ASCENSION TECHNOLOGY CORPORATION

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Tracking 3D Worlds

3D Guidance trakSTAR™
MUS (Multi-Unit Sync)

www.ascension-tech.com

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Rev 3

Note:
Multi-Unit Sync operation via RS232 connection NOT supported at this time.

OVERVIEW

This addendum to the *3DGuidance trakSTAR Installation and Operation Guide* describes operation of the *MUS (Multi-Unit-Sync)* mode. The MUS mode can be used to obtain data from up to four trakSTAR electronics units (up to 16 sensors) using USB connections (1 per electronics unit), and a single transmitter.
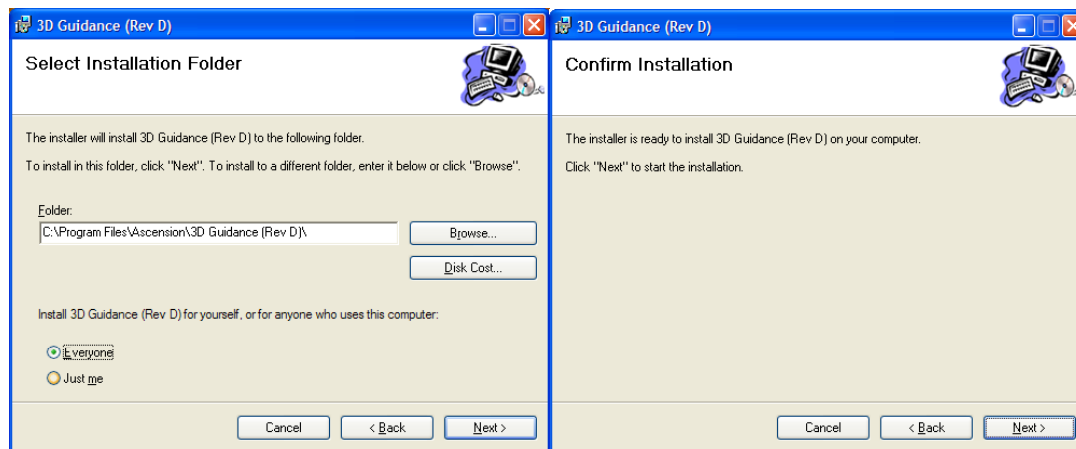
SOFTWARE INSTALLATION

Before connecting the components, be sure to run the installer found on the *3DGuidance trakSTAR CD-ROM*. This will install all required software and documentation to your PC. Note that you must have administrator privileges for the installer to run.

Note:
Install the software before attempting to connect the tracker.

1. To begin the installer, place the CD-ROM in the tray, and close the drive door. NOTE: If the installer does not start (drive not set to 'Autoplay'), then browse to the CD-ROM folder and run the *'setup.exe'* file.
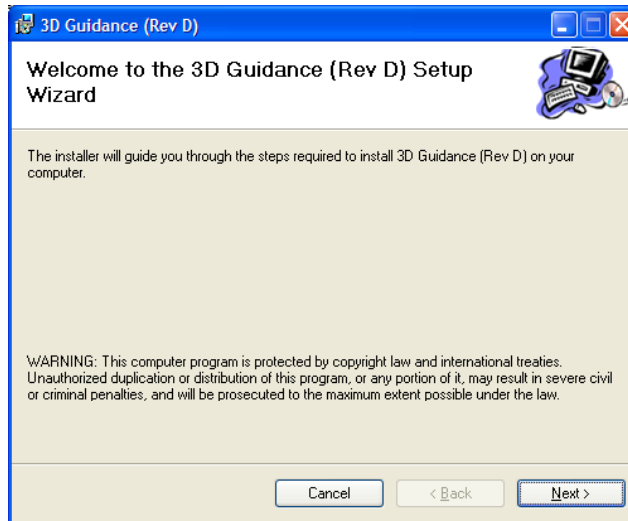

