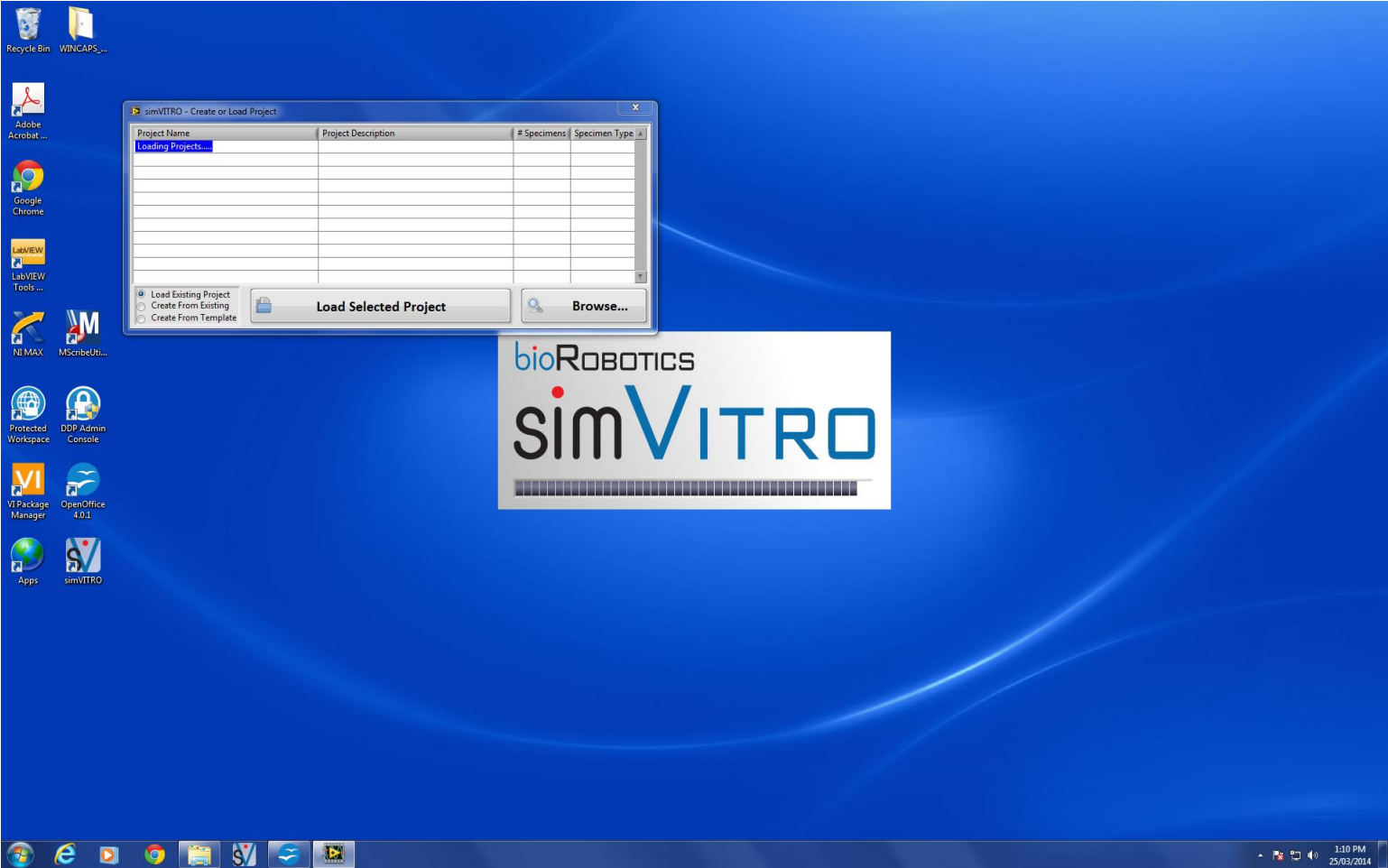
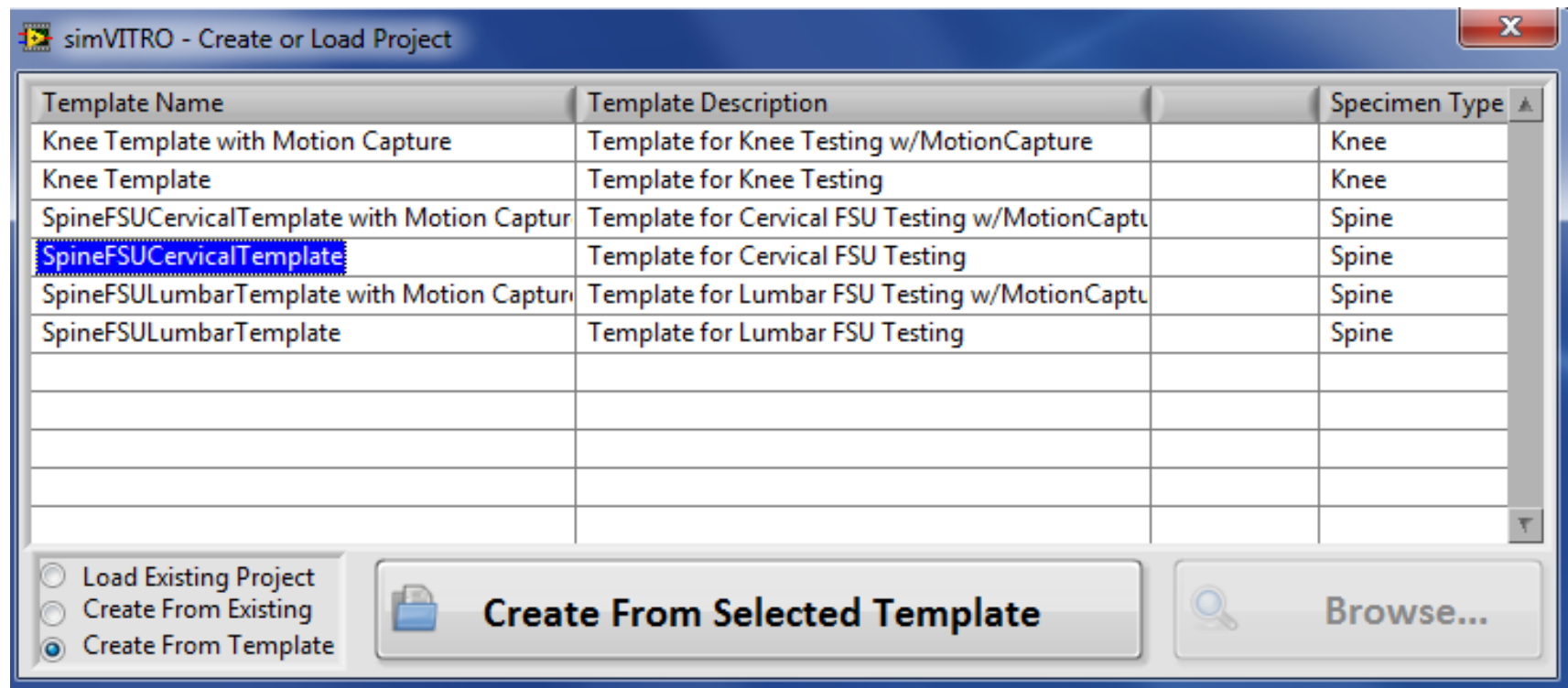


