

IN THE NAME OF GOD

# IMMORTALS 3D-PRINTED ROBOT

NOW IS OPEN-SOURCE

# ADVANTAGES OF 3D-PRINTING FOR SSL:

- EASY TO USE FOR SOFTWARE ENGINEERS .
- EASY TO LEARN AND IT'S INCREDIBLY ENJOYABLE .
- FAST DEVELOPMENT ABILITY .
- TIME SAVING FOR NEW TEAMS TO SPEND MORE TIME ON THEIR SOFTWARE'S .
- ALLOWS US TO DESIGN MORE COMPLICATED PARTS AND TO BE MORE CREATIVE .
- HIGHLY TUNABLE TO ACHIEVE OPTIMUM WEIGHT AND STRENGTH AND EVEN BEAUTY ;D .
- RUNNING COST IS JUST A RELIABLE 3D-PRINTER AND LOW COST MATERIAL WHICH IS GREAT .

# OUR DESIGN FOR 3D-PRINTED ROBOT:

- IT'S COMPACT AND WE CAN CARRY LESS BAGGAGE'S TO COMPETITIONS
- LOW CENTER OF GRAVITY
- EXCEPT GEARS ITS **ALL** 3D-PRINTED NOW (MAYBE AFTER MORE TESTS SOME PARTS OF KICKING DEVICE CHANGE TO METAL)
- AS WE MENTIONED IN OUR TDP PARTS WHICH SHOULD TOLERATE FORCE OR TORQUE REINFORCED BY STANDARD METAL PARTS SUCH AS PIN AND SCREW (WE WILL SHARE BILL OF MATERIALS SOON)
- COMPATIBLE WITH BOTH 30 AND 50 WATT MAXON MOTOR EC45
- AND IT HAS A DOOR FOR BATTERY CHANGE :D

# OUR GUIDE FOR PRINTING PARTS WITH OPTIMUM SETTINGS:

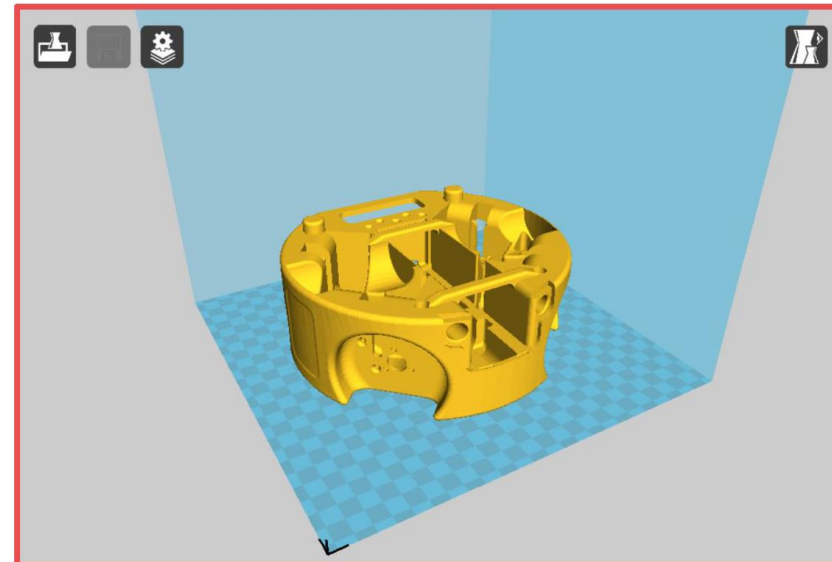
WE MADE A PDF AND WE MENTIONED BEST SETTINGS FOR  
PRINT EACH PART .

