

First Picks With VIM-303



For Firmware Release 2.6.1

Scope and other documentation

This manual covers how to create your first pick and place task with VIM-303. Other relevant manuals include:

- Unboxing and Hardware Assembly Manual
- User Interface Manual
- Blockly Programming Manual
- Settings Manual

Assumptions

It is assumed that the camera and gripper have been attached to the robot, and the robot and camera have both been set up (network address assignment, gripper configuration). See the **Unboxing and Hardware Assembly** manual to get your robotic workcell ready for this sample program. Make sure the compressor is filled with air.

VIM-303 Robotic Workcell Setup

This manual demonstrates the ease of use of VIM-303 for performing visual pick and place operations. The test setup used in this manual (Figure 1) is a Universal Robots UR5 robot arm with a VIM-303 camera and Visual Robotics Suction Gripper end effector. The robot is mounted on a cart with an integrated compressor and a Power Over Ethernet tablet, showing the QuickPick-303 user interface. The object to be picked is the VIM-303 camera box.

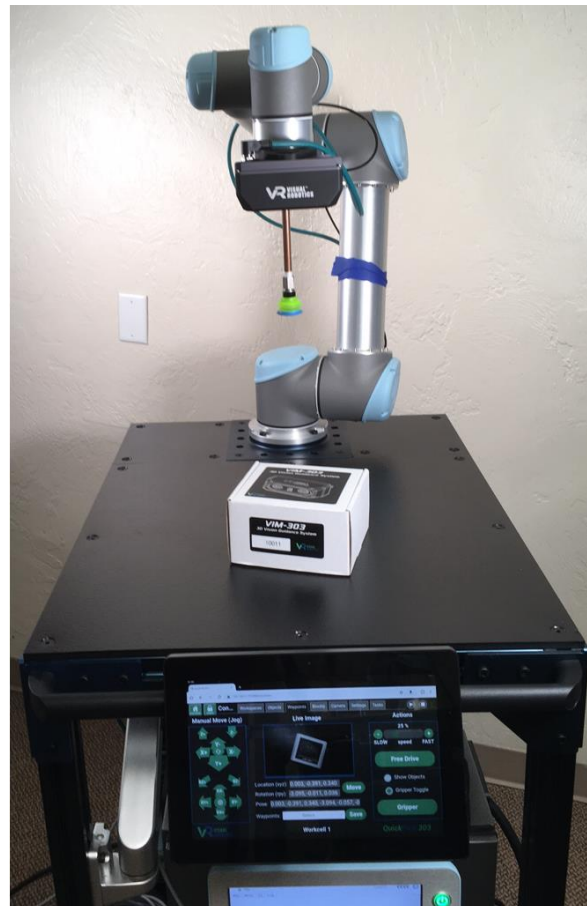


Figure 1 - Test Setup

Easy as 1, 2, 3

There are only three steps necessary to create a Task (program) with VIM-303:

1. Define Objects
2. Define Waypoints
3. Create Blockly program

Step 1 - Define Object

The first step is to define the object that VIM-303 is going to look for. In this case, it is the VIM-303 camera box. To do this, set the box on the table underneath the camera. If the camera is not in a suitable position, the robot can be **jogged** or you can use **free-drive** to move the camera to the correct place. See **Step 2** to define a waypoint for viewing the object if the camera is not currently in the correct position. For **software** version 2.6.0, it is important that the camera is looking straight down onto the table surface.

From the **Task Menu**, press the **Configure** gear to see the configuration menu and then select the **Objects** **Tab** (Figure 2). Align the VIM-303 camera box so that it is within the field of view of the camera, seen in the **Found Objects** window. The object should show up outlined in purple and say **Unknown**.

In the **Objects** pulldown menu, start typing the name of the object **Box** (Figure 3) and press Enter. The object's dimensions will be measured and the object has been trained (Figure 4). The object is outlined in purple and says **Box** and the dimensions are shown in the **User Object** table.

