### Repo Doc: <https://github.com/Bacmel/Borinot>

### [images folder](https://drive.google.com/drive/folders/1sKhCaoJuHLcfh3QGO7MWCxbDfbXwcxNZ?usp=drive_link)

### General

* Add all the tricky and important things that you can think
* insert\_nut.jpg to give a tip on how to insert it.

### [Component list](https://github.com/Bacmel/Borinot/blob/main/hardware/0_components_list.md)

* Component list -> Add images of all the components to visual check that you have all you need to build a new one. Divide in sections (upper\_body, motor case, limb&legs and landing) with a picture of all components in each section with names.
* Component list -> add a column to know where is stored
* Check the links, but maybe, if we have the visual information already in pictures, it’s not necessary any link. We have the reference and at the time to buy qe con google each reference. Just saying it because it seems difficult to keep the links working. If you think that is important the link to know where to buy it, maybe just the link of the home page is okey in a shopping colum or whatever.
* ø\*\*...\*\*mm O-ring Seals ????
* I don’t understand the difference between the component list and the bill of materials
* 3D printed parts don’t say anything to me without a visual reference.
* 3d printed -> motor case -> cache is cover??
* Add a link to next page at the end.

### How to print.

* Add a page with the necessary information of how to print the different parts. Where to find the cat files, any configuration necessary to be well printed, the color if it’s necessary a specific color, if it is necessary a specific 3d printer… I don’t know, whatever it may be important

### [Component preparation guide](https://github.com/Bacmel/Borinot/blob/main/hardware/1_component_preparation.md)

Part 1

* Add boxes with #id and add a column to the component list with an #id to match the components with the visual info. That id can be added in the instruction to easily check the components.
* reference (links) not working. Same as last point. If there is a visual information with pictures, maybe just with the reference and website where to buy it, is enough.
* Add a column to know where they are. Maybe it is enough with workshop (WS), Hidro shelves (HS) and to print (P). Maybe inside HS is important to know where (blue box, white box… I don’t know)
* [~~https://github.com/hidro-iri/Borinot/blob/main/hardware/brushless\_motor\_esc.md#part-2-esc-modification~~](https://github.com/hidro-iri/Borinot/blob/main/hardware/brushless_motor_esc.md#part-2-esc-modification) ~~-> How I know where are the signal pads?~~
* ~~Add at the end of each “chapter” the link to the next one.~~
* Add all the things that you found tricky in the process.
* For alopez. If I have the opportunity, change the image without heat shrink to a lateral one to see all the connections.
* Just silly, add a separator between the last instructions and the image of the following instructions. I think the picture is related to the last instruction.
* Add image microdriver\_cable\_finished.jpg (between 8 and 9)
* step 14 warning i think it goes in step 13
* step 15 -> add the heat shrink to cover the pins and maybe change the red cable to the other cable because in that case it is green.
* step 18 -> add heat shrink to cover the pins.

Part 2

* Same for component table
* step 2 -> If you think is important that the cables are soldered in the middle, not touching the banana connector border, just say it
* ESC modification -> missing back image. For me, add a box to the things to show.
* Well, I don’t know what you think, but I have modified all the cables adding the connectors and at the end soldered them to the ESC. If crimping a single cable is a pain in the ass, if it is also soldered to an esc with another 6 cables soldered…. It can be a good way to torture someone XD
* step 12 -> Double-check the orientation.?? which orientation?? Add esc\_servo\_crimp.jpg image??

### [Air frame assembly guide](https://github.com/Bacmel/Borinot/blob/main/hardware/2_airframe_assembly.md)

Part 1:

* Add airframe\_components.jpg with labeled components
* Change the first image with motor\_case\_parts.jpg labeling the name of each part
* M4x10mm Nylon not true. Explain the process (cut one bigger)
* step 2 -> add also according to the following table.
* step 2 -> Add explanation that orange ones are in the front.
* step 2 -> Clarify what is test-fit. add middle\_diference.jpg picture to show it. Add that it must match with the upper and lower part (and, between them at the end)
* I prefer start image and end image at the same level.
* (optional) add opt\_markers.jpg to check that is correct
* step 4 -> How do you assemble it? Which glue is necessary?