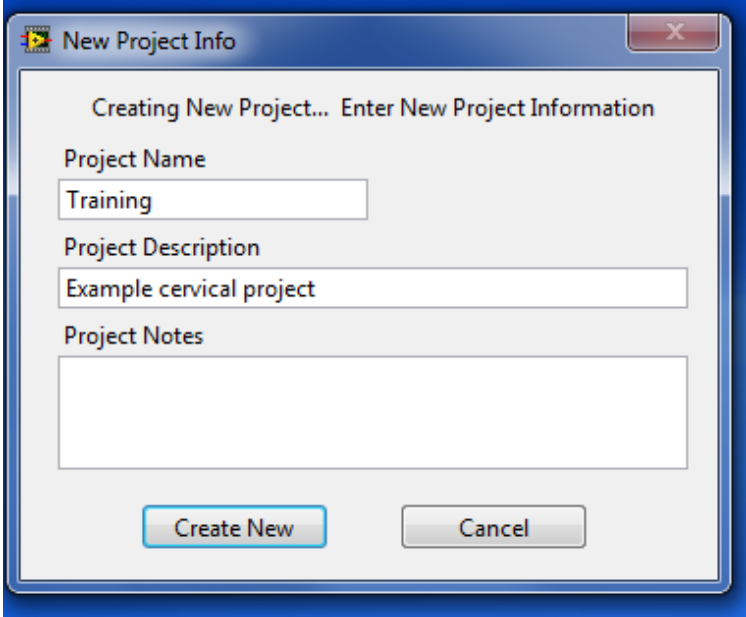
# Opening simVITRO



- Loading a project
  - Load existing project
    - Used most often (when testing a new specimen in an existing project)
    - Click browse and navigate to project file
  - Create from existing project
  - Create from template