2. Follow the prompts in the Setup Wizard, confirming the target folder and selecting the user access (install for everyone or just current user).
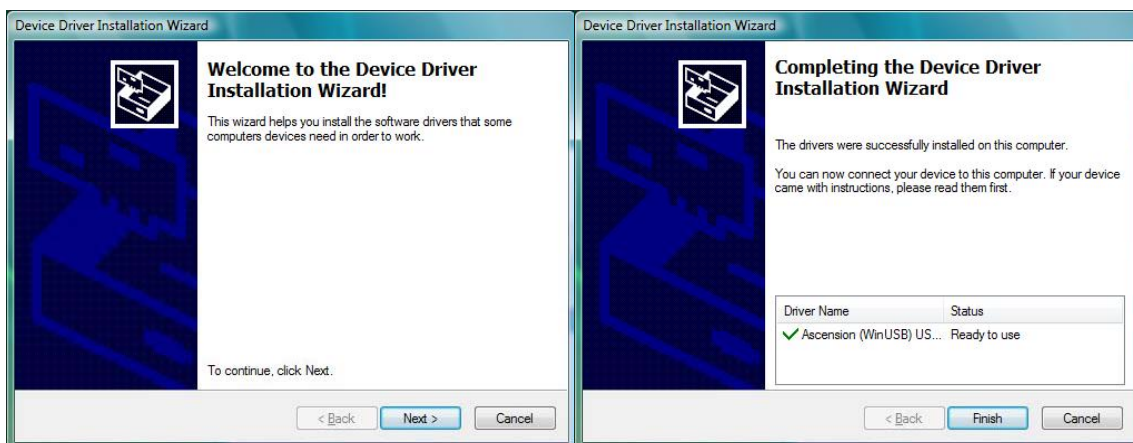
3. After the installer has copied over the software, it will ask you to select a USB driver.


    a. For new installations, and systems running a 64-bit operating system, select the 'Windows USB driver device driver' (winusb.sys).

    b. For continued use of the legacy USB driver (cyusb.sys), select the 'Cypress USB device driver'.

4. Note that Windows may then indicate that the software has not passed the 'Windows Logo Testing'. Select 'Continue Anyway' to proceeed with the installation.
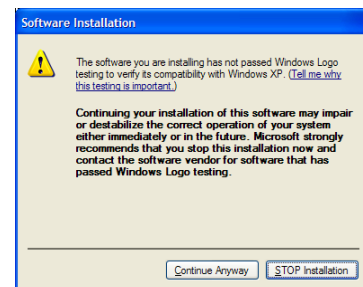
5. Note that Windows Vista32-bit systems will prompt the user to run the Driver Installation Wizard. Follow the prompts in the Wizard to copy over the required driver installation files.

After the necessary installation files have been copied over, the *Readme.txt* file will be displayed and provide important information about the software.
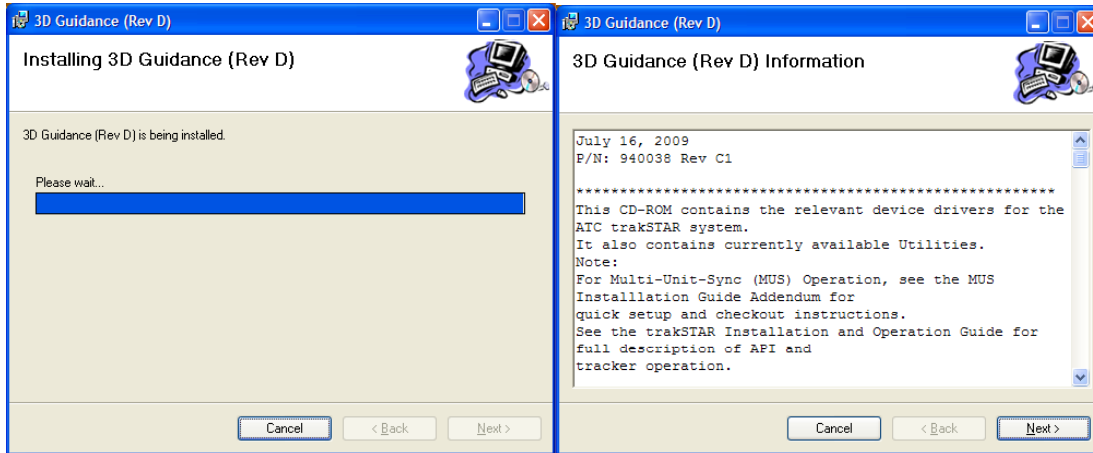
6. When the Software Installation is complete, proceed to the next page to setup and connect the hardware.