Part 2:

* Specify the head of the screw and in the large one if is necessary to be all screwed or not (just cilindric after the head or not)
* we don’t have M3x05mm Screws, just 06mm.
* Change the pictures for the new ones matching the haxarotor-x reference.
* step 1 -> Remove o rings information and maybe that step. I’m not assembling anything
* step 2 -> move the table to here. Add left\_right\_motor.jpg image to explain the sides.
* Remove all heat shrink reference
* So, after doing it. I will put in the first step before, the explanation to assemble one triangle and two motors of the other triangle and after that we will merge both triangles and after, assemble the last motor (step 4,5 and 6). Step 1 is the step 3. **Suggestion ->** Step 2: attach tubes. Select a motor. Insert the 4 30mm screws. Put something to keep the screws in its position (ball of paper) as shown in picture attach\_tubes.jpg. Insert the rest of the motor parts taking into account when it is necessary to insert between parts a fiber tube. Add the motor at the top. Turn it around pressing the motors to keep all the “sandwich” intact. Remove the paper ball. screw it keeping the pressure in the motor.
* ~~I think that step 3 must be before step 2~~
* ~~I think step 4, 5 and 6 are the explanation of the order of the assembly. I think it must be before, not the final steps~~
* step 2 -> Add the explanation that the nuts of the screws are the motors. Add the explanation of the position of each motor (not covering the marker)
* Add at the end airframe\_finished.jpg

Part 3

* Install ecs: Insert first the power side of the esc and after the motor phases one. Add esc\_installed.jpg
* Put picture for esc signal and power cables routing
* Connect the motor phases to their closer ones.

### [Upper body](https://github.com/Bacmel/Borinot/blob/main/hardware/3_main_body_assembly.md)

part 1

* Add upper\_body\_comp.jpg with labels. If a 3d parts it’s called in any way in the instructions, label it also. Add also pixhawk.jpg and radio\_receiver.jpg (missing radio receiver cable)
* specify head of screws.
* Pay special attention to the marker holders and fastener holders. marker holders?? fastener holders??
* Change dots to steps.
* How to create the dumpers (earplug\_tool.jpg)
* How to fix the dumpers? (Glue)
* First put m3 nuts, after dumpers in the pixhawk case.
* Explain the trick to put the nuts in the pixhawk case.
* A suggestion on how to put nuts in holes (screwdriver and hammer in my case)
* the pixhawk fastener must have the head outside (pixhawk\_fateners.jpg)
* How to cut Square carbon fiber tubes (dremel??)
* How to fix carbon fiber tubes? (fasteners instructions)

part 2

* Attach the Wi-Fi antenna to the Pixhawk case using fasteners. -> disconnect the antenna
* Missing step to insert carbon fiber tubes before power module
* add instructions of where cables must be inserted and the order if important
* add power\_module\_assembled.jpg
* Before screwing the power module, insert blue connector and diode connector. (maybe not necessary with new design)
* Secure the Ethernet adapter and radio receiver to the top part using fasteners (do not tight the radio receiver - it should be tightened during the cable routing for an easyer routing). radio receiver???? secure also the usb connector of the ethernet adapter (NO)?? eth\_radio\_assembled.jpg. Add explanation on how to connect radio receiver cable.
* Remove all connect things and put it at the end?
* pixhawk connections -> power1 and eth. before eth to pixhawk pass it through the hole. power at the side of the antenna. add pixhawk\_box\_assembled.jpg
* Position the bottom part of the main body inside the contour part. -> in the pictures is not. Do we have to do it at that point?
* Insert the 150mm square carbon fiber tubes into the top and bottom parts of the main body case. -> just the bottom, the upper must be inserted before
* Think like 1. prepare single element (top, contour, bottom :warning: positionate the cables properly before 2), 2.¨ ässemble¨, 3. connect he cable
* nuc: usually, 1. connect the power supply, 2. install bottom inside contour Position????, 3. install nuc in the main body
* For Patrick: on the contour part, the material ove the power cable of the nuc should be remove to facilitate the installation.
* Add mainbody\_orientation.jpg image
* Insert the 150mm square carbon fiber tubes into the top and bottom parts of the main body case. -> Add pushing them until the end.
* Add fastened lower part before screwing the nuc.
* add upper\_and\_lower assembled.jpg (and use it to specify the front)
* Add instructions to insert the nuts of main body markers (M4). Decide if for the upper boy we use nuts or insertions and add the instructions of the insertions before assembling the nuc.

### [Upper body integration](https://github.com/Bacmel/Borinot/blob/main/hardware/4_upper_body_integration.md)

* Add images: cable\_prev.jpg,cable\_prev2.jpg (choose one), usbc\_cable.jpg (components), big\_spacer.jpg, airframe\_mainbody\_orientation.jpg, 3d\_integration\_comp.jpg (missing smaller ones for small spacers), integration\_comp.jpg, medium\_spacer.jpg. small\_spacer.jpg
* For the routing modify cable\_prev.jpg or cable\_prev2.jpg
* Missing pictures of the routing
* first pixhaw power
* first pass through the hole the motor signals, after connect the power cables of motors and after that connect all of them. Connect the receiver cable
* After route usbC and eth from pixhawk
* add images: route\_radio\_esc.jpg, route\_pixhawk\_power.jpg, route\_ethernet\_antenna.jpg, route\_radio\_antennas.jpg, route\_usbs\_c\_eth.jpg, route\_down\_cables.jpg and route\_finished.jpg