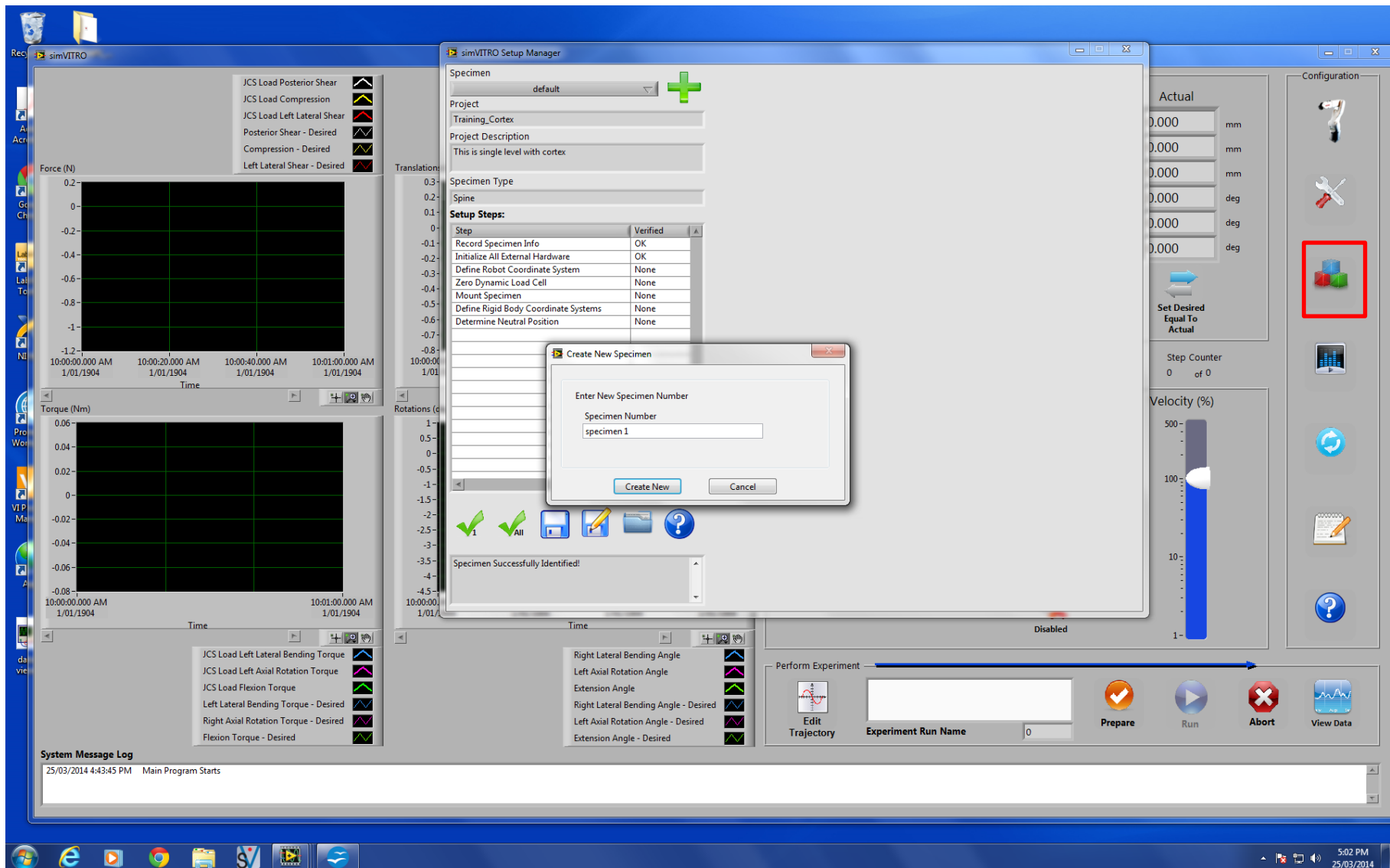
- When creating a new project, the following screen will appear
- Project Name and Project Description must be filled in
- A project folder will be created within D:\simVITRO



The screenshot shows a Windows-style dialog box titled "New Project Info". Inside the dialog, the text "Creating New Project... Enter New Project Information" is displayed. There are three input fields: "Project Name" with the text "Training", "Project Description" with the text "Example cervical project", and "Project Notes" which is currently empty. At the bottom of the dialog, there are two buttons: "Create New" and "Cancel".

# • Setup manager

- Load a specimen or create a new one
- After creating a new specimen, a folder will be created within the project folder



- specimen 1

+

Project

Training\_Cortex

Project Description

This is single level with cortex

Specimen Type

Spine

Setup Steps:

| Step                                 | Verified |
|--------------------------------------|----------|
| Record Specimen Info                 | OK       |
| Initialize All External Hardware     | None     |
| Define Robot Coordinate System       | None     |
| Zero Dynamic Load Cell               | None     |
| Mount Specimen                       | None     |
| Define Rigid Body Coordinate Systems | None     |
| Determine Neutral Position           | None     |
|                                      |          |
|                                      |          |
|                                      |          |
|                                      |          |
|                                      |          |
|                                      |          |
|                                      |          |
|                                      |          |
|                                      |          |
|                                      |          |
|                                      |          |

Enter Specimen Details. Include notes and comments on condition of specimen, cause of death, or other pertinent information to track specimen in your data management or inventory system.

Specimen Number

specimen 1

Gender

Female

Age (yrs)

62

Weight (kg)

40

Height (cm)

170

BMI

14

Medical Diagnosis

COD: Anorexia

Additional Comments

This specimen had two freeze/thaw cycles...

