Basics to Robotics- RoboDK Overview 2

Since completing the pages with UArm Studio programs you now have a the basic knowledge and skills to moving forward to conceptualizing 3D space with the approachable small scale UArm Swift Pro. Progressing to a new software called RoboDK that is an industrial robotics station simulator. It allows users to simulate complex assemblies and visualize a script in a similar interface to the programs learned in CAP. For now, we will be using this software to connect our usage of a small desktop robotic arm to that of the large industrial scale Kuka in the CAP basement. We will be using an online playlist to explain the ins and outs of the software as it is very well documented by official RoboDK professionals.

Step 1 Download RoboDK and install at (https://robodk.com/download)

Step 2 Open Software and select the “Earth” icon on the top left next to the folder and save icon.

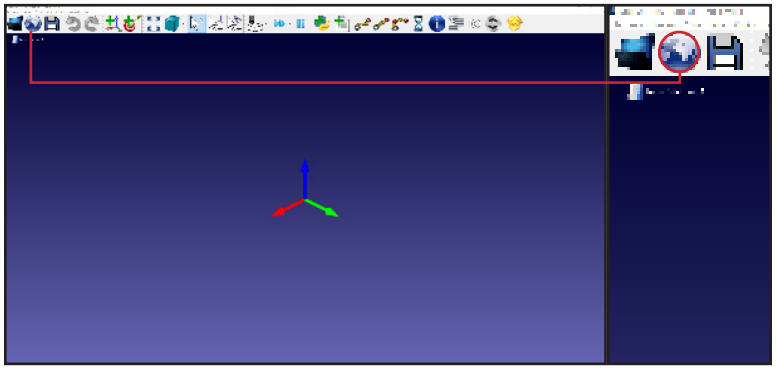
Step 3 Once the browser window opens up go to the left and select Brand>UFactory>Ufactory UArm>Download. Then go back to RoboDK and you will click the folder icon next to the earth icon and then select the UArm.

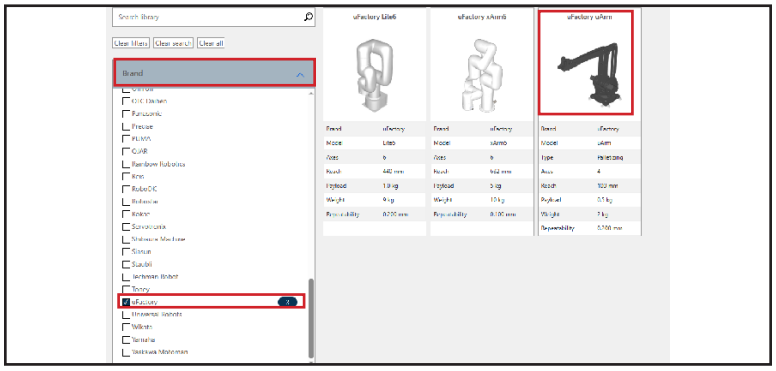
Step 4 Create a linear, joint , and circular movement and play the simulations of these different types of movement for a staff member to approve. If you need further assistance on how to do this after watching the videos proceed to the next pages for help.

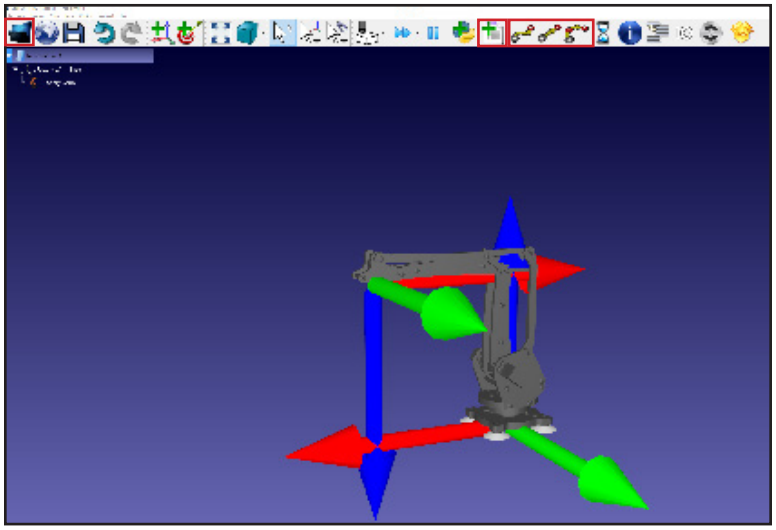
That is the software controls at its most basic level. I highly recommend watching the tutorial series Module 01 CH1- 10 below to further understand how create usable programs.

https://www.youtube.com/watch?v=qBSQhG8_HCQ&list=PLjiA6TvRACQexjP3pB1YOaxT-aTLG0GO2&ab_channel=RoboDK

Make sure to watch the Module 01 CH 11 and CH 12 videos as these will walk you through how to export the code required to post to the robots but feel free to continue on with more videos if you are interested in learning more.