COMPONENT CONNECTION

The following cable connection will allow you to operate up to four 3DGuidance trakSTAR systems in the MUS (Multi-Unit Sync) mode. The remainder of the tracker connections are exactly as described in Chapter 2 of *the trakSTAR Installation and Operation Guide*.

1. Find the connector on the back of the electronics unit labeled **"Unit Synch"**.

2. For MUS operation with 2 trakSTARs:

- Locate the black BNC to BNC cable provided in the shipment.
- Connect each end of the BNC to BNC cable to the **Unit Synch** connectors on the two electronics units.

MUS Connections (labeled **Unit Synch**)

Figure 1 MUS Connection for 2 trakSTAR units

3. For MUS operation with 3 trakSTARs:

- Locate the 2 black BNC to BNC cables, and 1 BNC 'T' Adapter provided in the shipment.
- Connect one end of the first black BNC cable to the **Unit Synch** connector on the first trakSTAR unit.
- Attach the other end of the BNC cable to the BNC 'T' Adapter, and connect the adapter to the **Unit Synch** connector of the second trakSTAR unit.
- Connect one end of the second BNC cable to the open terminal of the BNC 'T' Adapter.

- Connect the other end of the BNC cable to the **Unit Synch** connector of the third trakSTAR unit.

Figure 2 MUS Connection for 3 trakSTAR units

4. For MUS operation with 4 trakSTARs:

- Locate the 3 black BNC to BNC cables and 2 BNC 'T' Adapters provided in the shipment.

- Connect one end of the first black BNC cable to the **Unit Synch** connector on the first trakSTAR unit.

- Attach the other end of the BNC cable to the first BNC 'T' Adapter, and connect the adapter to the **Unit Synch** connector of the second trakSTAR unit.

- Connect one end of the second BNC cable to the remaining open terminal of this first BNC 'T' Adapter.

- Attach the other end of the BNC cable to the second BNC 'T' Adapter, and connect this adapter to the **Unit Synch** connector of the third trakSTAR unit.

- Connect one end of the third BNC cable to the remaining open terminal of this second BNC 'T' Adapter.

- Connect the other end of the BNC cable to the **Unit Synch** connector of the fourth trakSTAR unit.

Figure 3 MUS Connection for 4 trakSTAR units

5.   Now connect the transmitter to one of the electronics units (typically to ID=0). This unit will be identified by the system as the 'master' (controls the synchronization).

Transmitter connection

Note:
Multi-Unit Sync operation with multiple transmitters NOT supported at this time.

6. Plug in Sensors as shown. Be sure to fully insert the connector - until an audible 'click' is heard.

7. Now connect the AC Power Cords and USB cables – **one of each** to all electronics units. Connect the other end of the USB cables to your host PC.

8. Power ON the tracker with the transmitter connected (Master), and follow the steps in the **Driver Installation** section below.

