

EZ-Map Navigation

A Graphical 'EZ' Web App For Ubiquity Robotics Magni Robot

Slide deck version: 20210525

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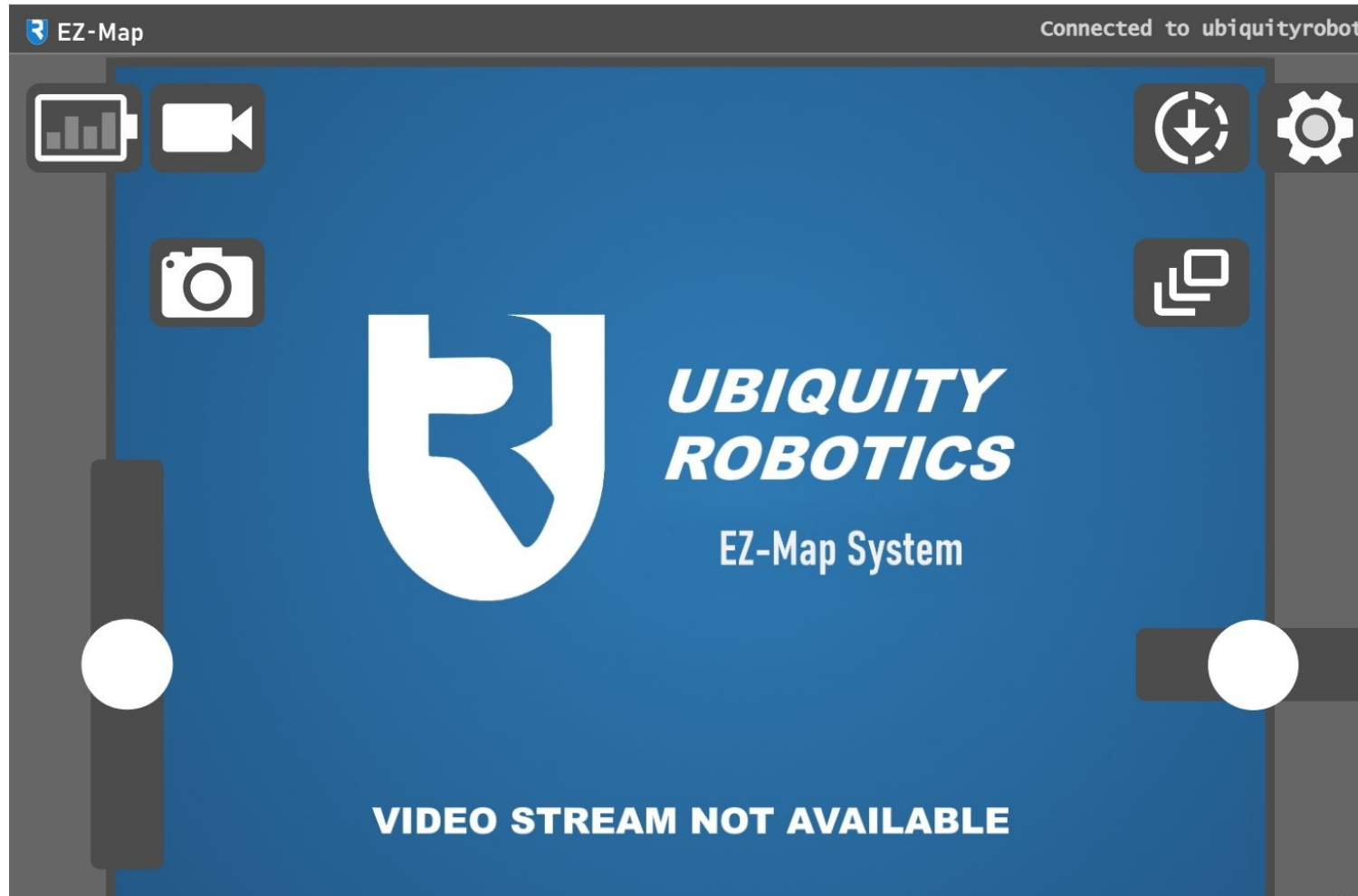
Disclaimer: I am presenting EZ-Map but it is not my
brainchild



Mapping The Area

- Connect to the EZ-Map web app on port 3000
- The opening screen shows assorted info and camera with tank motion controls so by itself without running EZ-Map this app is a frontend.