Basics to Robotics- RoboDK Videos Key 2

MOD 1 CH1: Set Up	RoboDK download and installation
MOD 1 CH2: User Interface	
Submission Environment	3D workspace
Station Tree	Parent- child folder system
MOD 1 CH3: Navigation	
Pan	Middle mouse button
Zoom	Scroll middle mouse button
Rotate	Right click
Views	3D box icon in toolbar
Hide/Show Reference Frames	Right click robot
Hide/Show Tools	Right click tool in station tree
Enlarge / Reduce Reference Frame Size	+ or -
MOD 1 CH4: Robot Panel	
Robot Panel	Double click robot
Reference Frame	XYZ of a reference plane
Hide/Show Names	/
Hide/Show Robot Workspace	*
MOD 1 CH5: Positioning	
Tool Center Point (TCP)	The central axis of the tool movement
Hide/Show XYZ Labels	Main menu> Tools> Options> Display (click display xyz axis letters)
Show and Move Along Axis, Rotate Along Axis, and or Move Along Shared Planes	Hold ALT and click then drag selected axis
Align/Home	Open robot panel and select align or home button
Jog Robot	Open robot panel, select a reference frame, select an axis, and then click/drag the jog wheel to move (*finer control, click jog and drag out past jog wheel boundary*)
MOD 1 CH6: Targets	
Targets	A recorded position in space (including XYZ position and tool orientation)
Create New Target	Move robot into selected target location and click the bullseye plus icon in the toolbar
Move to Target	Click or double click selected target in station tree child
Rename Target	Click selected target and F2
Adjust Simulation Speed	Click play icon for normal speed, click fast-forward icon for fast speed, and or click drop down menu next to those icons to use a slide bar
Target Panel	Click selected target and F3
MOD 1 CH7: Targets Continued	
Manual Modify Target Position	Hold ALT and select axis, rotation, or plane to modify position and then right click this target in the station tree and select “Teach Current Position”
Cartesian Modify Target Position	Open target panel of selected target and enter new values (click ALT to move to next box) and then click “Teach Current Position”
*Note	When modifying targets if there is an error there will appear a warning sign on a target icon in the station tree
Select Target Without Robot Simulation Movement	CTRL click selected target
Singularity	A point that a robot cannot cross with a linear motion

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MOD 1 CH8: Program and Motion	
New Program	Paper icon with plus symbol in the toolbar
Rename Program	F2
New Joint, Linear, or Circular Motion	Select desired program and target in the station tree and then select corresponding motion icon in the toolbar that will appear under parent program
Select Multiple Objects	Hold CTRL and select objects (for objects not back to back) or select first object the SHIFT click last object (for back to back objects, like a column of motions or targets)
Link Targets	Hold CTRL and select motion and target in station tree to link together (linked target name should appear next to motion in station tree)
Run Program Simulation	Double click program icon in station tree
Change Motion Type	Right click motion icon in the station tree and select new motion type
Remove Transparent Robot Arm	Click ESC
Hide/Show Targets	Select Targets and click /
Hide/Show Motion Path	Right click program icon in station tree and click “display path” box
Hide/Show TCP	Right click robot and select “visible TCP” box
Loop	Right click program icon in station tree and select “loop” box and to stop loop press ESC
MOD 1 CH9: Reference Frames	
Reset Robot Position	Right click robot arm in the station tree and select reset
Create New Reference Frame	Select robot arm base in station tree and then select plus sign with a red line icon next to the create new target icon in the toolbar
Change Reference Frame for Targets	Select all targets and right click select “change support” then select the desired reference frame
Active Reference Frame/Tool	Will be displayed as a green dot next to their icons in the station tree
Change Reference Frame for Program	Right click reference frame in station tree under the selected program and right click “set reference link” and click desired reference frame
Slider Control of Program Simulation	The blue slider at the bottom of the submission environment
MOD 1 CH10: Configuration	
Configuration	Different set of joint values that would equal or end up bring the tool to the exact same Cartesian XYZ and rotation position
Configuration Panel	Double click the robot arm and it is at the bottom of the robot panel and use middle mouse button to scroll through the option (select more options to filter configuration by joint orientation)
Linear Motion	Point-to-point motion with no curve that is the fastest possible path
Joint Motion	Also known as Point-to-Point motion, is a method of path interpolation that commands the movement of the robot by moving each joint directly to the commanded position so that all axis arrive to the position at the same time. The path is predictable, however the path will not be linear.
Robot Movement with Respect to Joint Configuration	Single click of target in station tree will be a linear movement which does not respect joint configuration Double click of target will be a joint motion which will respect joint configuration
Set Target Joint Configuration	Select target in station tree and select desired joint configuration then open target panel and click “teach current position”

Basics to Robotics- RoboDK Motion Types 2

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Linear, Joint, and Circular Motion Type

Step 1 Open RoboDK and import your UArm model via the folder button icon on the toolbar

Step 2 Create a set of four targets via the bullseye plus icon in the toolbar.

Step 3 Create a new program via the page plus icon in the toolbar

Step 4 Create a set of motions with at least one of each motion type under the new program

Step 5 Link the different motion types with the different targets by right clicking the motion type in the station tree then selecting target linked and selecting the desired target

Step 6 If you receive a error, modify your target positions to allow for proper space for the motion type. Hold ALT to modify target position and right click the target icon in the station tree and select teach current position.

Step 7 Save your station under the main menu> file> save station as. Then schedule a consultation in service now to have a staff member view your file to move forward with the KUKA M6A3 module. Make sure to note in your consultation request that you have completed M6A2 and need to have your file tested.

Station File Example