9. Once the driver install completes for the Master, power ON the second unit (Slave) and repeat. Repeat this step for any remaining trakSTAR units.
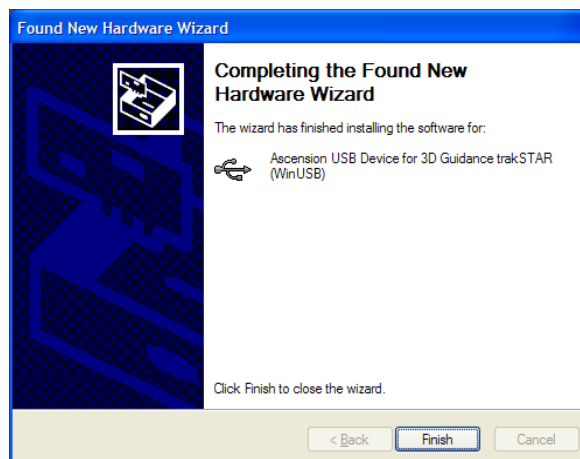
DRIVER INSTALLATION

After plugging in the USB cable, your computer's operating system will indicate it has detected new hardware and start the *New Hardware Wizard.* (Note that Vista systems will initiate the driver install automatically)

1. Follow the *New Hardware Wizard* prompts, allowing Windows to Automatically search for a suitable driver. (This is the default option). Note that if you inserted the CD-ROM and ran the installer prior to connecting the hardware, the Wizard will find these automatically.

2. Follow the steps in the *New Hardware Wizard*, allowing Windows to install the USB driver. When notified that the software has not passed 'Windows Logo' testing, select 'Continue Anyway'.

3. When the Wizard completes installing the appropriate files, close the *New Hardware Wizard* by clicking 'Finish'.

4. Now power on the second Electronics unit (1st Slave) and repeat the driver installation steps.

5. Repeat step 4 for the remaining trakSTAR electronics units.

CONFIGURING THE MULTI-UNIT ID NUMBER

After completing the driver installation, you must run the *trakSTAR Configuration Utility* to check/configure the Multi-Unit ID numbers for proper Multi-Unit Sync operation. The Multi-Unit ID number helps the API (DLL) identify how the units and sensors should be enumerated.
Valid configurations for Proper MUS Operation, include the following Multi-Unit ID settings:

- 2 trakSTARs (8 sensor system)
  - Master: ID = 0
  - Slave: ID = 1
- 3 trakSTARs (12 sensor system)
  - Master: ID = 0
  - Slave#1: ID=1
  - Slave#2: ID=2
- 4 trakSTARs (16 sensor system)
  - Master: ID = 0
  - Slave#1: ID=1
  - Slave#2: ID=2
  - Slave#3: ID=3

Note that units with an ID of 1, 2, or 3 can also be a 'Master', but are listed as above for clarity.

*Note that if you purchased your units together as a multi-unit system, they should already be configured appropriately (i.e. sequentially as: 0,1; 0,1,2; or 0,1,2,3). This will allow you to skip this section, and proceed directly to TESTING FOR SUCCESSFUL INSTALLATION. Checking and identifying (or re-configuring) the settings is recommended.

2,3,or 4 trakSTAR MUS Operation: SET Master: ID=0

1. Begin by turning OFF (set power switch to '0') all units EXCEPT the MASTER unit. Remember that the Master is the unit that has the transmitter connected.

2. Start the **trakSTAR Configuration Utility** by selecting *trakStar Utility* from the Program Files\ Ascension\ 3D Guidance XXXX\ Menu.
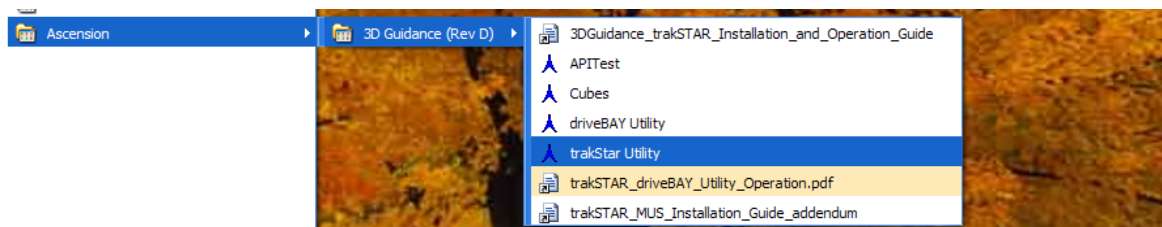
3. This will bring up the **Communications Init** window, allowing you to configure the Interface and the Unit (the trakSTAR electronics unit) that you would like to configure. If you have powered down the other units as suggested in Step 1, only a single device (Master) should be shown in the Unit drop down window.