✓1

✓All

Save

Edit

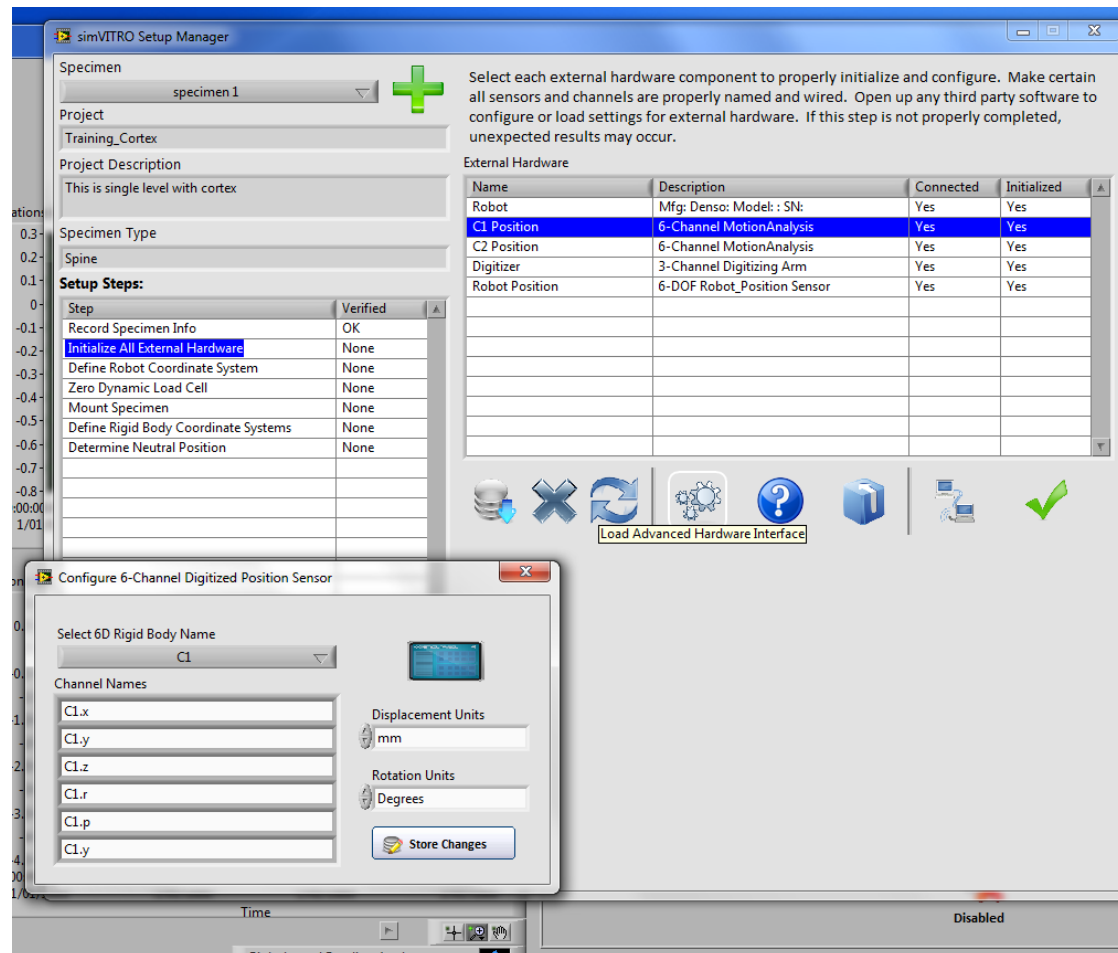
Folder

Help

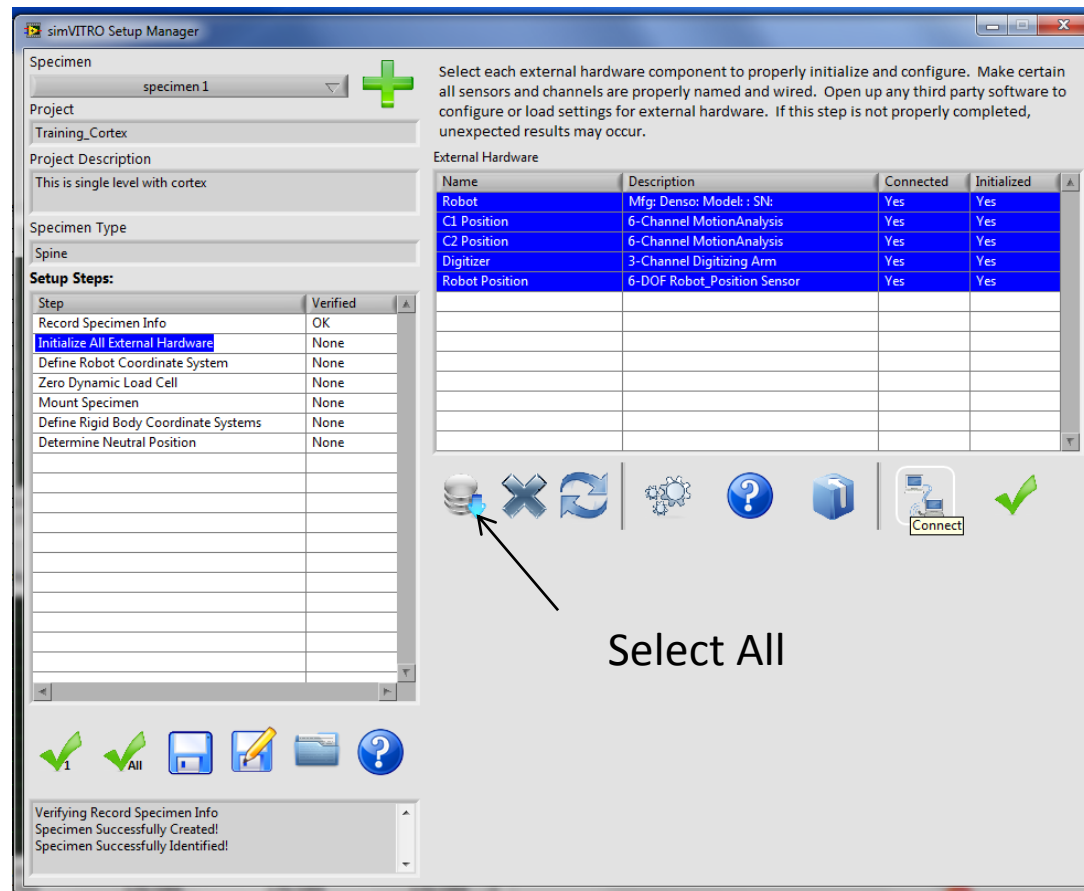
Specimen Successfully Created!