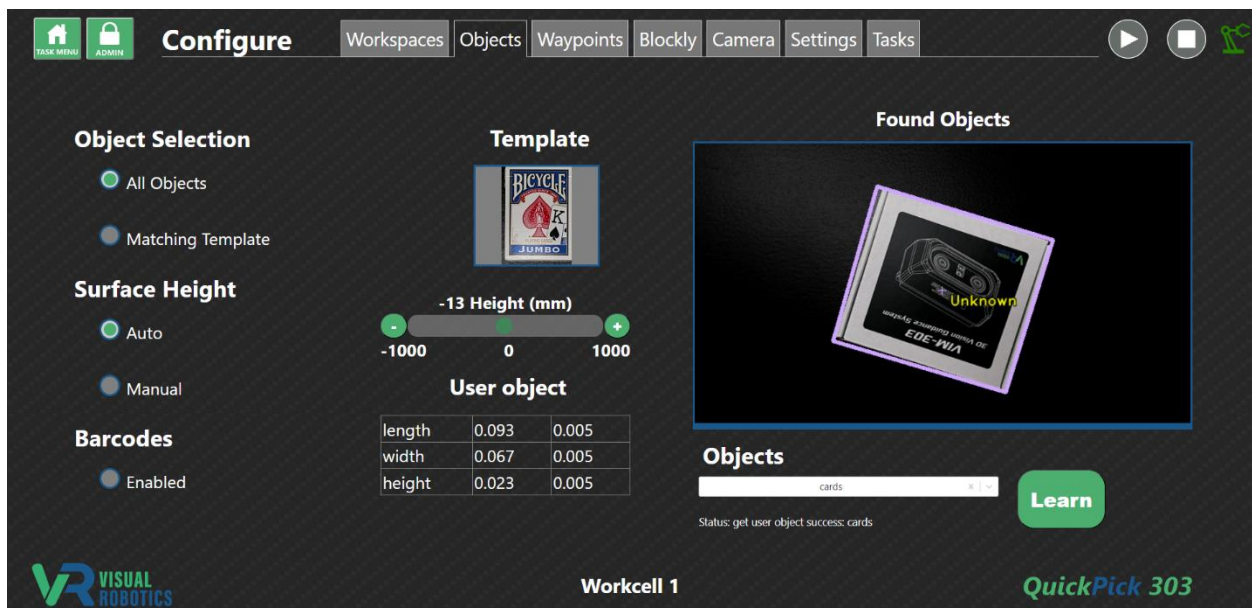


Figure 2 - Objects Tab

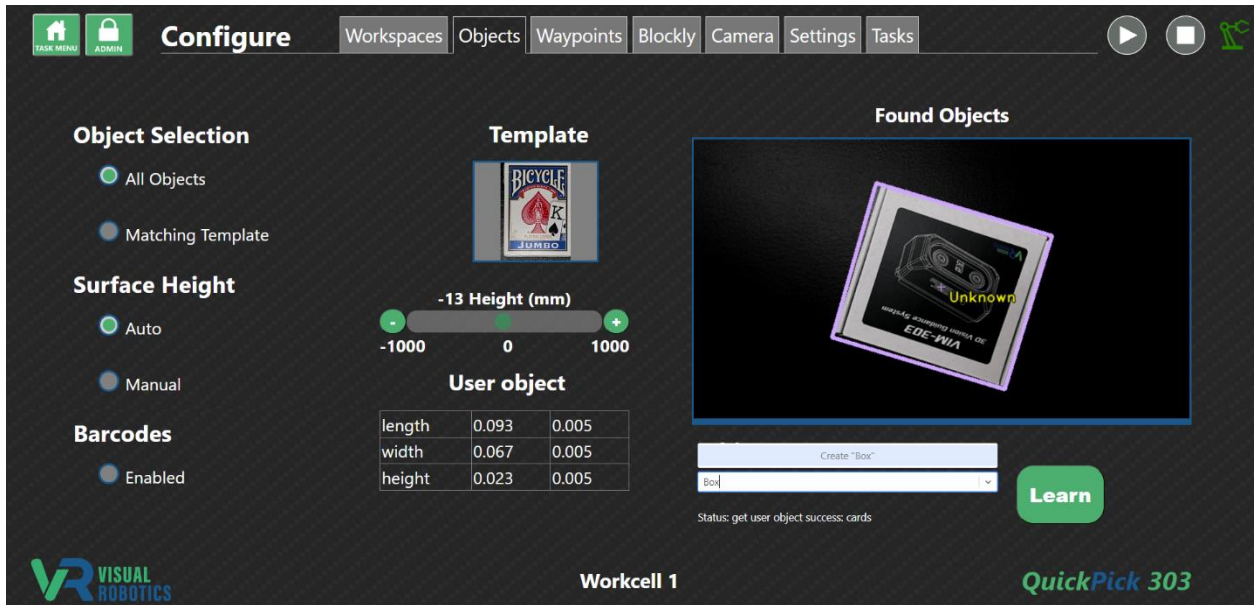


Figure 3 - Name the object "Box"