HERE IS AN EXAMPLE:

## MAIN BODY

Base part of the 3D-printed robot which all the other parts e.g. shafts, encoders, etc. will be mounted on this part. Printing settings for main body is as below:

- **Material** : PLA 1.75mm diameter, for 3D-printer nozzle 0.4mm diameter
- **Infill density**: 20 percent.
- **Shell thickness** : 0.8mm (for 0.4mm nozzle means two layers of PLA for shell)
- **Layer height** : 0.2mm
- **Amount for one robot** : 1
- **Support**: Supports will touch the build plate.
- **Heated bed temperature** : 50 C



**AND CLOSER LOOK TO DESIGN:**

3D-PRINTED DRIBBLING DEVICE

3D-PRINTED COVER

IMMORTALS

3D-PRINTED MAIN PART

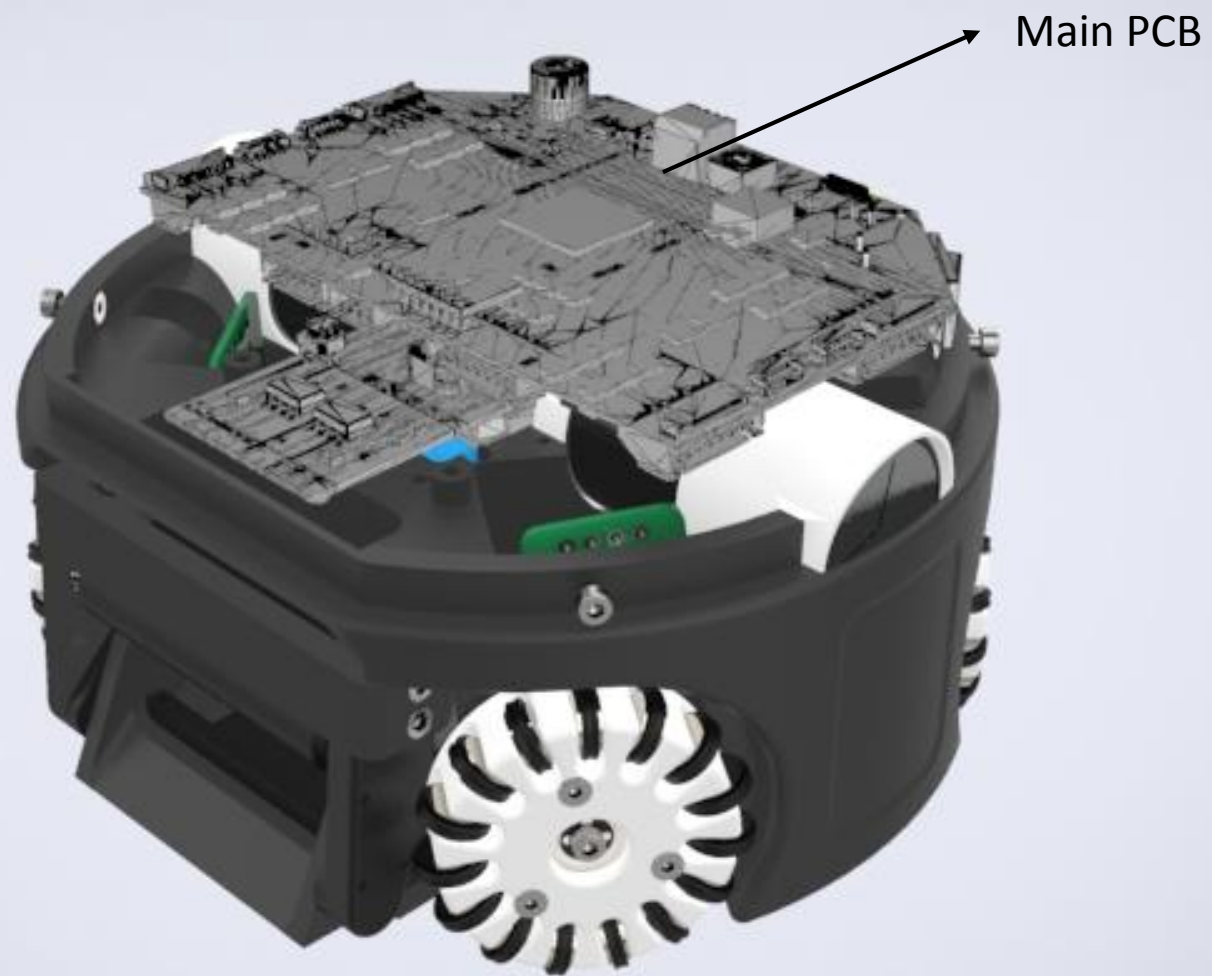