Specimen Successfully Identified!

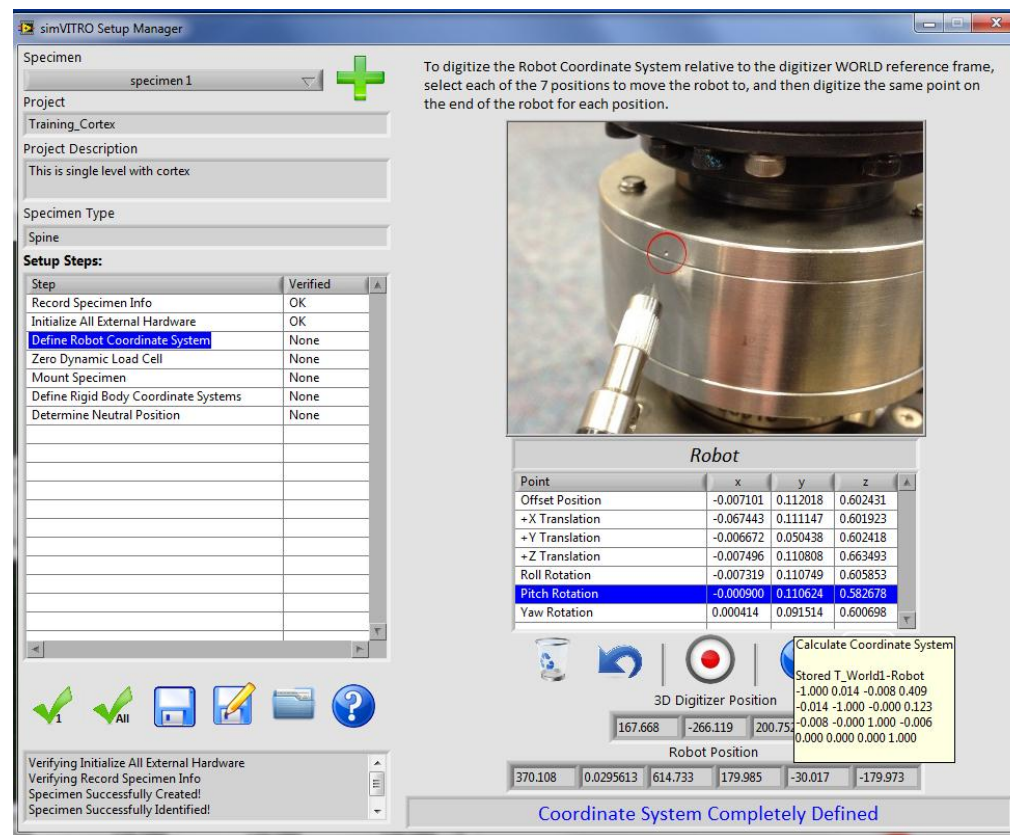
- Setup – Initialize all external hardware
  - All position sensors must be configured (microscribe and motion analysis)
  - Click the blue question mark for instructions



- Setup – Initialize all external hardware
  - After configuring the sensors, select all of them and click the connect button
  - If they all connect successfully, click the check button next to the connect button
  - Then click the check 1 button the bottom left