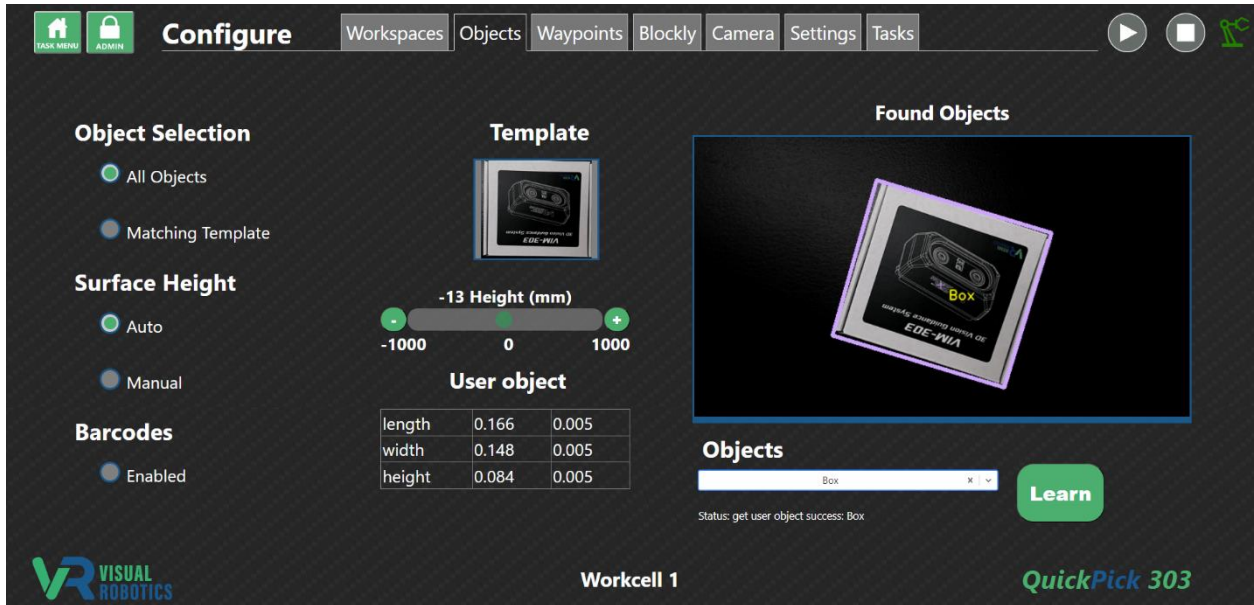


Figure 4 - Object has been trained

Step 2 - Define Waypoints

The second step is to define **Waypoints**. These are places the robot will be defined to move. The first Waypoint is called the **Pick Zone**. This is where the camera will be located in order to see the object. The Pick Zone for this example will be defined as the location where the robot was when the object was trained.

Press the **Waypoints Tab** and see the live image of the camera (annotated to see the box if **Show Objects** is checked) and the various **Jog** buttons. Move the robot using the jog buttons (arrows) or press the **Free Drive** button to cause the robot to become pliable, allowing you to physically move the robot to the desired location. Press the **Free Drive** button again to disable this mode and have the robot become rigid at that location. For software version 2.6.0, the camera must be pointing straight down to see objects. Press the “centering” button (the bullseye between RY+ and RY-) to aim the camera straight down at the current location.

When you have moved the camera to a suitable pick location, type **Pick Zone** in the Waypoints pulldown menu (Figure 6) and press Enter and the Waypoint has been saved (Figure 7).

Create another Waypoint **Place Zone** by moving the box somewhere outside of the field of view (but not too far away for this example) where you want the box to be placed. Jog the end effector onto the top center of the box and rotated to match the orientation (Figure 8). Type **Place Zone** in the Waypoints pulldown menu and press Enter and this Waypoint will be saved (Figure 9).

