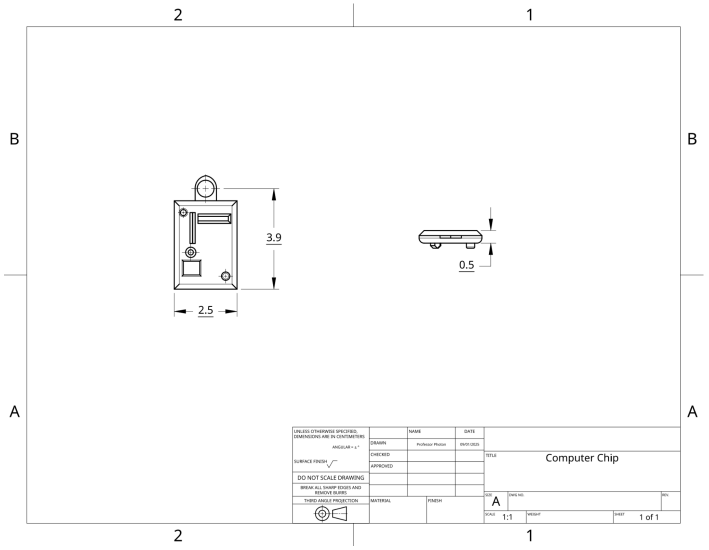

Emergency Supply Pod (4.0cm diameter)
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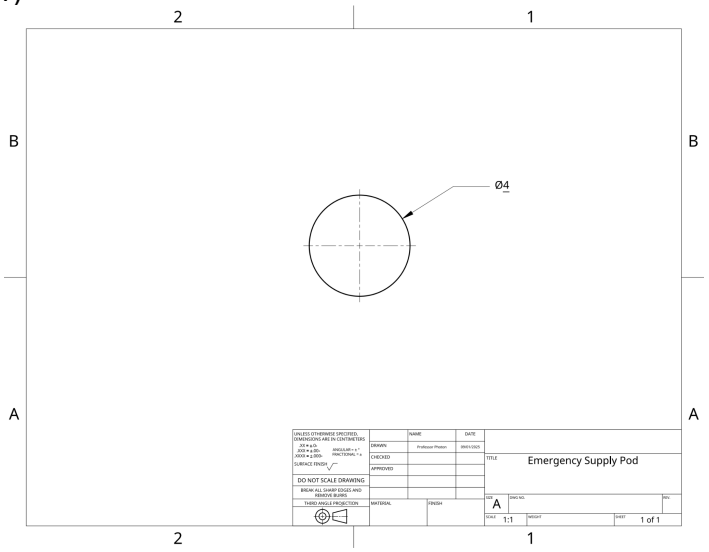

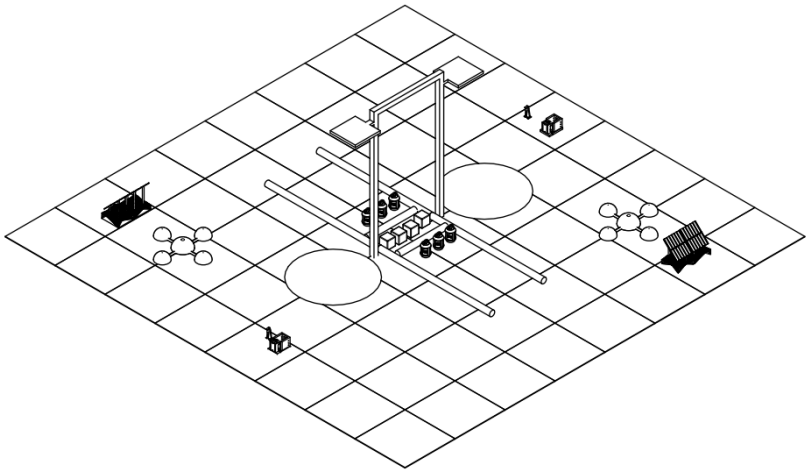

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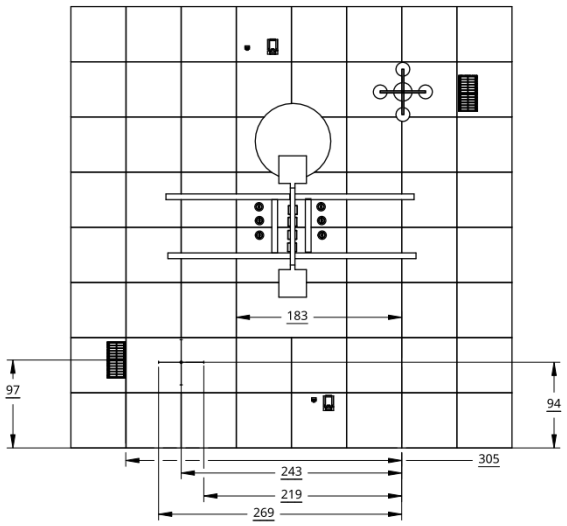