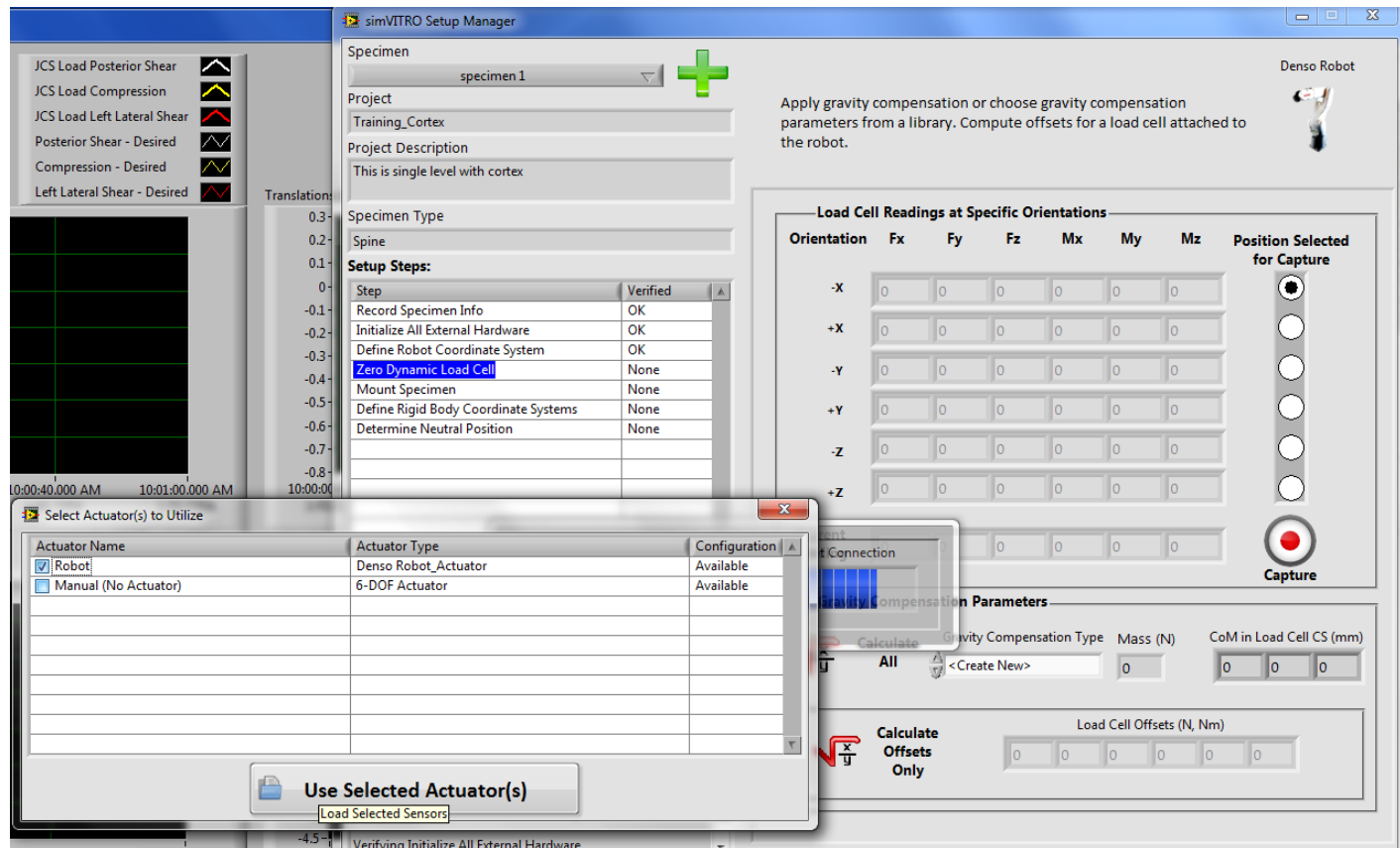


- Setup – Define Robot position
  - Select the point and the robot will move to the corresponding position
  - Place the microscribe tip on the divot below the robot end-effector and record a point
  - When finished recording all points, click the calculator and then the check 1 button





- Setup – Zero Dynamic Load Cell
  - Choose Robot and select the actuator



- Setup – Zero Dynamic Load Cell
  - In the calibrate tab of the advanced robot interface, send the robot to the predefined positions that correspond to the load cell position (i.e. Negative X Load Cell positions the load cell so the  $-x$ -axis is pointed down)
  - Capture the load cell output for each position

The screenshot displays the Denso Robot Interface and the Setup Manager window. In the Denso Robot Interface, the 'Calibrate' tab is active, and the 'Negative X Load Cell' position is selected in the 'Defined Positions' list. The Setup Manager window shows the 'Zero Dynamic Load Cell' step in the 'Setup Steps' list. The 'Load Cell Readings at Specific Orientations' table shows the current reading for the  $-X$  orientation. The 'Gravity Compensation Parameters' section shows the 'Calculate All' button and the 'Load Cell Offsets (N, Nm)' table.

**Load Cell Readings at Specific Orientations**

| Orientation            | Fx     | Fy     | Fz     | Mx      | My      | Mz      | Position Selected for Capture    |
|------------------------|--------|--------|--------|---------|---------|---------|----------------------------------|
| $-X$                   | -6.72  | 2.204  | -8.939 | 0.01305 | 0.09865 | -0.3625 | <input checked="" type="radio"/> |
| $+X$                   | -0     | 0      | -0     | 0       | -0      | 0       | <input type="radio"/>            |
| $-Y$                   | -0     | 0      | -0     | 0       | -0      | 0       | <input type="radio"/>            |
| $+Y$                   | -0     | 0      | -0     | 0       | -0      | 0       | <input type="radio"/>            |
| $-Z$                   | -0     | 0      | -0     | 0       | -0      | 0       | <input type="radio"/>            |
| $+Z$                   | -0     | 0      | -0     | 0       | -0      | 0       | <input type="radio"/>            |
| <b>Current Reading</b> | -1.478 | 0.4902 | -1.977 | 0.00284 | 0.02255 | -0.0801 | <input checked="" type="radio"/> |