3D-PRINTED WHEELS

IMMORTALS

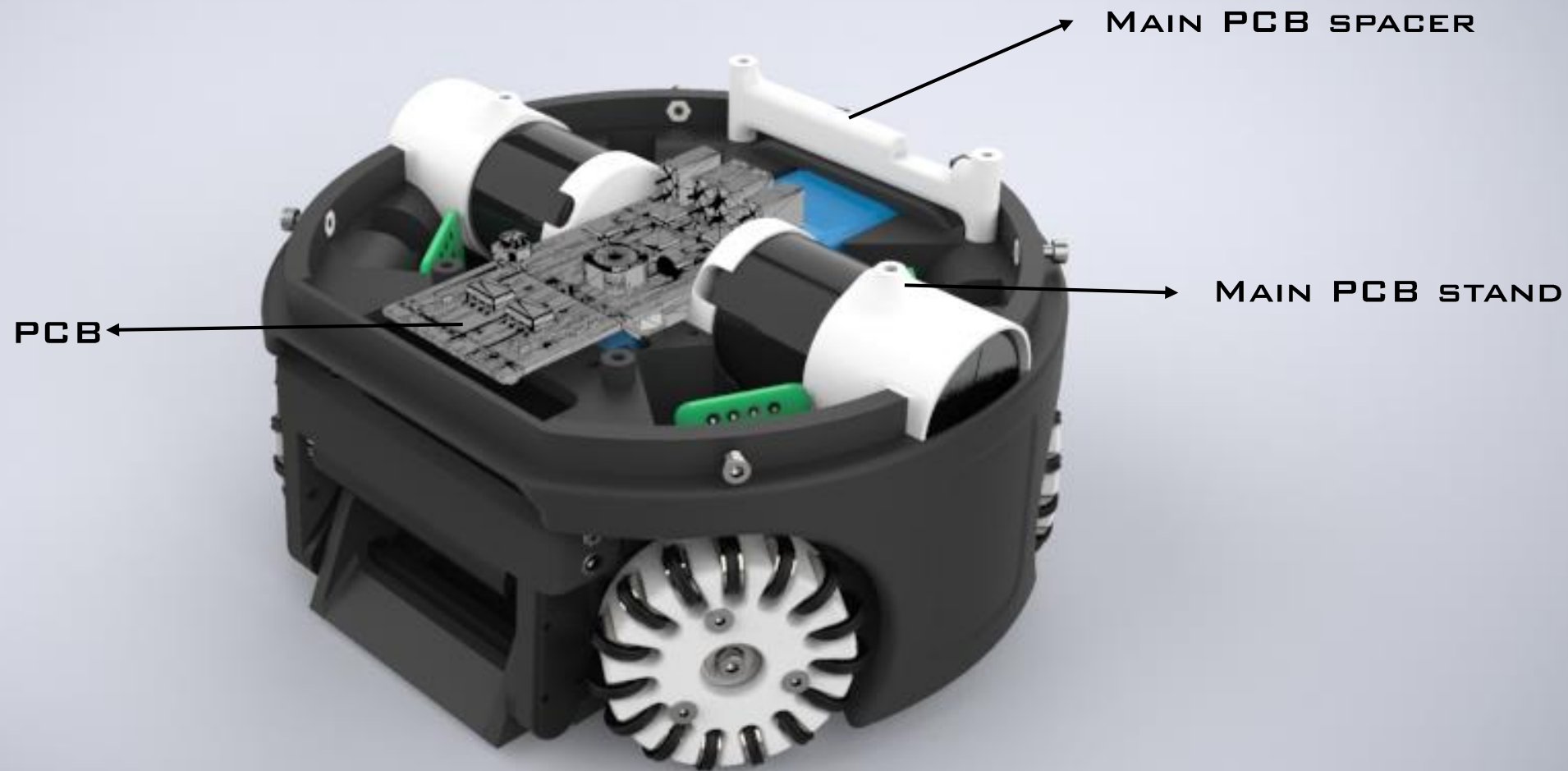


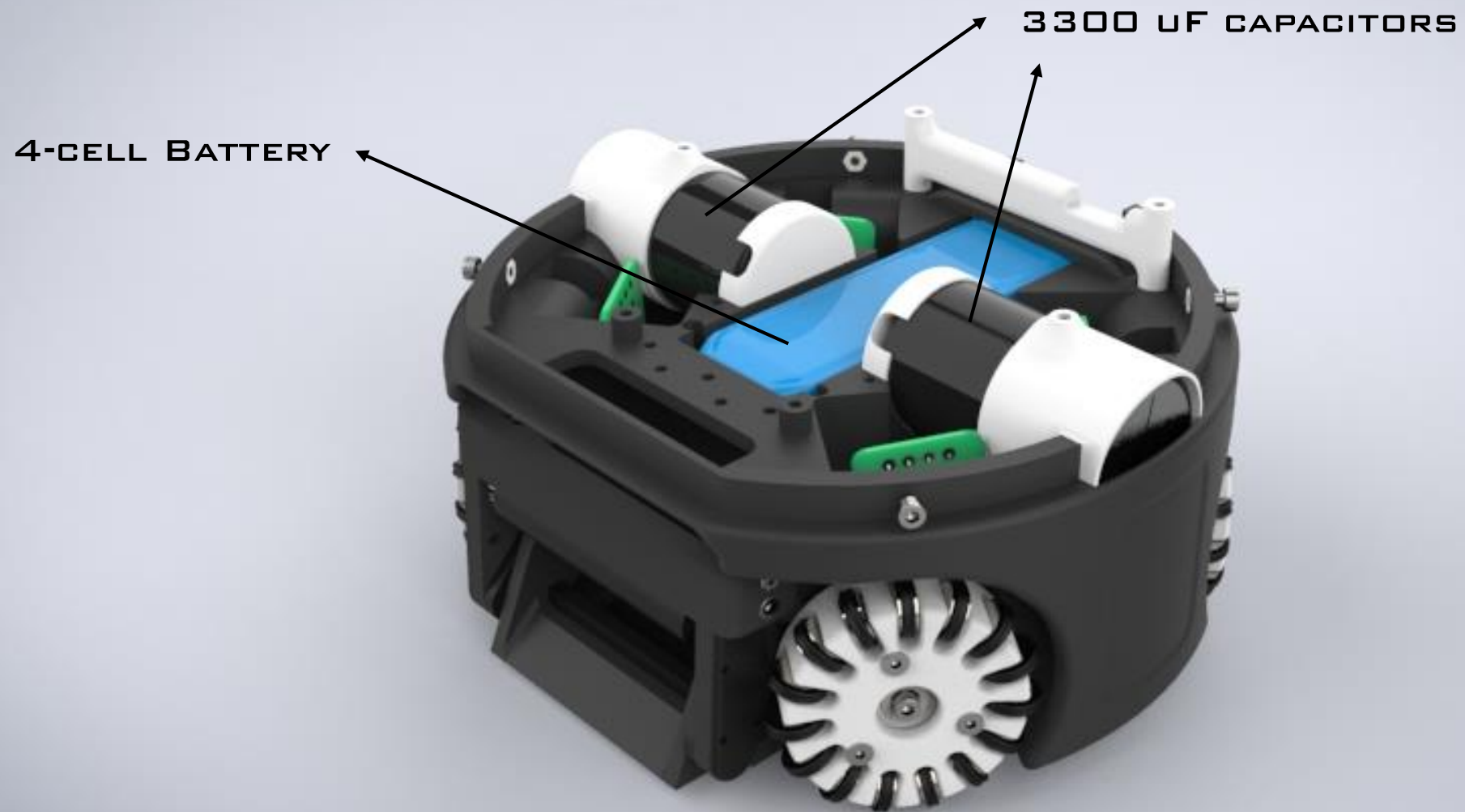


IMMORTALS











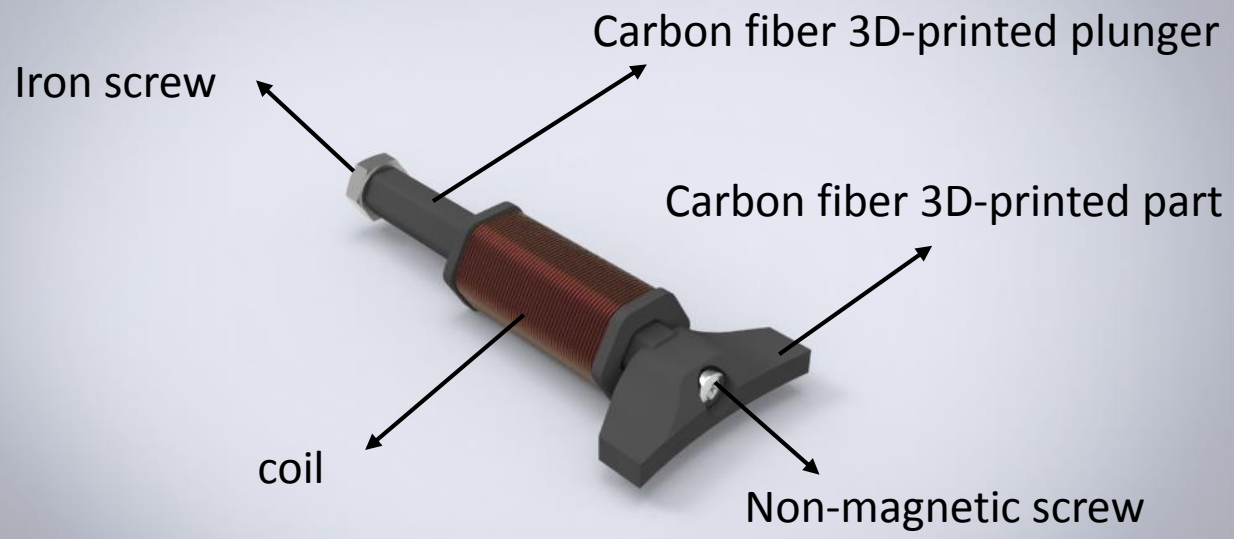
INTERNAL GEAR