Note:
Only USB can be used for Multi-Unit Sync operation at this time.
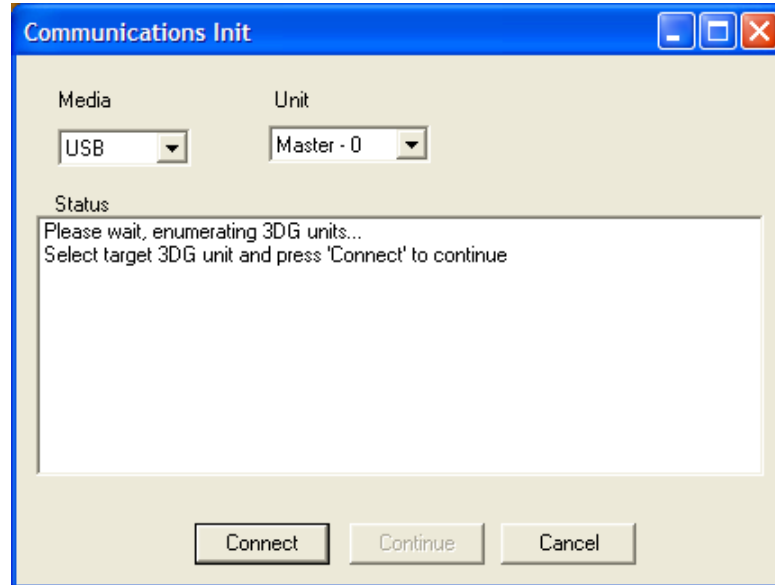
4. Select the Master unit by leaving it selected in the drop down window, and click 'Connect'. This will establish communication with the unit and gather information about its status. Status will be echoed in the display window.
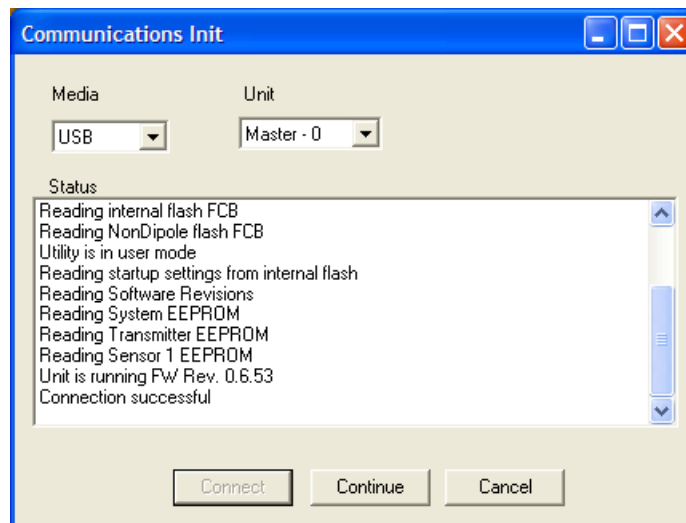
5. When the window indicates 'Connection successful', click 'Continue'. This will bring up the main Settings window of the Utility.

Note:
For a full description of the Configurable Default settings, see **Power-Up Defaults** in the Installation and Operation Guide.

Note:
Note that the *Sync Mode* setting should be left at **Internal** for proper MUS operation.

6. Click on the drop down menu next to the MultiUnit ID field, and **set the ID for the Master unit to '0'** (click on number 0 to select it).

Set the Master unit's ID to '0'

7. Click 'Apply' to write this setting into memory, exit the Utility, and power OFF the 'Master' unit.

2,3,or 4 trakSTAR MUS Operation: SET Slave#1: ID=1

8. Turn on the first 'Slave' unit (this will be configured to report sensors 4-7) and repeat Steps 2-5 above, ensuring that you select the 'Slave' device from the Unit drop down window (Step 4).