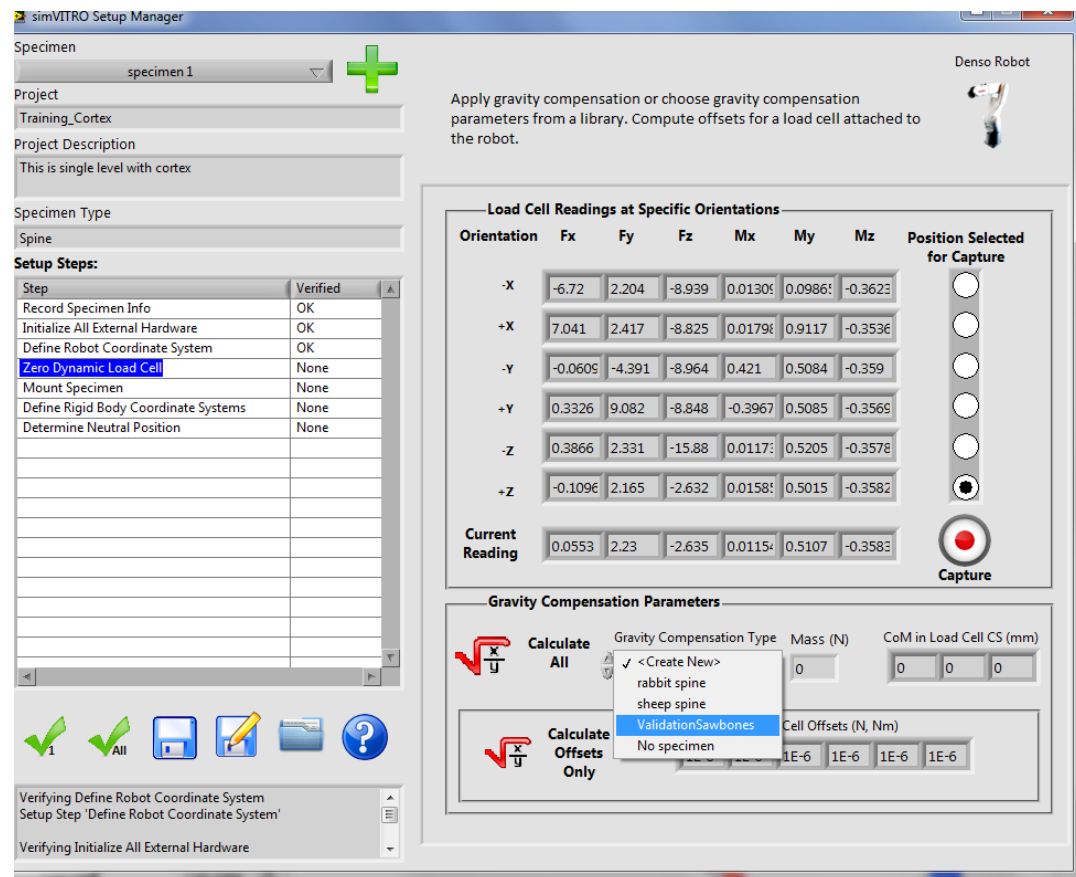
**Gravity Compensation Parameters**

Calculate All Gravity Compensation Type Mass (N) CoM in Load Cell CS (mm)

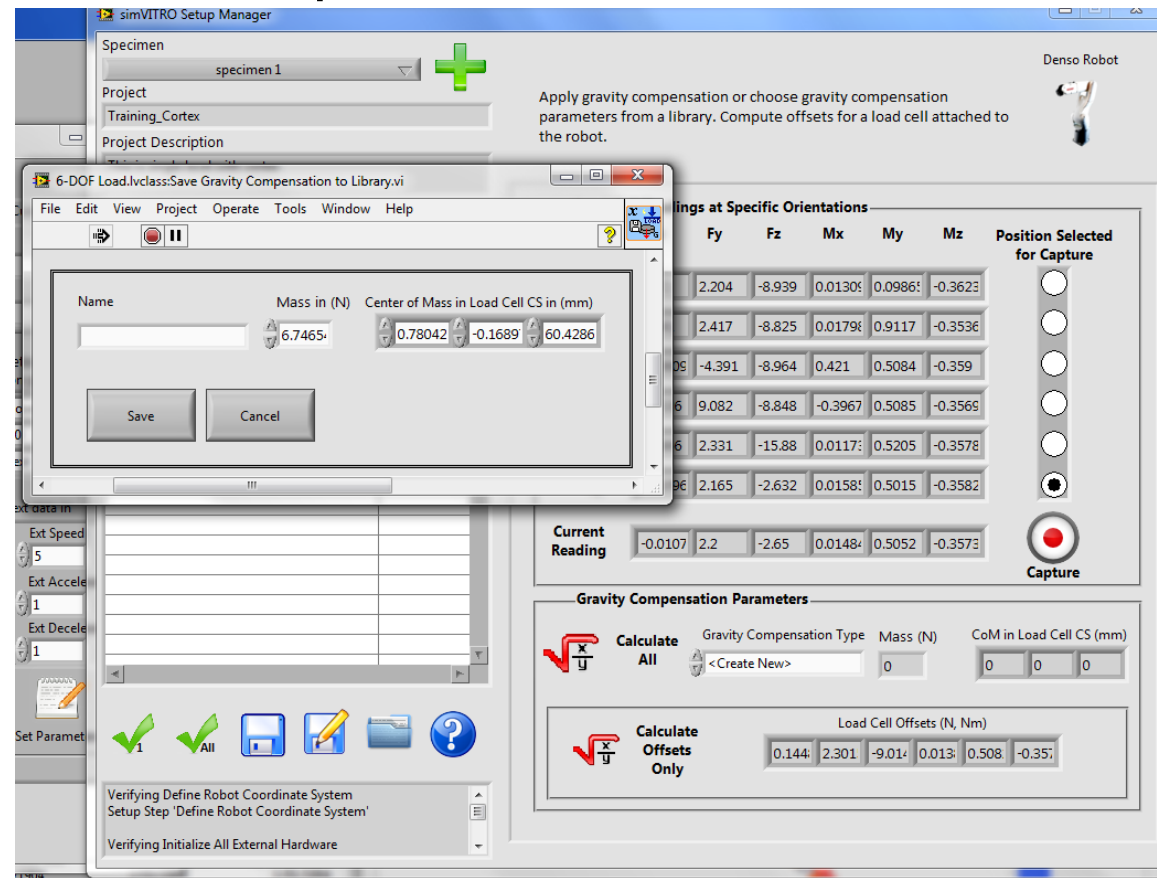
Calculate Offsets Only Load Cell Offsets (N, Nm)