EZ-Map Splash Screen



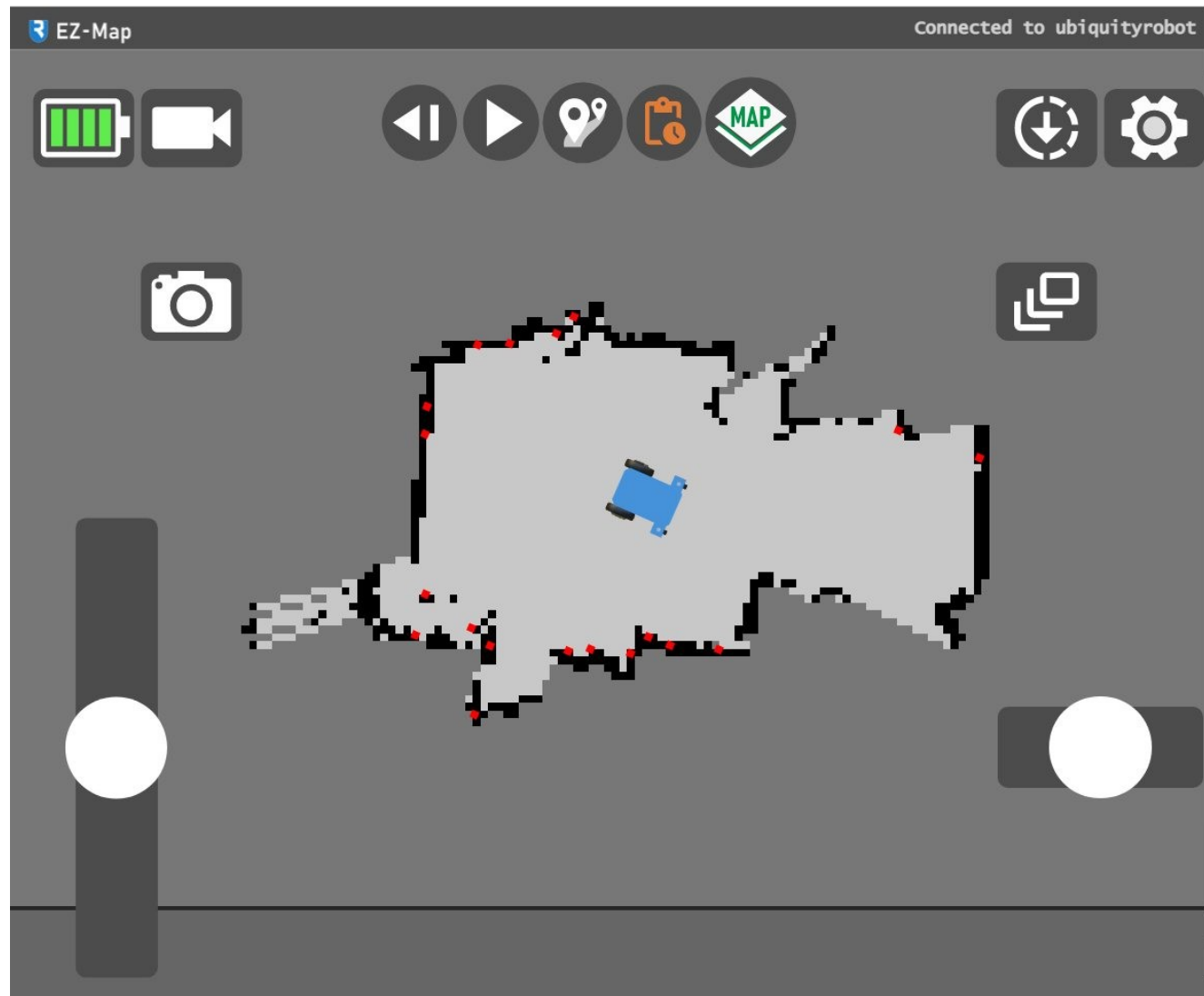
The Top Level With Drive-About Controls

- Top level has the 'Tank' controls to drive around (no mapping)
- The live video feed shows up (My workshop 'inspirational' pic)
- You can see battery status
- Taking pictures is done with icon on the left
- All these controls will be always available
- To start EZ-Map the lowest Icon on the right will be clicked