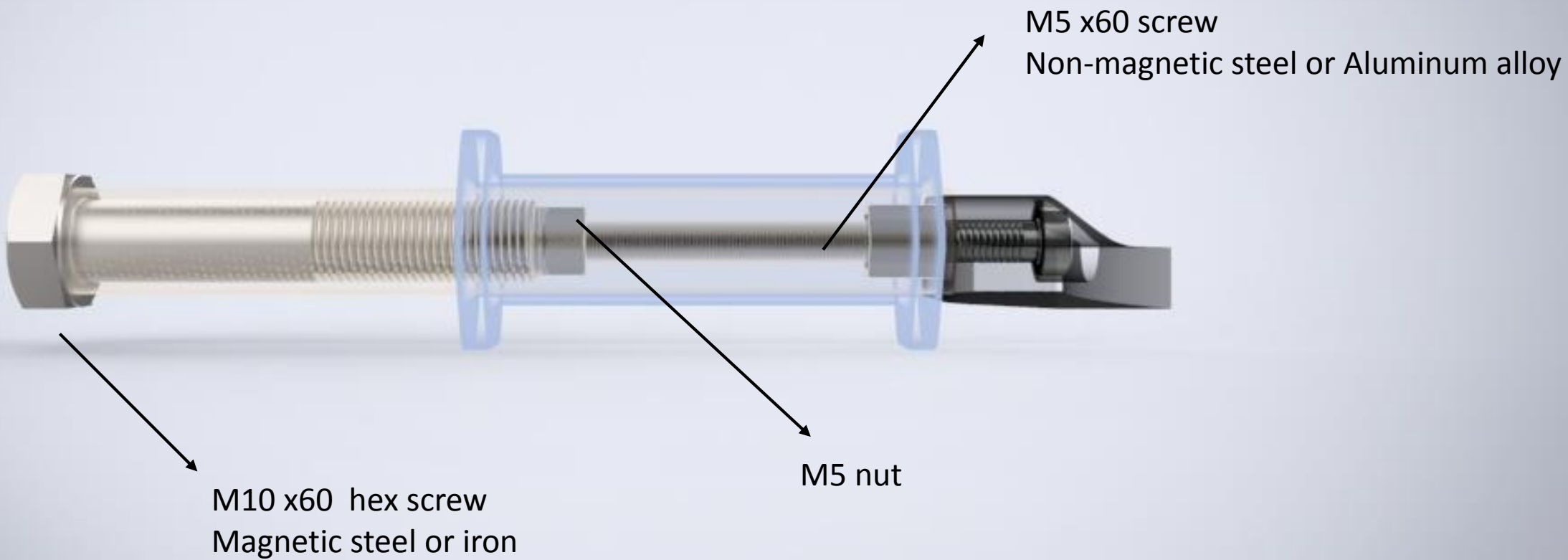
3D-PRINTED COVER

3D-PRINTED WHEEL HUB

M3 NUT

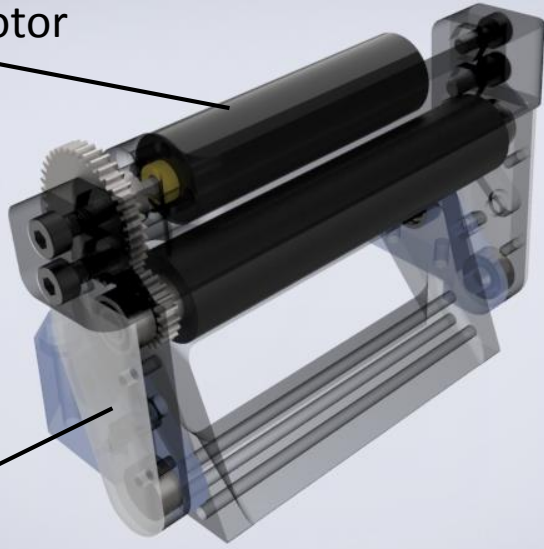








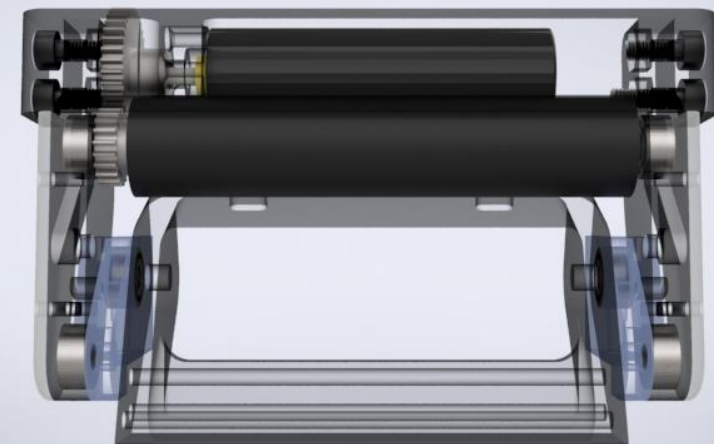
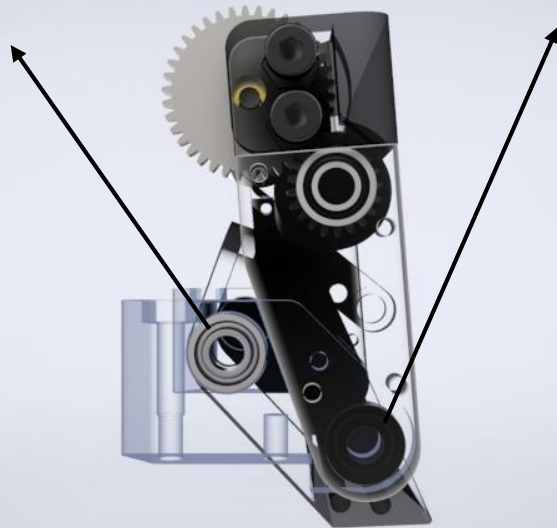
Dribbler motor