1E-6 1E-6 1E-6 1E-6 1E-6 1E-6

- Setup – Zero Dynamic Load Cell
  - Either load an existing mass/center of mass value and calculate only offsets or create a new mass/center of mass value
  - Most of the time you will just load previously used values

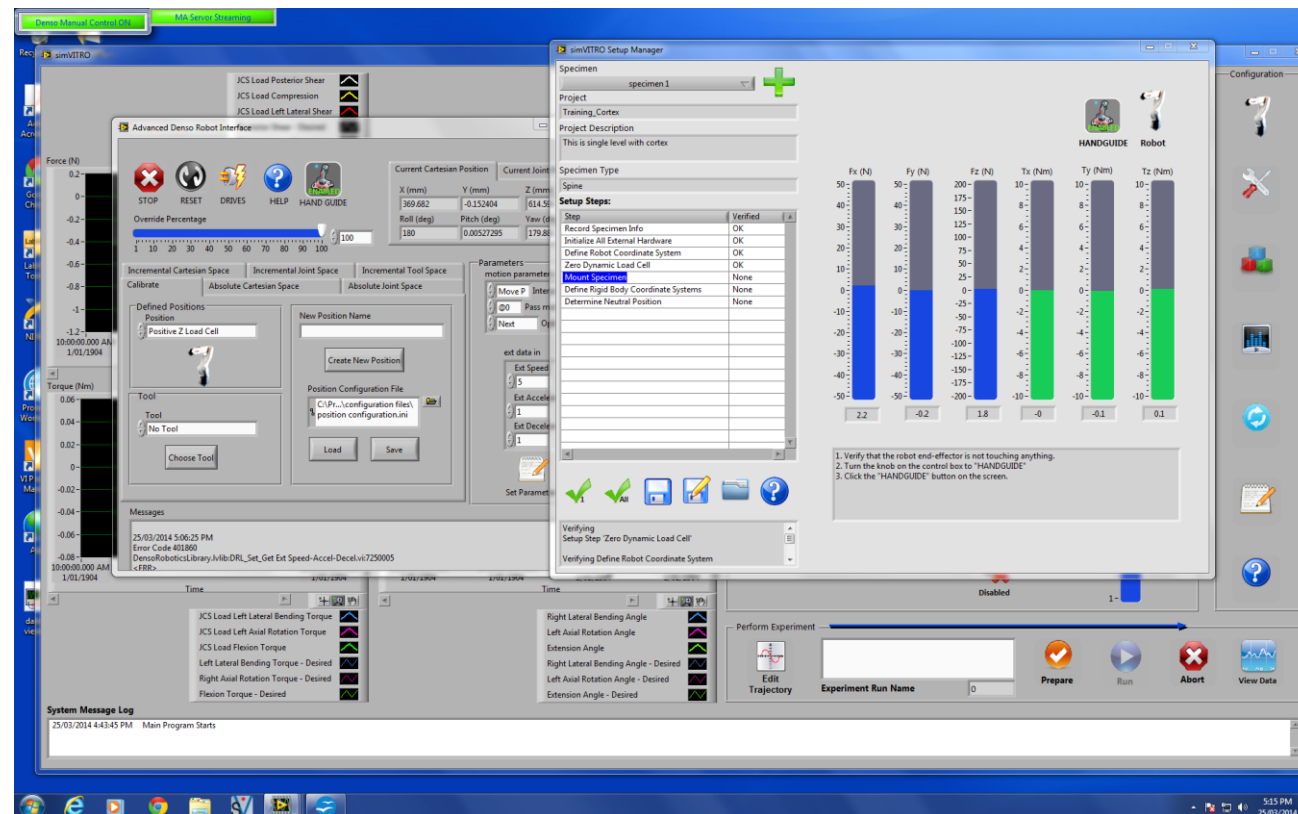


- Setup – Zero Dynamic Load Cell
  - To create a new mass/center of mass value, the half a specimen with fixtures must be attached to the robot when capturing load cell value (this requires destruction of the specimen, so do this on a previously tested specimen)
  - Fill in a descriptive name (i.e. sheep tibia) and these values can be loaded every time a sheep knee is tested.
  - Click the check 1



# • Setup – Mount Specimen

- Drive the robot close to the top of the specimen using the advanced robot interface
- Push the HandGuide Button and follow instructions for mounting the specimen
- Be sure deselect HandGuide before moving forward
- Click the Check 1



- Setup – Define Rigid Body Coordinate System
  - Collect the points for each rigid body and when finished, click the calculator
  - If there are no errors, click the check