Top Level Drive-About and Take Pics View



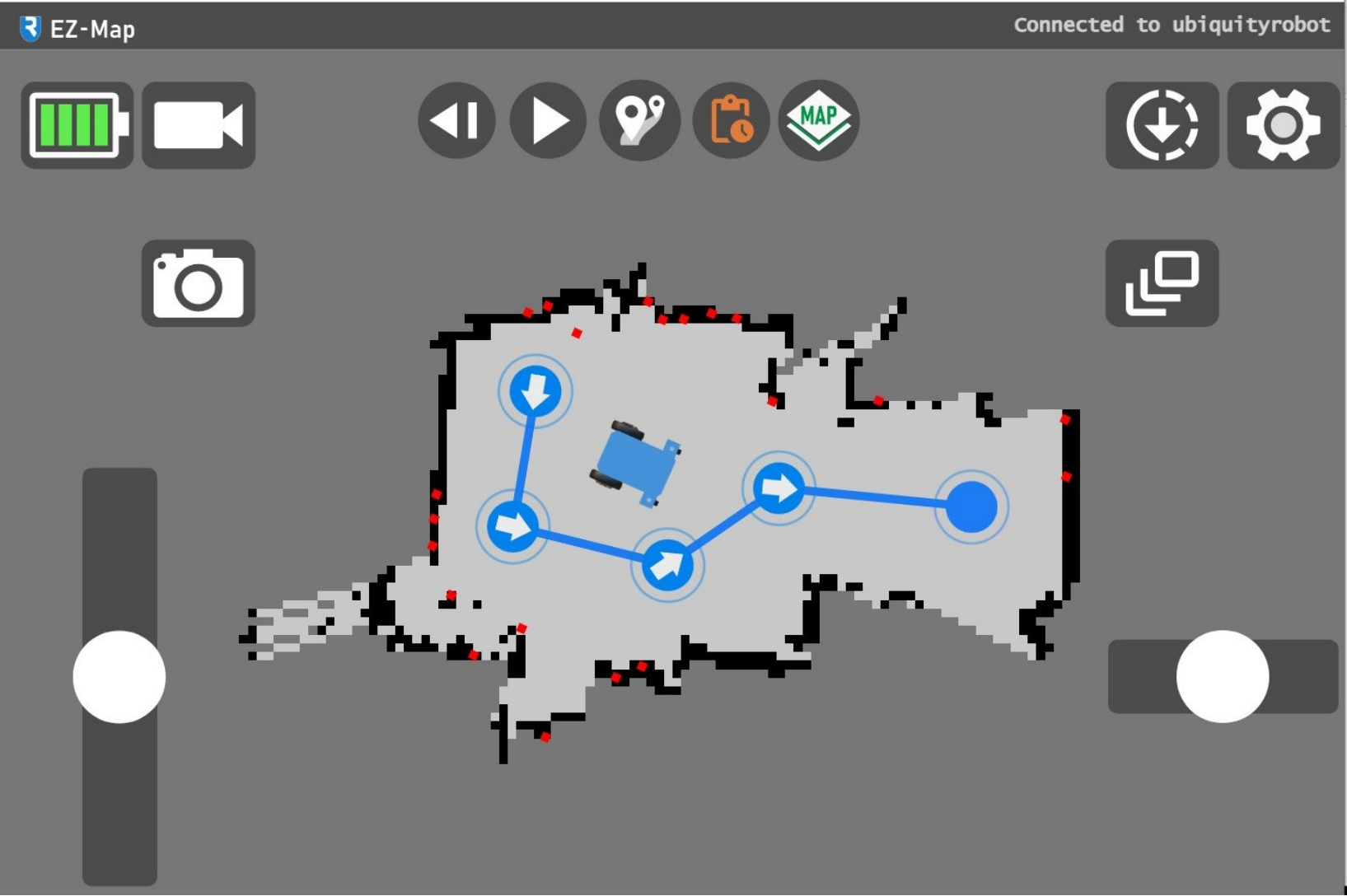
Once in EZ-Map use 'Tank' controls to form a map