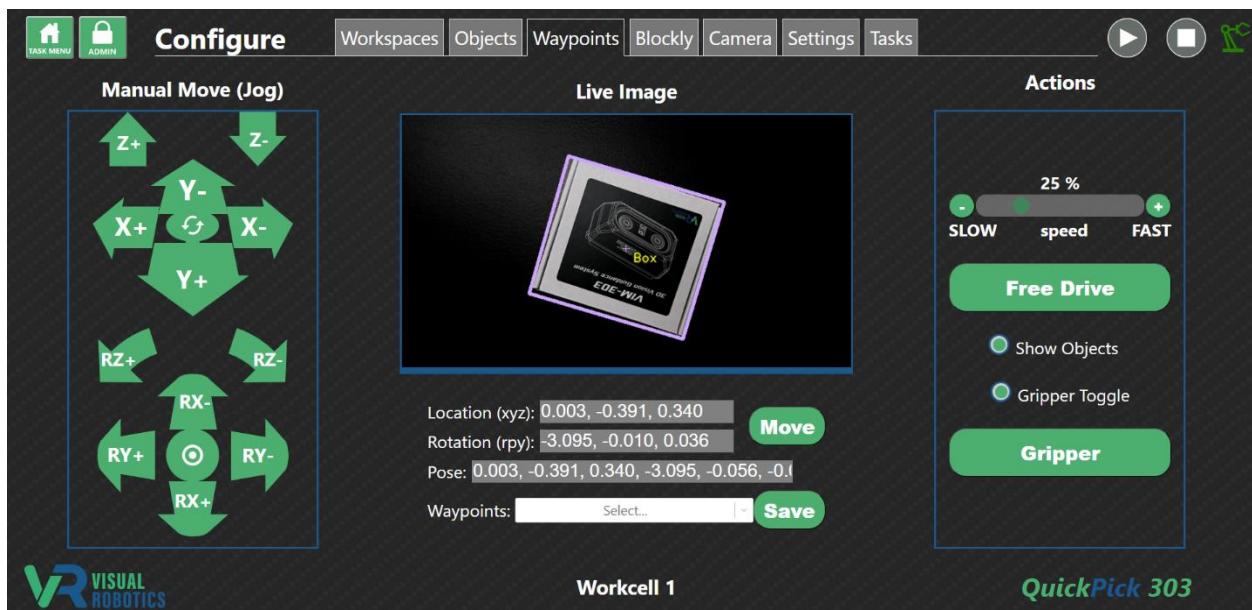


Figure 5 - Waypoints Tab

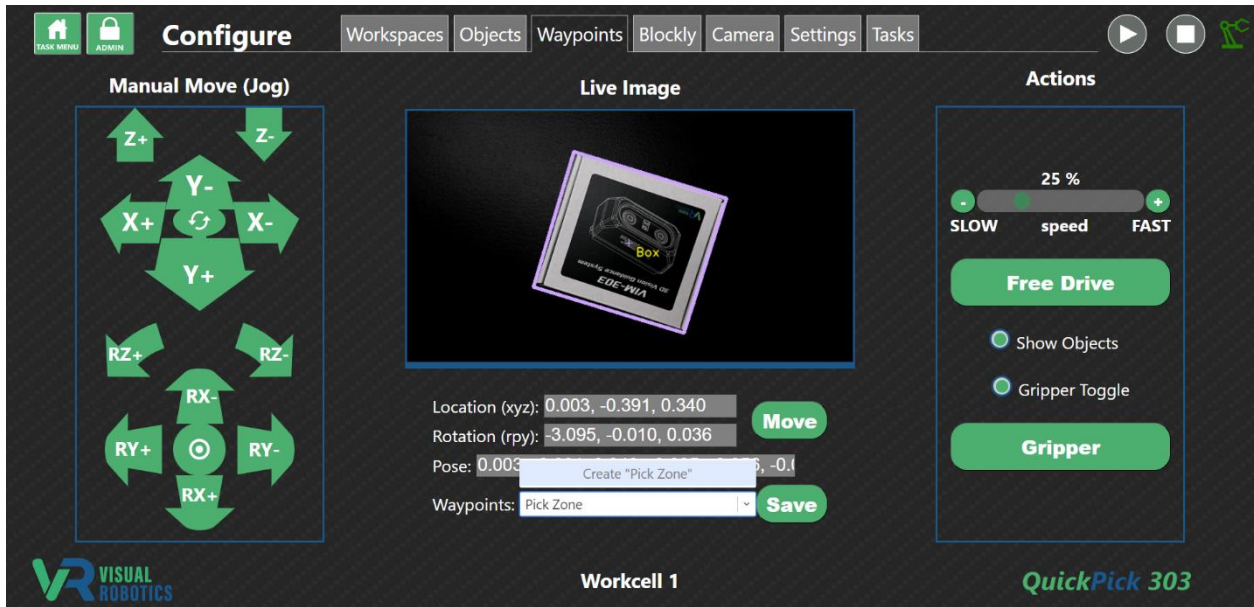


Figure 6 - Creating a Waypoint

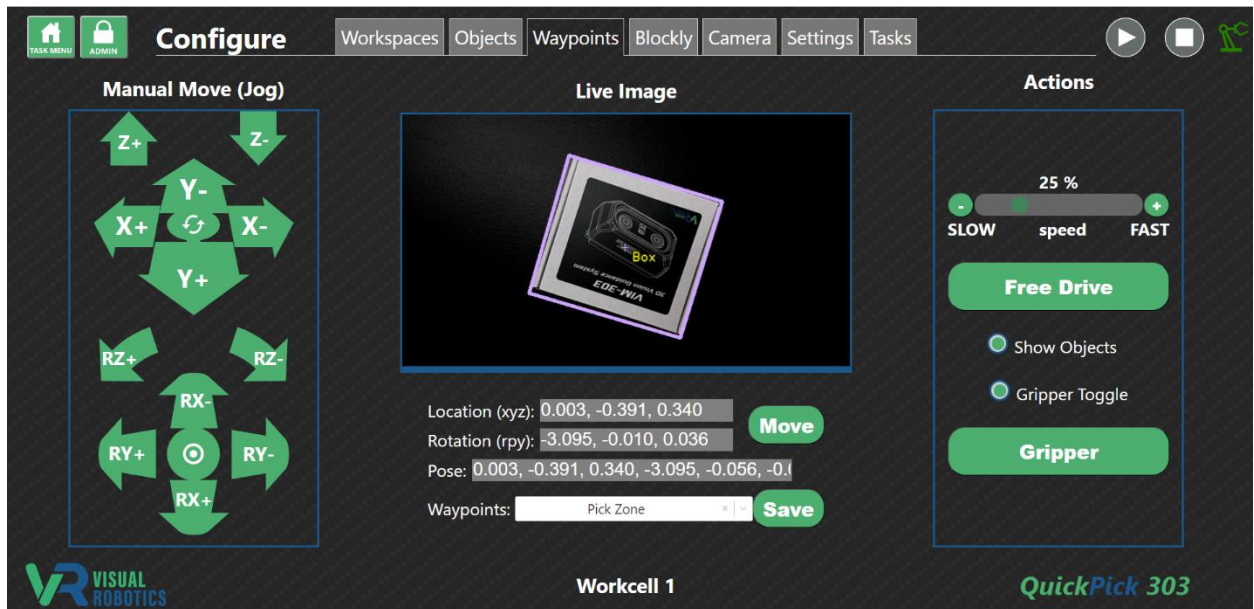


Figure 7 - Waypoint "Pick Zone"

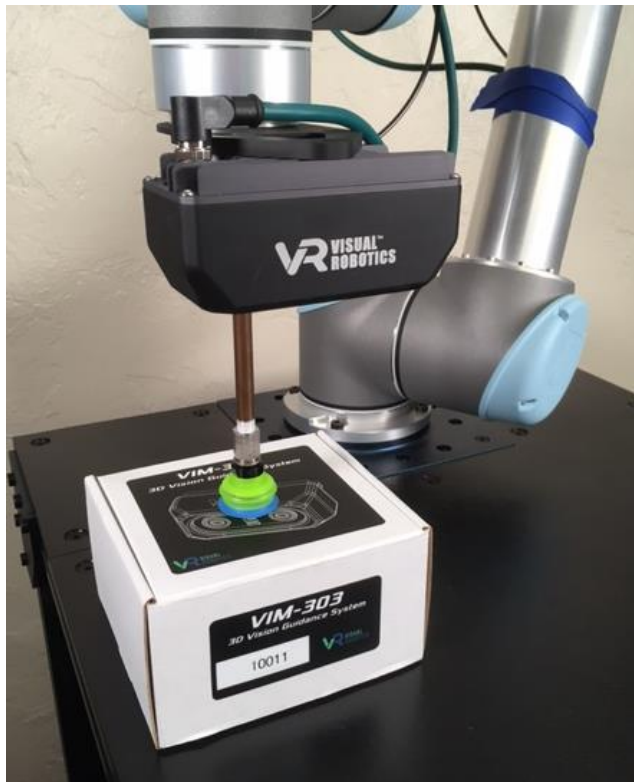


Figure 8 - Moved robot end effector on top of box for “Place Zone”