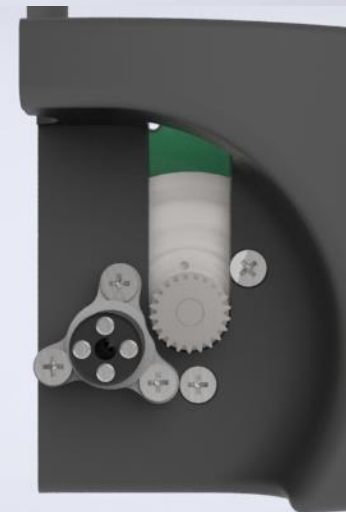
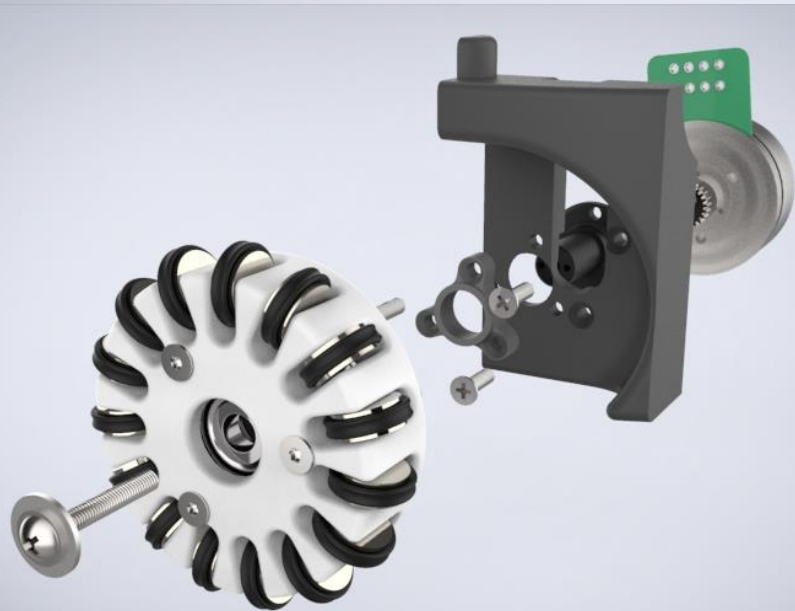
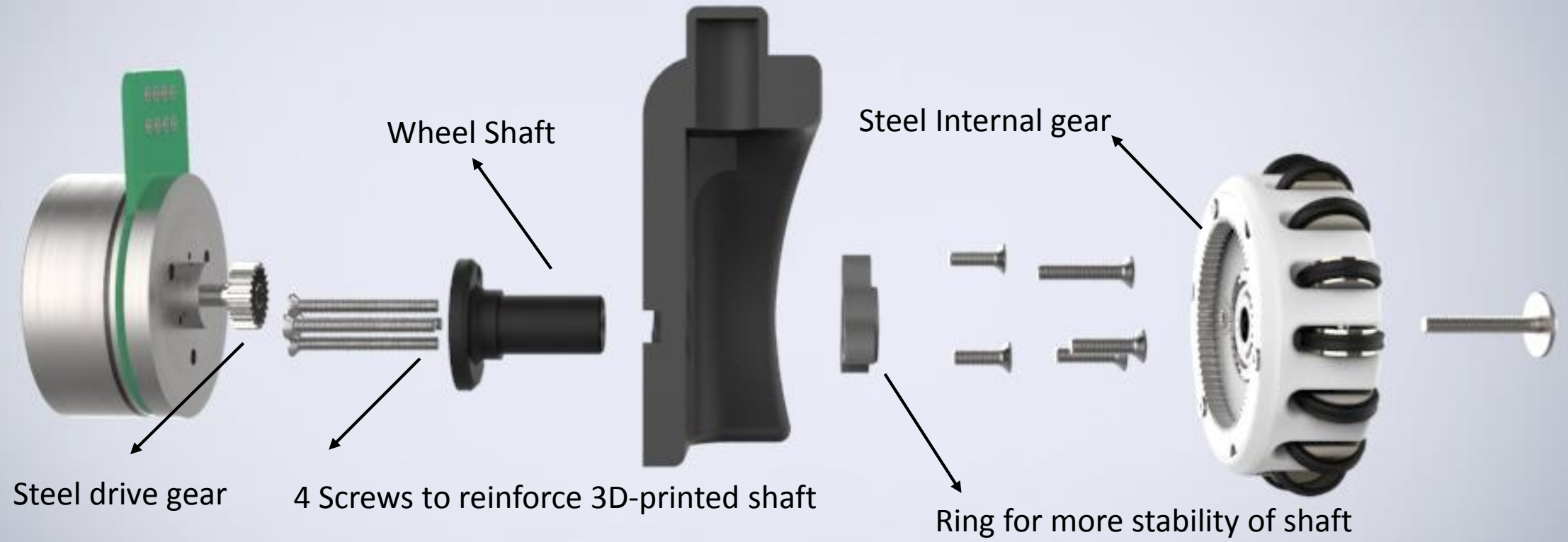