9. Click on the drop down menu next to the MultiUnit ID field, and **set the ID for this first Slave unit to '1'** (click on number 1 to select it).

10. Click 'Apply' to write this setting into memory, exit the Utility, and power OFF the 'Slave' unit.

3 or 4 trakSTAR MUS Operation: SET Slave#2: ID=2

11. If you have additional Slave units, power ON the next one, and repeat Steps 3-6 above. In Step 7, set the MultiUnit ID field for this unit to **2**.

12. Click 'Apply' to write this setting into memory, exit the Utility, and power OFF this second 'Slave' unit.

4 trakSTAR MUS Operation: SET Slave#3: ID=3

13. If you have an additional Slave unit, power it ON and repeat Steps 3-6 above. In Step 7, set the MultiUnit ID field for this unit to 3.

14. Click 'Apply' to write this setting into memory, exit the Utility, and power OFF this third'Slave' unit.

NOTE: You must cycle power to the tracker for the new setting to be used.

TESTING FOR SUCCESSFUL INSTALLATION

After configuring the ID numbers for the Slave units, power ON all units (Master and Slaves) and run the CUBES demo utility to confirm that the system is operating correctly. Note that this utility is installed to your PC, during the software installation.

1. With all units powered ON, start the demo utility by selecting the *CUBES* from the Ascension\3D Guidance\ Start menu
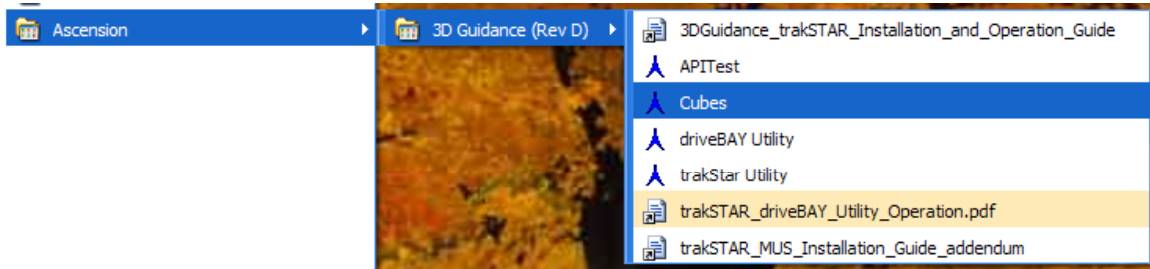
2. If you have installed the hardware and drivers and set the Multi-Unit ID correctly, there will be a pause (~20-25sec) while the application establishes communication with the trackers. Then the main window of the utility will be displayed.
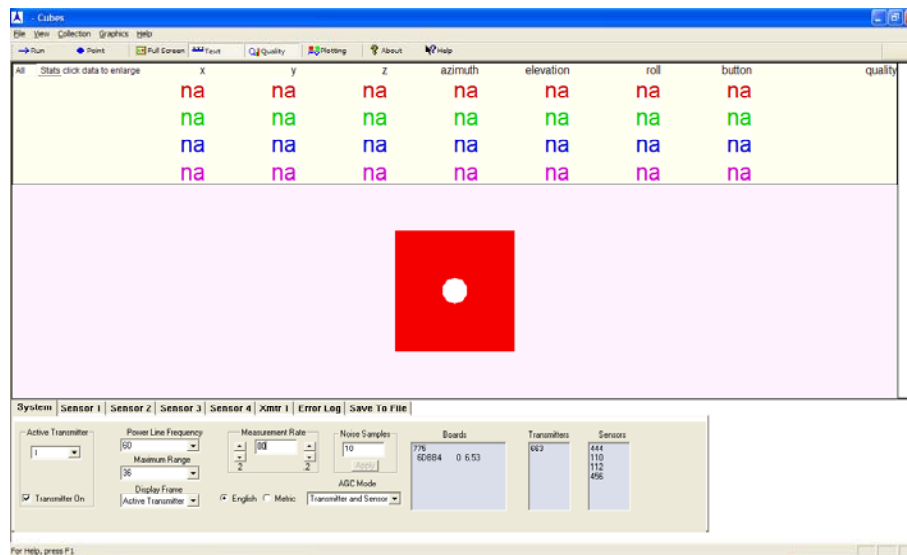
3. To start collecting data from the tracker, press the 'Run' button in the toolbar.
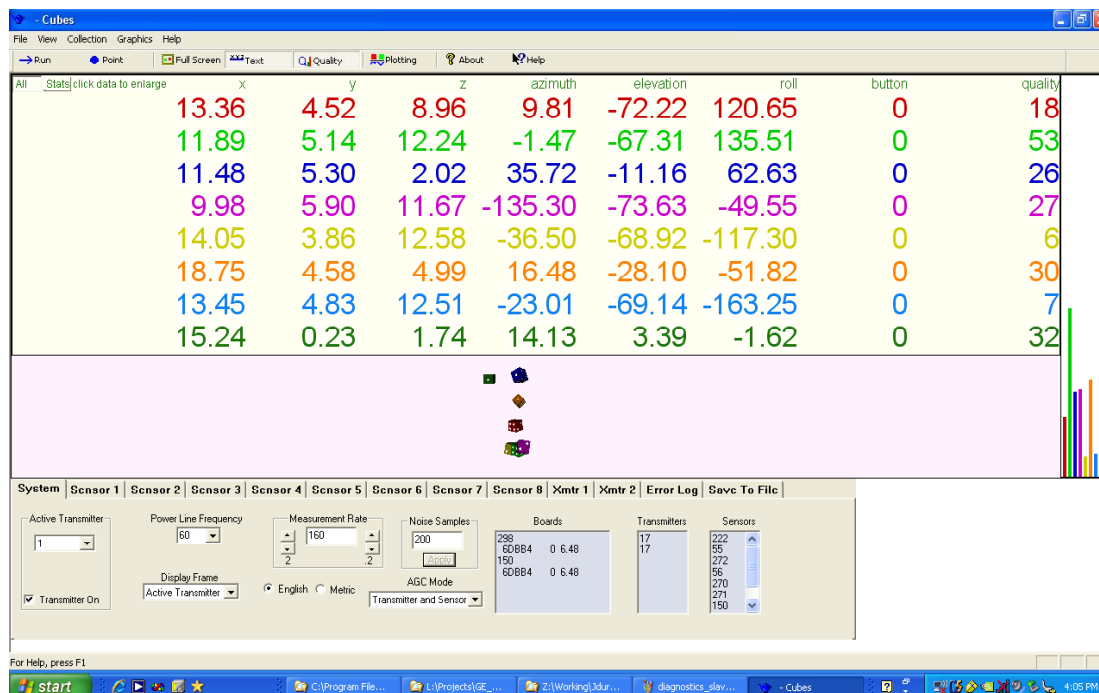

Press this to Start
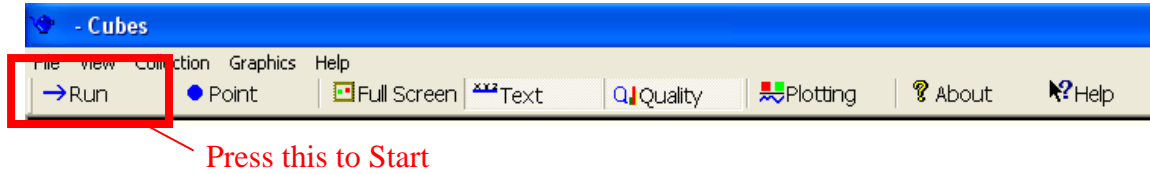
If the *CUBES* utility does not run, please consult the troubleshooting table for assistance.