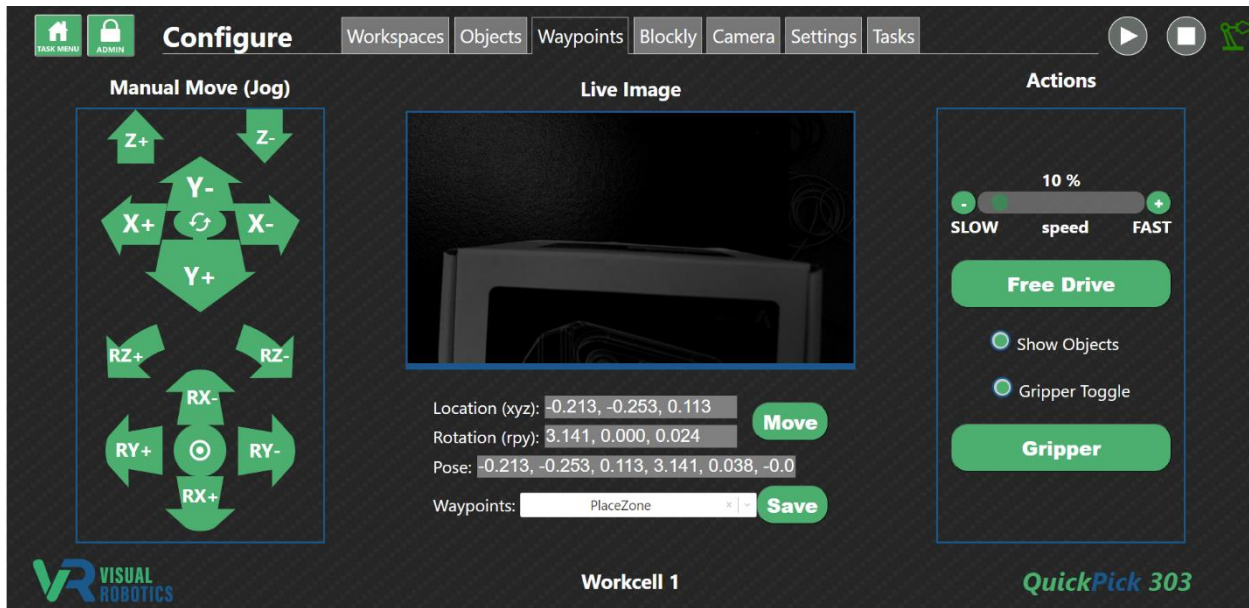


Figure 9 - Defined “Place Zone”

Step 3 - Create Blockly Program

The last step is to create a Blockly program (Task) to tell the robot what to do. Our demonstration task is to pick up the box when viewed at the **Pick Zone** and place it at the **Place Zone**.