IR cover



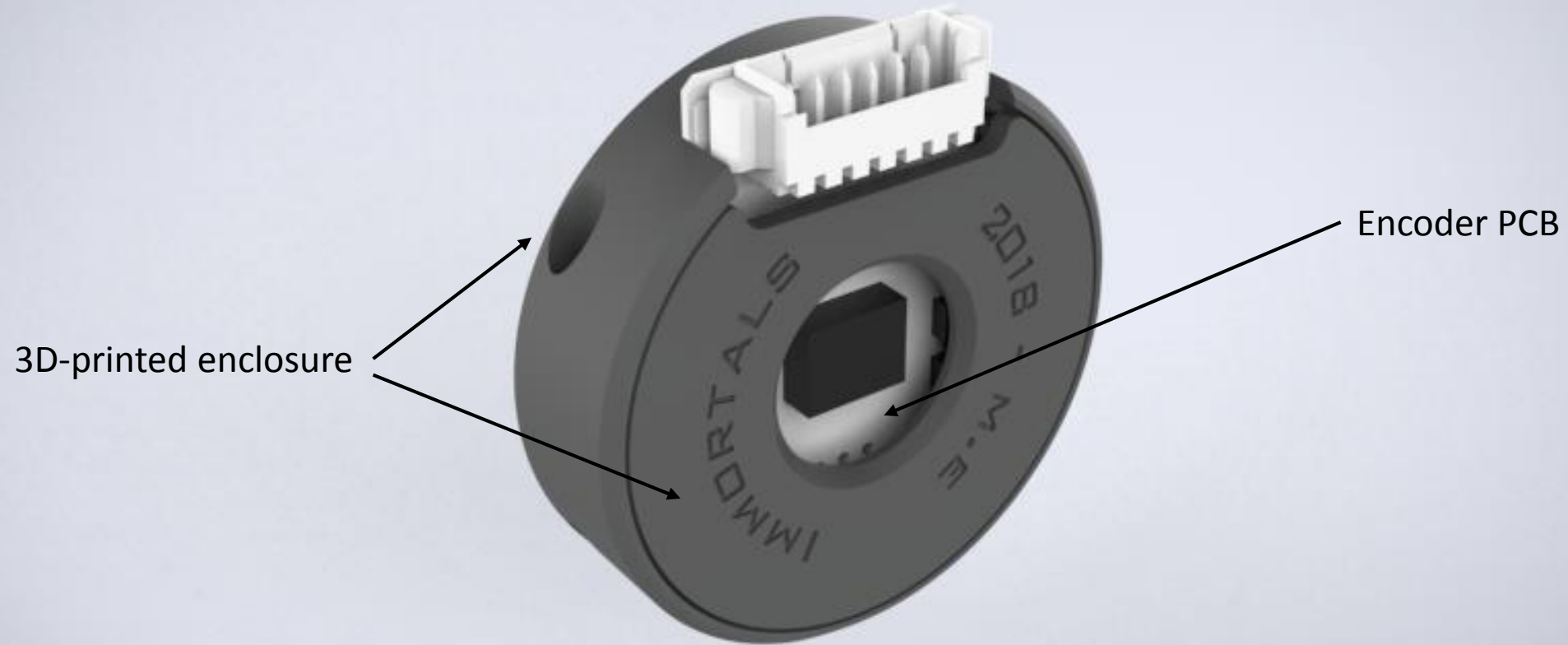
Ball-bearing to avoid damage on plastic parts







# MAGNETIC ENCODER MADE BY IMMORTALS WITH 4096 PULSE AND NO NEED TO BACK-SHAFT OR CUSTOMIZING MOTORS





DESIGNED BY GHASEMIEH, M.

IMMORTALS

**ALL YOU NEED IS JUST A RELIABLE 3D-PRINTER**

# REFERENCES:

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2. Najafi Koopai, O., Ghasemieh, M., Khanloghi, M.: Immortals 2018 Team Description. In: Proceedings of Robocup2018.
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4. Gao, T., Wu, Y., Yang, T., Huang, Z., Xiong, R.: Zjulinct 2017 Extended Team Description. In: Proceedings of Robocup2018.
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