### [Landing gear assembly](https://github.com/Bacmel/Borinot/blob/main/hardware/5_landing_gear_assembly.md)

* Image with all components (landing\_comp.jpg) missing components to fix the “wheels” to the carbon tube and the instructions.
* Specify screw heads
* How to cut carbon fiber tubes
* change dots by steps
* add land\_base.jpg
* Join the cross-block connectors using the 170mm carbon fiber tubes, ensuring alignment with provided images. Create two such assemblies. -> 4x 110mm
* tip, force into the tube while moving the angle until match with the right orientation.
* add land\_vertical.jpg
* Assemble the entire landing gear by integrating the previously made assemblies with the 4 110mm carbon fiber tubes. Follow the reference images for accurate alignment. -> 2x 170mm
* add land\_legs.jpg and land\_gear.jpg
* Add instructions to assembly “wheels” to the landing gear. Add 4 inserts and 20mmm M3 cone head screws.
* When do we have to screw to fix each bar. How much to not broke the 3d parts.
* For the “feet” 16mm screw
* add land\_gear\_finished.jpg

### Check motor ids and directions and that don’t need to be cleaned.

Add instructions to how to clean it.

Maybe flash before the pixhawk

before check with hand that spin well

Connect borinot to a power supply (hot swap) cable and to the hidro computer (usbC). Text with QGroundControl. -> ready to flight -> vehicle setup -> motors

with airframe X we will check if the motors are in the correct id(1-6). Check also the direction with a paper

### [Pixhawk installation](https://github.com/Bacmel/Borinot/blob/main/software/1_pixhawk_configuration.md#1-installation)

I have just follow that instructions

In NUC:

mkdir libraries && cd libraries

git clone --branch v1.3.1 <https://github.com/eProsima/foonathan_memory_vendor.git>

cd foonathan\_memory\_vendor && mkdir build && cd build

cmake -DCMAKE\_BUILD\_TYPE=Release ..

make -j6

sudo make install

cd ~/libraries

git clone –branch v2.0.2 https://github.com/eProsima/Fast-DDS.git

cd Fast-DDS

git submodule update --init --recursive

mkdir build && cd build

cmake -DTHIRDPARTY=ON -DSECURITY=ON ..

make -j6

sudo make install

cd ~/libraries

git clone --branch v1.0.4 –recursive https://github.com/eProsima/Fast-DDS-Gen.git

cd Fast-DDS-Gen

git submodule update --init --recursive

cd gradle/wrapper/

vim gradle-wrapper.properties change DistributionUrl to 6.8.3

cd ../..

./gradlew assemble && sudo env "PATH=$PATH" ./gradlew install

pip install empy==3.3.4

Saltamos a este punto

cd ~/libraries/PX4-Autopilot/

make px4\_fmu-v5x\_rtps upload

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### [Eagle](https://github.com/Bacmel/Borinot/blob/main/software/2_eagle_mpc_installation.md)

* ~~2 -> modify .bashrc -> add before a line to know that is for crocoddyl (# Crocoddyl)~~
* ~~3 -> change for sudo apt install -qqy robotpkg-py38-eigenpy=2.8.0 robotpkg-hpp-fcl=1.8.1 robotpkg-py38-hpp-fcl=1.8.1 robotpkg-pinocchio=2.6.10 robotpkg-py38-pinocchio=2.6.10 robotpkg-py38-example-robot-data~~
* ~~sudo apt install -qqy robotpkg-py38-eigenpy=2.8.0 \~~
* ~~robotpkg-py38-example-robot-data \~~
* ~~robotpkg-hpp-fcl=1.8.1 \~~
* ~~robotpkg-py38-hpp-fcl=1.8.1 \~~
* ~~robotpkg-pinocchio=2.6.10 \ robotpkg-py38-pinocchio=2.6.10~~
* git clone https://github.com/hidro-iri/eagle\_mpc\_lib.git -b bfa2\_experiments -> or public or change to git clone git@github.com:hidro-iri/eagle\_mpc\_lib.git -b bfa2\_experiments
* solve eagle\_mpc example problem or delete it in doc

### [Master board](https://github.com/Bacmel/Borinot/blob/main/software/3_master_board_configuration.md)

* Part ***2***: Odri Control Interface Installation
* Add explanation of the examples and what we are expecting. Stop it with ctrl+C.

### [ROS2](https://github.com/Bacmel/Borinot/blob/main/software/3_ros2_install_config.md)

* sudo apt update
* sudo apt install python3-vcstool
* mkdir ~/galactic\_ws && cd ~/galactic\_ws
* wget <https://raw.githubusercontent.com/Bacmel/Borinot/refs/heads/main/resource/borinot.repos>

### leg microcontroller installation

### hidro laptop

### [Troubleshooting](https://github.com/Bacmel/Borinot/blob/main/resource/troubleshooting.md)

* Check battery level before flight (23,5V)

## To Print