Invalid Multi-Unit ID setup

If the utility runs, but the title bar indicates "Could not initialize", check the Error Log tab at the bottom of the Window. If the Log shows the following error, go back to the CONFIGURING THE MULTI-UNIT ID NUMBER, section of this guide and check for proper setup
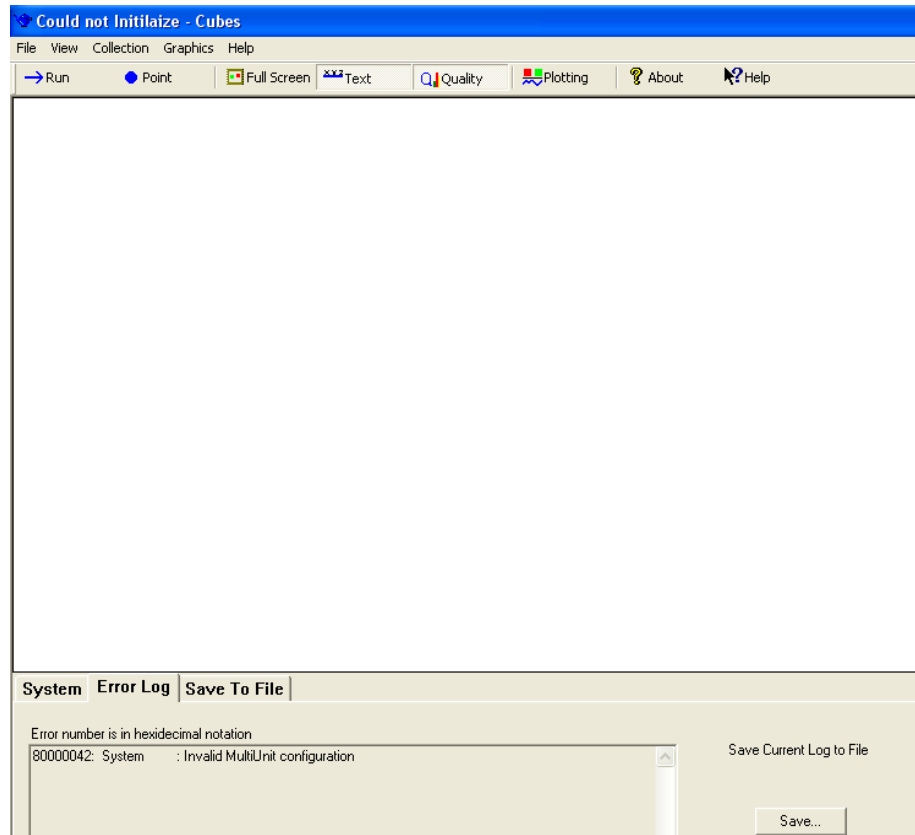
4. The following is what you will see when the demo is working.

The top of the window displays reported position and orientation data for each sensor attached to the tracker electronics unit. Each color-coded row contains tracking data for a single sensor. The first three values in a row represent sensor position in inches, relative to the transmitter. The next three values in the row represent sensor orientation in degrees.

<div style="float:left; border:1px solid; padding:4px; width:180px;">

🔖 **Tip:** For additional information and assistance on using the QUALITY number, see the API Reference Chapter of the Installation and Operation Guide.

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The last column in each row presents reported QUALITY number. It gives you an indication of the degree to which position and angle measurements are in error. Errors may often be attributed to metal in the environment. See the "Environmental Factors" section of the Installation Guide.

The center of the window displays a colored cube for each sensor attached to the electronics unit. Note that colors correspond with the preceding rows of text values

Note that when 12-16 sensors are connected, the graphical display of the Cubes (dice) will only be visible if the 'Text' is toggled off in the toolbar.

The bottom of the window allows you to configure and adjust most tracker parameters.

Use the demo utility to acquaint yourself with the sensor's motion volume (i.e., motion box) and the tracker's measurement capabilities. If the utility does not run or the tracker does not operate as described, please consult the troubleshooting table for assistance.