A Brief View Of The Moving Parts

- Magni Robot (from Ubiquity Robotics)
- Lidar with 360 deg view (we use a N301 LsLidar in this Demo)
- The EZ-Map Web App frontend to 'The Magic'
- User uses a Chrome or other Browser after connecting to Magni AP
- We are using LaMa ROS for SLAM NAV stack (more on this later)
- We use our MoveBasic package (a simple MoveBase alternative)
- You can record video and telemetry for debug with a

Setup Goals By Clicking On Man



Goals Are Easily Dragged/Edited

- Once goals exist you can drag them with the mouse
- Can also add more goals (waypoints)
- Can delete them as well
- Each goal can be assigned ordered Actions that happen once that goal is reached. Things like changing speed, pause and even custom script!
- You can form a loop of goals so the robot continues around again
- You can set to go back along the path once end is reached

One Or More Actions For Each Goal

The screenshot displays the EZ-Map software interface. At the top left, the logo 'EZ-Map' is visible, and at the top right, it says 'Connected to ubiquityrobot'. The interface includes a toolbar with icons for battery, camera, navigation, and map. A central map shows a blue robot icon and a path of blue arrows connecting several circular goal markers. A dialog box titled 'Actions' is open, containing the text 'Define a list of actions that will be triggered sequentially when the goal is reached.' Below this text is a list of actions: '1. Select action', 'Select action', 'Wait', 'Set Speed', 'Run Bash Command', 'Drive - Forwards', and 'Drive - Backwards'. The 'Set Speed' option is currently selected and highlighted in blue. A '+ Add' button is located to the left of the list. A red 'X' icon is visible in the top right corner of the dialog box. The background map shows a grey area with black outlines representing walls and a blue robot icon positioned on the path.

Examples Of Actions On a Goal

- Set the speed to the desired speed
- Wait for some period of time or a user input
- Run a custom script to perform action of users choice
- Tell the robot that after this goal it should return to the start in the reverse order of how it traveled to this point
- Other Actions are in the works for the future

Running With A Map And Route

- As you enter route mode you are asked for the name of the route
- You then can define Actions and edit and add goals and so on
- The idea is later you can load this map and the route you want and the robot will 'play' the route using the play type icons at the top
- I have a video of this but must show it in a separate screen.

We Default To A N301 LsLidar

- We are going to default to use of the LsLidar but of course other Lidars are usable such as the RPLidar which I have done as well.



N Series 2D Surround LiDAR

LaMa ROS Localization And Mapping

- We have chosen the LaMa ROS Nav stack
- Github is at: https://github.com/iris-ua/iris_lama_ros
- Written by Eurico Pedrosa of IRIS (Intelligent Robotics And Systems)
- This Nav/SLAM stack is involved so read about it on the github
- Ubiquity Robotics has worked with Eurico to also implement a completely fiducial based version that uses a partical filter based global optimization. This means the stack we use can use Lidar or Fiducials which have been a mainstay for Ubiquity Robotics.

Summarize EZ-Map Features

- Supply a web interface to move the robot and show video feed
- Define a map of an area and save it for later usage
- Define route(s) within an area to allow autonomous robot movement
- Have some diagnostic info such as battery level always seen
- Allow debug traces and video feeds to be captured easily
- Have a great deal of productive fun in EZ map and route creation

For Additional Questions Or Details

- Feel free to contact me to get more information on this project
- EZ-Map is integrated with some components of Magni so it is not quite suitable for general usage across general ROS robot platforms
- Our goal is to form an open source core set of EZ-Map components however we do not have a published timeline for that effort.
- For More Details contact: mj@ubiquityrobotics.com
- Visit UbiquityRobotics.com for additional Magni information