Press the **Blockly Tab** to see the Blockly programming environment (Figure 10). Using the pullout menus on the left, create the Blockly program as shown in Figure 11. Each type of block is color coded. The “**when Start is pressed**” block is in the **Events** category. The “**move to Pick Zone**” is in the **Move** category. The block starts out saying “**move to nowhere**” but simply click on the pulldown menu and select **Pick Zone**. The “**visual pick Box**” is in the **Visual** category and the “**blind place at PlaceZone**” is in the **Blind** category. Press **Save As** and name your program **FirstPick** (Figure 12).

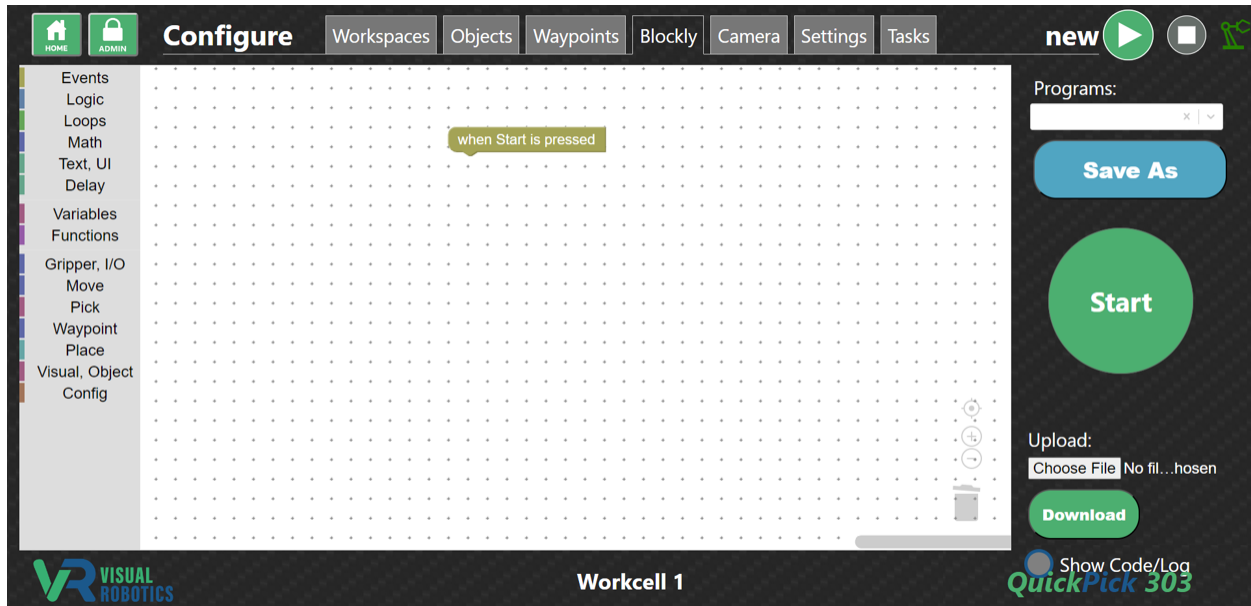


Figure 10 - Blockly Tab

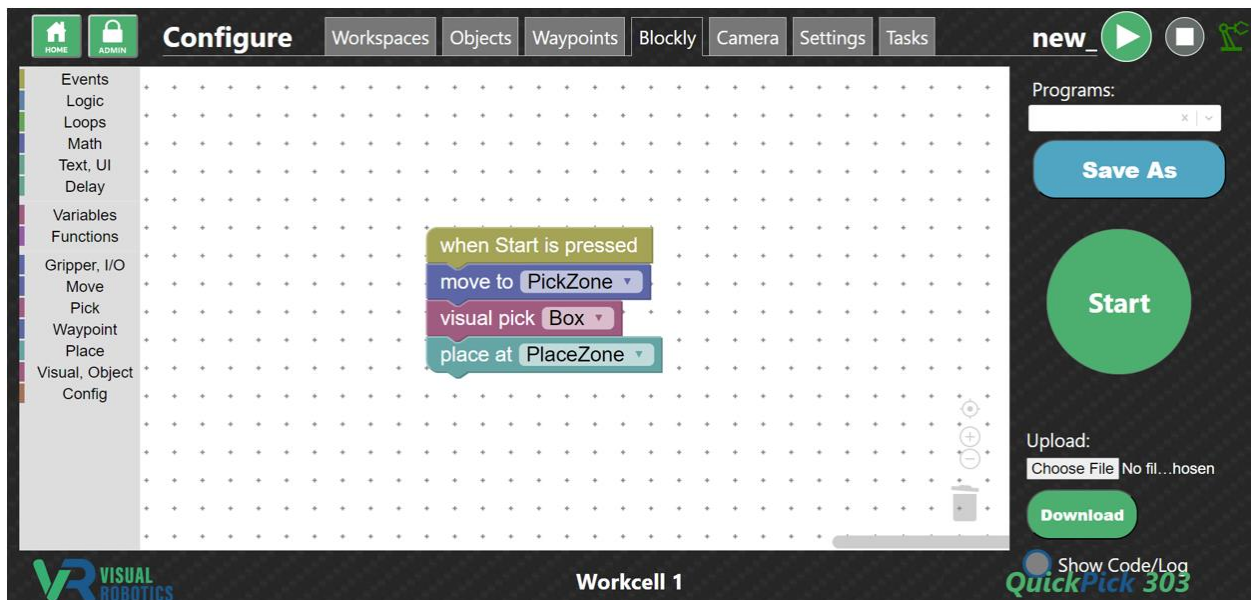


Figure 11 - Blockly program for “FirstPick”

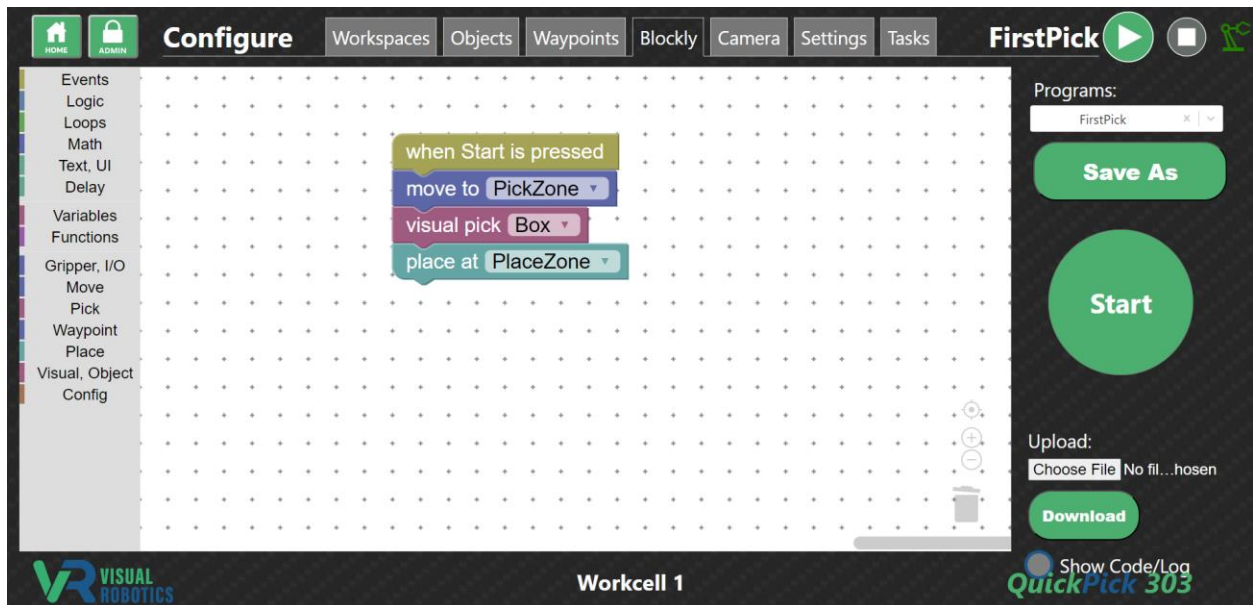


Figure 12 - Blockly program named as "FirstPick"

Test Your Program

Your program is now complete. On the **Waypoints Tab** select **Pick Zone** and press **Move** to move the camera back to the beginning. Move the box within the field of view of the camera (Figure 13). You are now ready to start.

You can test the program in two ways: 1) press **Start** from the **Blockly Tab**, or 2) select the task from the **Task Menu** and press **Start**. For this example, we will chose the second method, which is the way an operator would use the finished program.

Press the **Task Menu** (home) button. The task **FirstPick** is shown - the program that was just created (Figure 14). Press the **FirstPick** button. A **Start** button appears (Figure 15). Press the button and the robot will pick your box and place it at the place zone.