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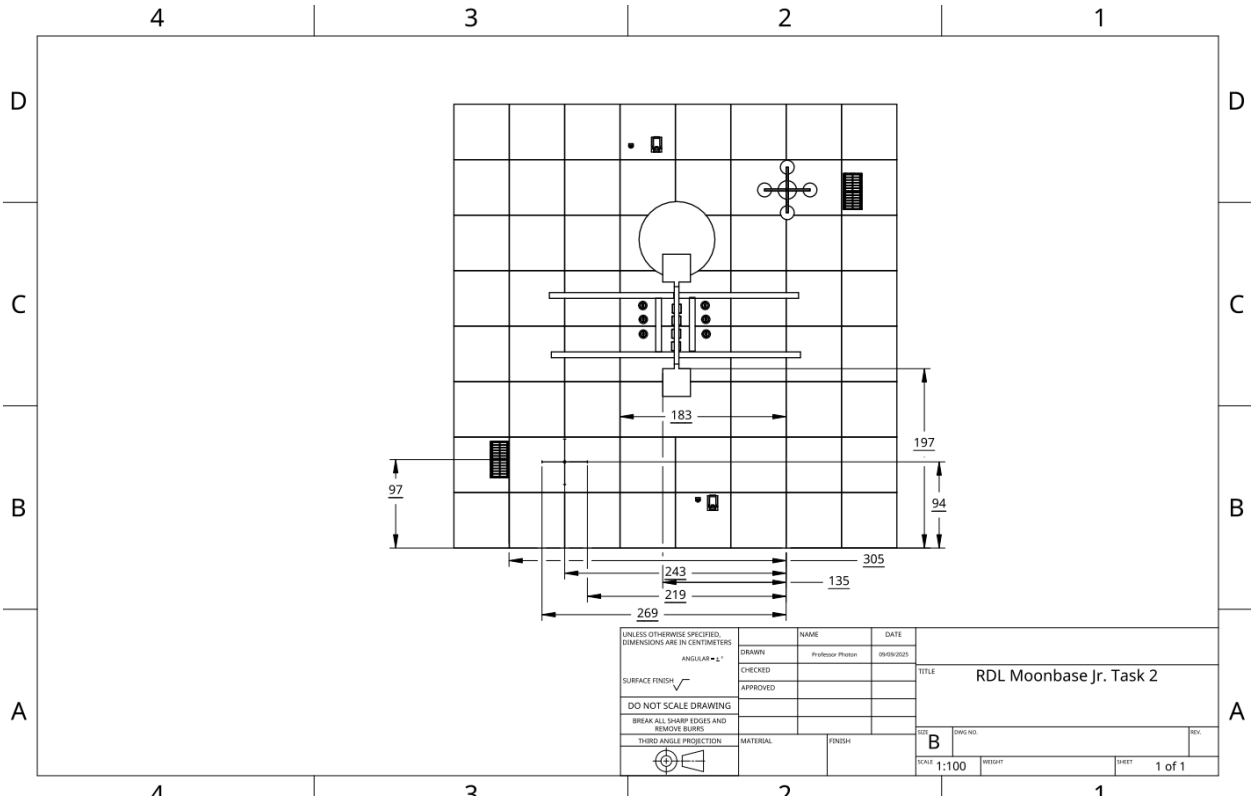
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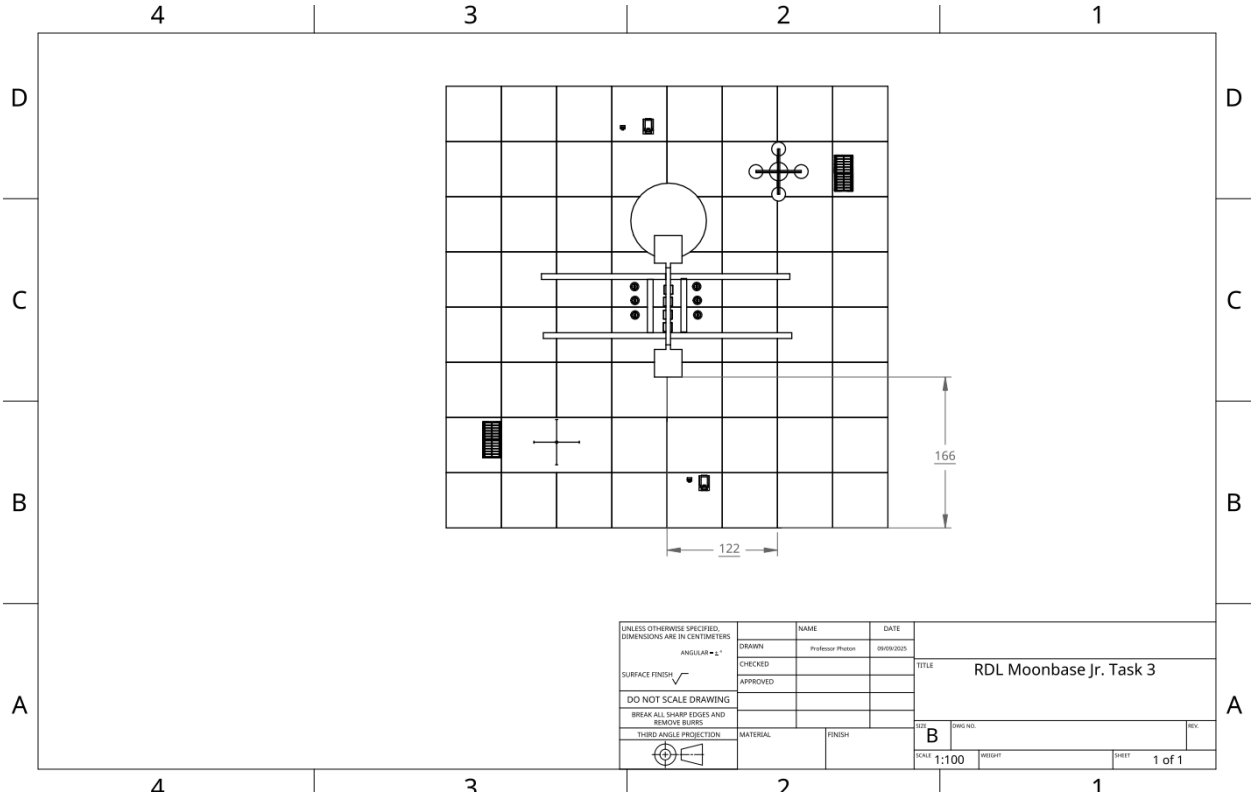
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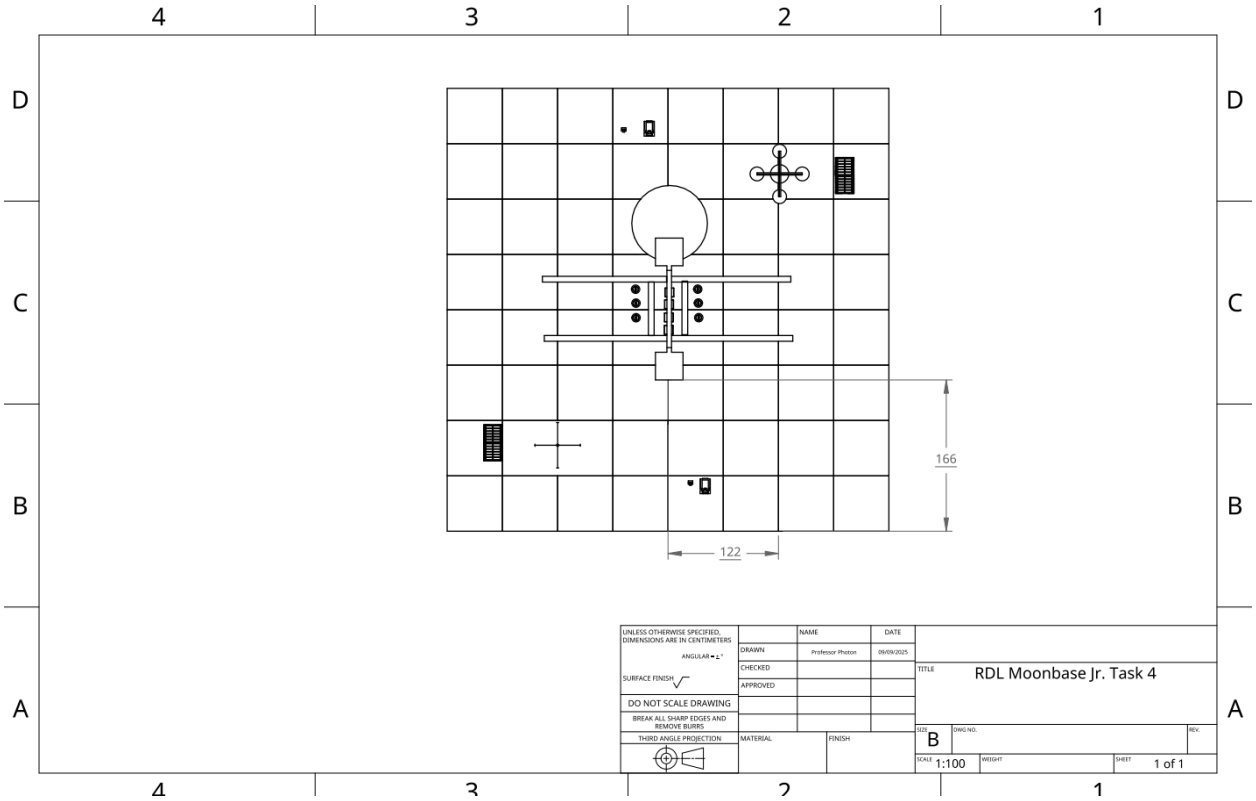
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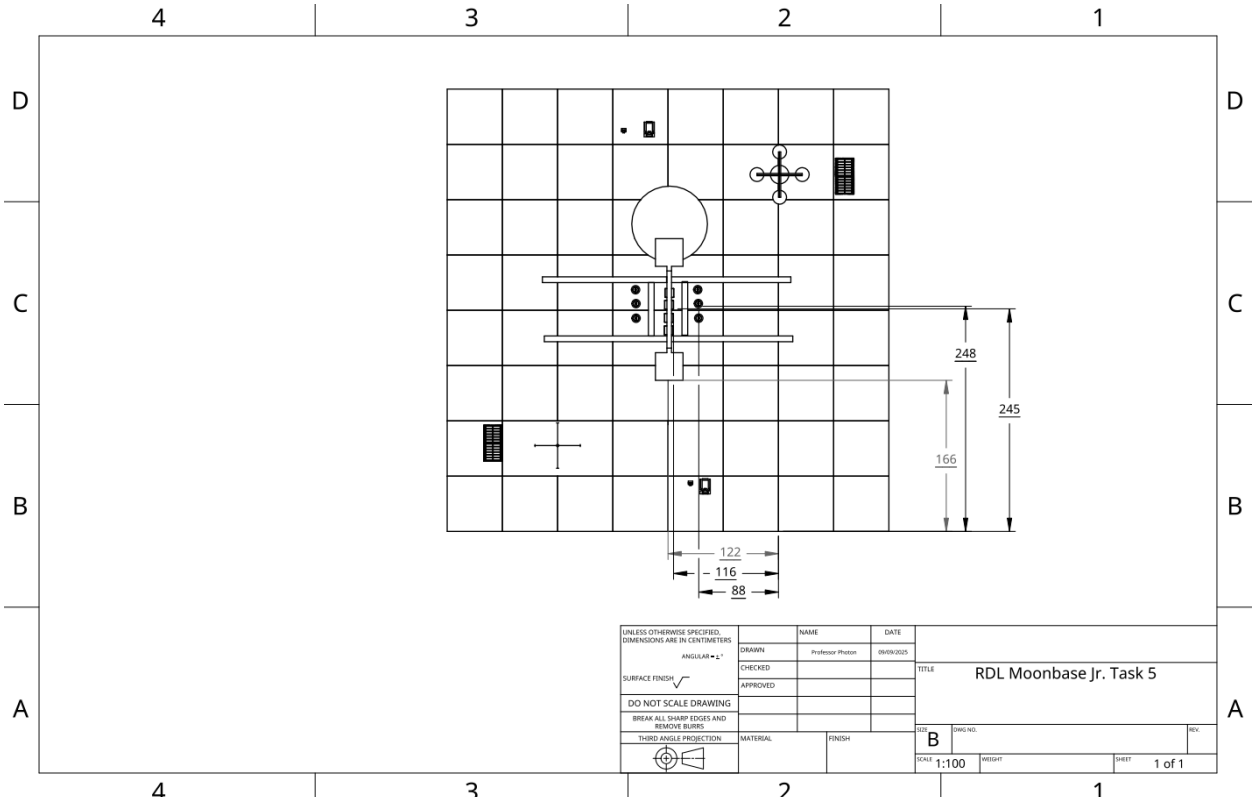
