



Guide for Flashing the NAO Robot with Sabana Hérons

Laura Maria Franco

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1 Introduction

This document describes the procedure for flashing a NAO robot with the operating system required to use it with the **Sabana Herons**' software. The objective is to provide a clear and reproducible guide for current and future members of the Applied Robotics Research Group.

2 Prerequisites

- **NAO Robot:** It must be configured with the Choregraphe image.
- **Ubuntu:** Can be virtual machine or native installation.
- **CLion:** Required to open the Sabana Herons project.
- **Libraries:** For Ubuntu 22.04 LTS, the following libraries are required.

```
sudo apt install ccache clang cmake git graphviz libasound2-dev  
libbox2d-dev libgl-dev libqt6opengl6-dev libqt6svg6-dev libstdc  
++-12-dev llvm mold net-tools ninja-build pigz qt6-base-dev rsync  
xxd
```

- **Sabana Herons 2026 repository:**

```
git clone --recursive https://github.com/juanulloa2050/  
SabanaHeron2026
```

- **Original Aldebaran operating system image:** This file is private and cannot be published on GitHub. It can be found in the files section of the general channel of the Teams group “Applied Robotics Research Group”.

```
nao-2.8.5.11_ROBOCUP_ONLY_with_root.opn
```

- **USB:** Used to upload the image to the NAO.

3 Image Generation

1. **Generating the CLion project files:** After cloning the Sabana-Herons repository:

- If the window shown in the following image appears when compiling *Develop - Nao*, then the files have already been generated.
- Otherwise, if the window does not appear, it will be necessary to run the following command in the terminal:

```
Make/Linux/generate -c
```

After running it, the file *Make/Linux/CMakeLists.txt* must be opened as a project in CLion.

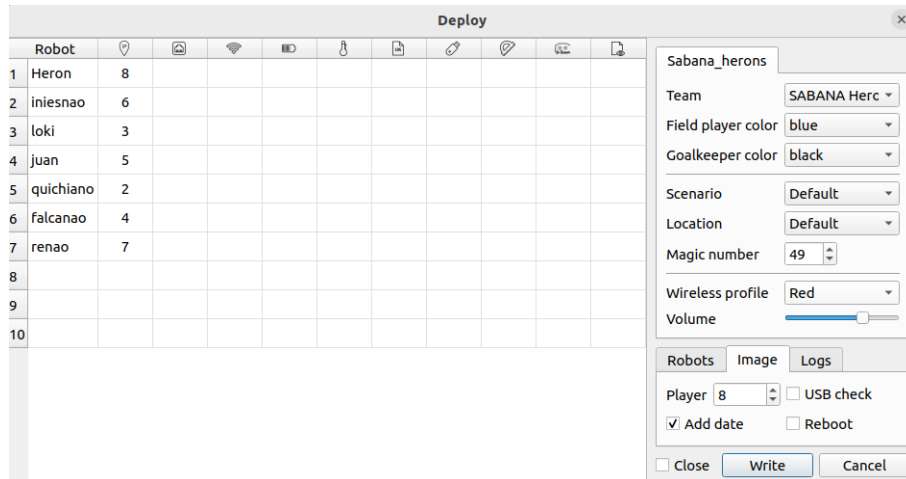


Figure 1: Deploy window.

2. Installation of additional libraries:

```
sudo apt install bzip2 debootstrap patchelf
```

3. Compilation of the Aldebaran OPN: After the additional libraries have been installed, the following command must be executed:

```
sudo Install/createRootImage <path to original Aldebaran OPN>
```

to compile the OPN. If the compilation finishes successfully, the following file will appear:

```
Install/root.ext3
```

4. **Parameter adjustment:** It is necessary to compile *Develop - Nao* again, and once the *Deploy* window opens, different parameters can be modified, such as the robots' jersey color, the location (field_e/outdoor) where they will play, the team number, among others. Additionally, in the lower right part of the window, the *Image* option must be selected, the player number chosen, and the parameters shown in "Fig. 1" should be left unchanged.
5. **Image generation:** Finally, with the parameters configured, pressing the *Write* button will start the image creation process¹. After the creation finishes, the result can be seen at the path shown in the following image (each image has a timestamp in the file name).

4 Storage Device Preparation

1. Connect the USB drive to the computer.

¹In case an error occurs due to permissions, a command like the following can be executed to change the permissions of the Build folder: `sudo chown -R user:group /path/to/folder`.

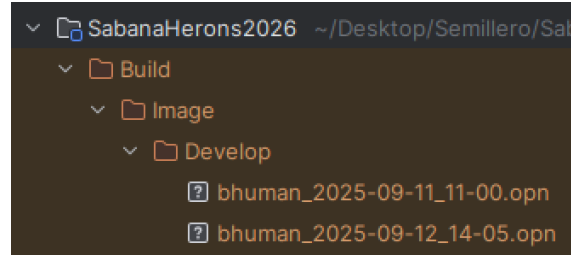


Figure 2: Path of the generated images.

2. Identify the device by running the following command in the terminal:

```
lsblk
```

3. Upload the image to the USB using the following command:

```
sudo dd if=nombreImagen.opn of=/dev/sdX bs=4M status=progress  
sync
```

Where sdX is the USB device (shown with lsblk).

5 Flashing Process on the NAO Robot

1. Turn off the NAO.
2. Insert the USB drive with the image.
3. Turn on the robot while holding the chest button until the ear LEDs turn blue.
4. Wait for the installation process to finish (indicated by the NAO's LEDs).
5. Remove the USB drive and restart the robot.

References

- [1] Röfer, T., Laue, T., Böse, F., Hasselbring, A., Lienhoop, J., Monnerjahn, L. M., Reichenberg, P., & Schreiber, S. (2023). B-Human Code Release Documentation 2023. <https://docs.b-human.de/coderelease2023/getting-started/initial-setup/>.