Figure 13 - Ready for first pick

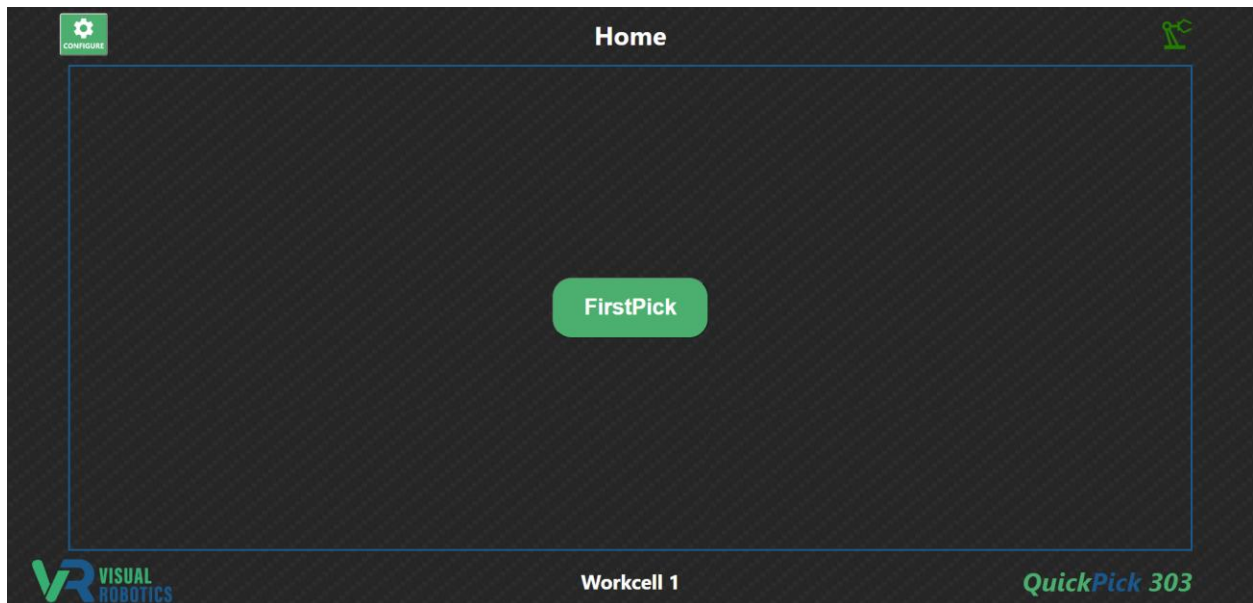


Figure 14 - "FirstPick" task on Task Menu

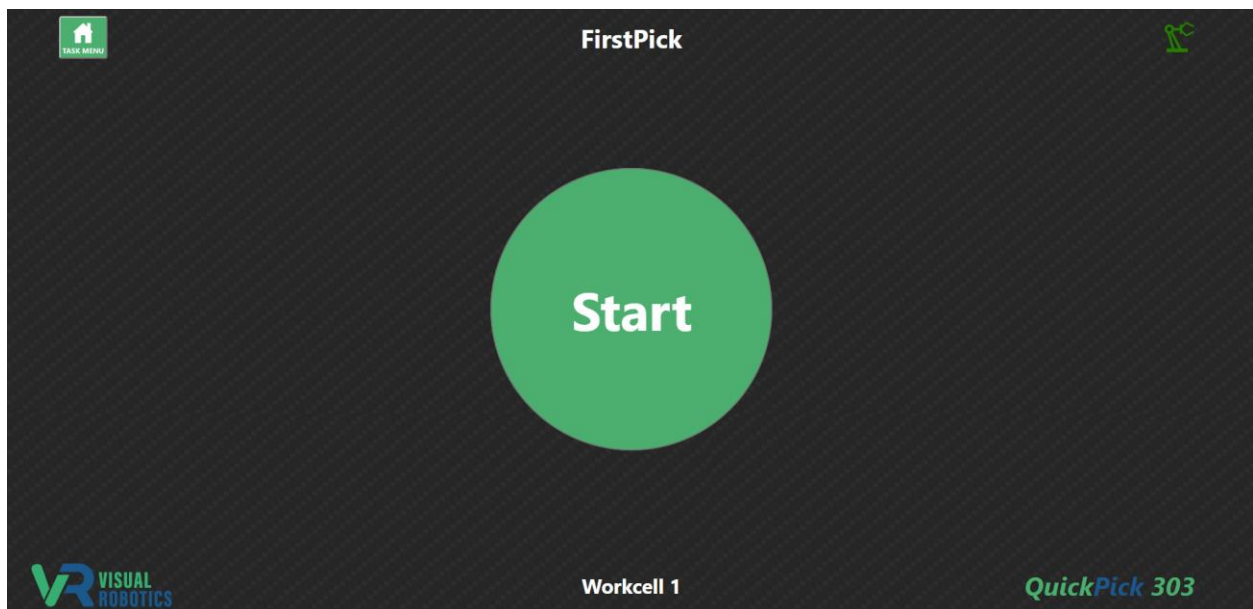


Figure 15 - "Start" button

Summary and Next Steps

You have now seen how easy it is to create a visual pick and place task: 1) define objects, 2) define waypoints, 3) create Blockly program. Read the following manuals to learn more about the QuickPick-303 user interface, how to program in Blockly, and the various configurable settings for the VIM-303 camera:

- User Interface Manual
- Blockly Programming Manual
- Settings Manual