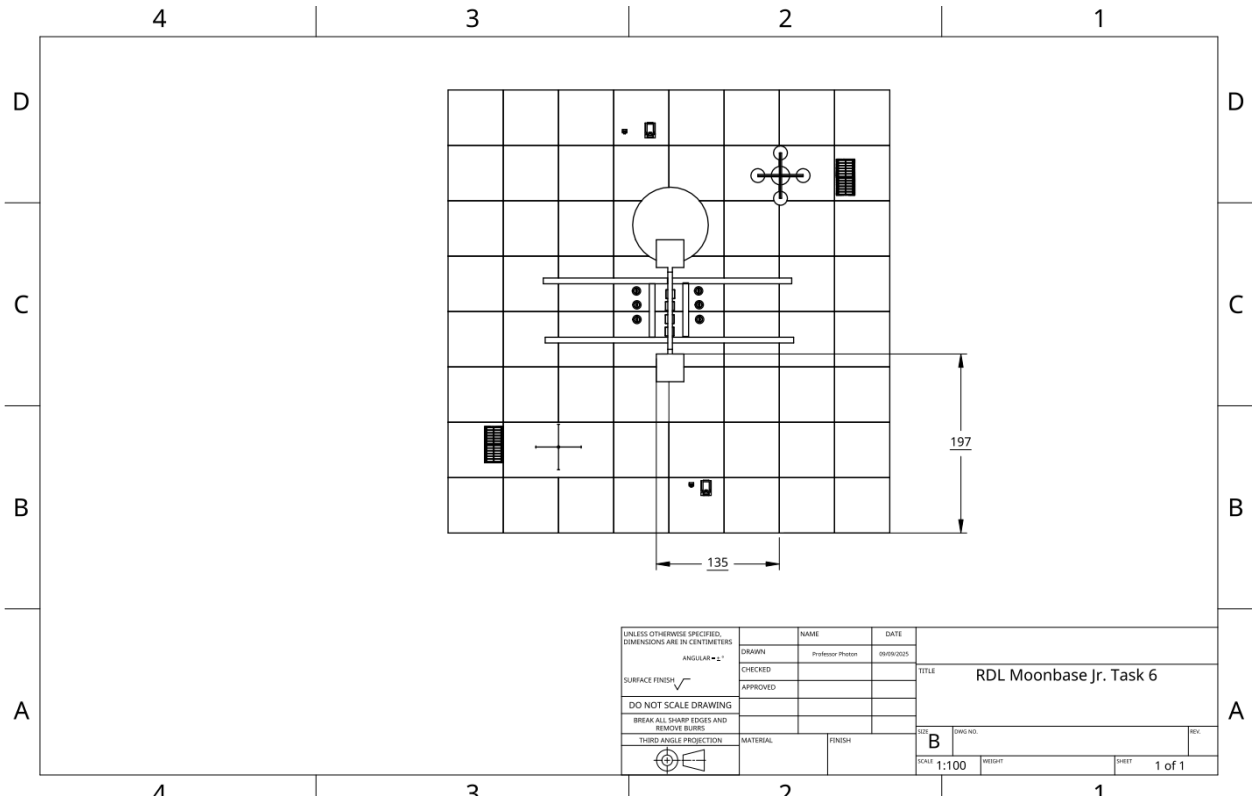
ANGULAR ± 1°
SURFACE FINISH
DO NOT SCALE DRAWING
BREAK ALL SHARP EDGES AND REMOVE BURRS
THIRD ANGLE PROJECTION
NAME
DATE
DRAWN
Professor Photon
09/09/2025
CHECKED
APPROVED
MATERIAL
FINISH
TITLE
RDL Moonbase Jr. Task 4
SIZE
B
DWG NO.
REV.
SCALE
1:100
WEIGHT
SHEET
1 of 1


4
3
2
1
D
C
B
A
248
245
166
122
116
88
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN CENTIMETERS
ANGULAR ± 1°
SURFACE FINISH
DO NOT SCALE DRAWING
BREAK ALL SHARP EDGES AND REMOVE BURRS
THIRD ANGLE PROJECTION
NAME
DATE
DRAWN
Professor Photon
09/09/2025
CHECKED
APPROVED
MATERIAL
FINISH
TITLE
RDL Moonbase Jr. Task 5
SIZE
B
DWG NO.
REV.
SCALE
1:100
WEIGHT
SHEET
1 of 1



UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN CENTIMETERS		NAME	DATE
ANGULAR: ± °	DRAWN	Professor Photon	09/09/2025
SURFACE FINISH	CHECKED		
	APPROVED		
DO NOT SCALE DRAWING			
BREAK ALL SHARP EDGES AND REMOVE BURRS			
THIRD ANGLE PROJECTION	MATERIAL	FINISH	

TITLE: RDL Moonbase Jr. Task 6

SIZE: B	DWG NO.		REV.
SCALE: 1:100	WEIGHT	SHEET: 1 of 1	