Tutorial of OptiTrack Arena Motion Capture System
1st : Installation of System

Motivation of this tutorial is to make readers understand how to set up OptiTrack Motion Capture System by themselves and how to install ARENA software. How to use Motion Capture System using Arena software and how to stream data using NATNET SDK will be presented in a next tutorial.
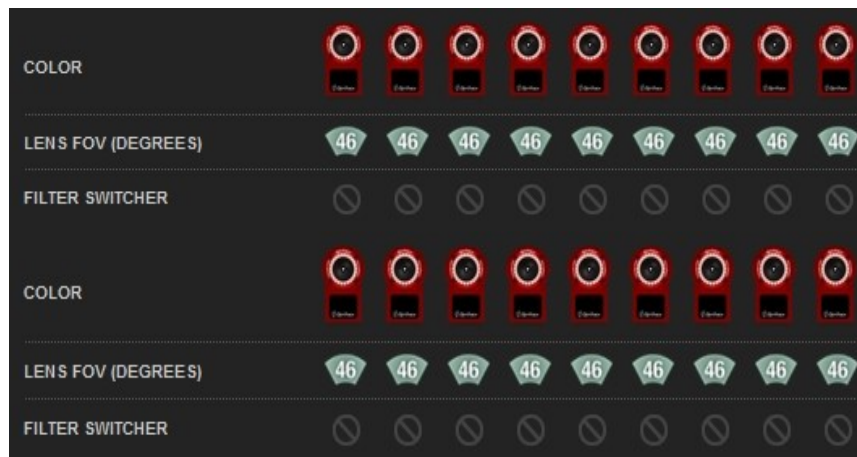
1. Part Lists

US-based vendor to obtain material to complete this tutorial is Natural Point company (http://www.naturalpoint.com). To complete this tutorial, you'll need the following items.

Line	Part Number	Description	Unit Price	QTY	Total
1	ARN-SFTW	ARENA Motion Capture software	$1,999	1	$1,999.00
2	MCP1010	Calibration Square	$99	1	$99.00
3	TR0004	Camera Stand : 10ft	$79	4	$316.00
4	HDWKEY	Hardware Key	$99	1	$99.00
5	TRA1010	Manfrotto Super Clamp with 3-way Head (#056, #035 & #037)	$69	4	$276.00
6	TRA1015	Manfrotto Wall Mount with Swivel-Tilt Head (#356)	$49	15	$735.00
7	MCP1080	Marker Set : 5/8" Semi-Soft	$249	2	$498.00
8	MCP1035	Motion Capture Suit (M)	$279	1	$279.00
9	OPTHUB	OptiHub	$299	3	$897.00
10	FL-R2	OptiTrack FLEX:V100R2	$599	18	$10,782.00
	.RD.LENS0003.	Red, 46.2° FOV (4.5mm), -			
11	CBL0013	OptiTrack Sync Cable : 30ft	$10	2	$20.00
12	OPTKT	OptiWand Kit	$249	1	$249.00
13	CBL1015	USB 2.0 Active Extension Cable : 5m	$20	3	$60.00
14	CBL1021	USB Cable : 16ft A to B	$5	3	$15.00
15	CBL0018	USB Cable High Grade, Left-Angle : 5m	$10	18	$180.00
			Subtotal		$16,504.00
	Shipping	UPS			$89.00
			Total		$16,593.00

2. Installation of Arena Bundle setup using 18 V100:R2 Camera

This package include 18 USB camera like below :

And also includes :


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3  OPTIHUBS
3  UPLINK CABLES (USB)
3  EXTENSION CABLES (USB)
2  SYNC CABLE (RCA)
2  SETS OF 5 7/16" MARKERS
2  RIGID BODY MARKER BASES
1  TRACKING TOOLS LICENSE
1  HARDWARE KEY
1  OPTIWAND KIT
1  CALIBRATION SQUARE
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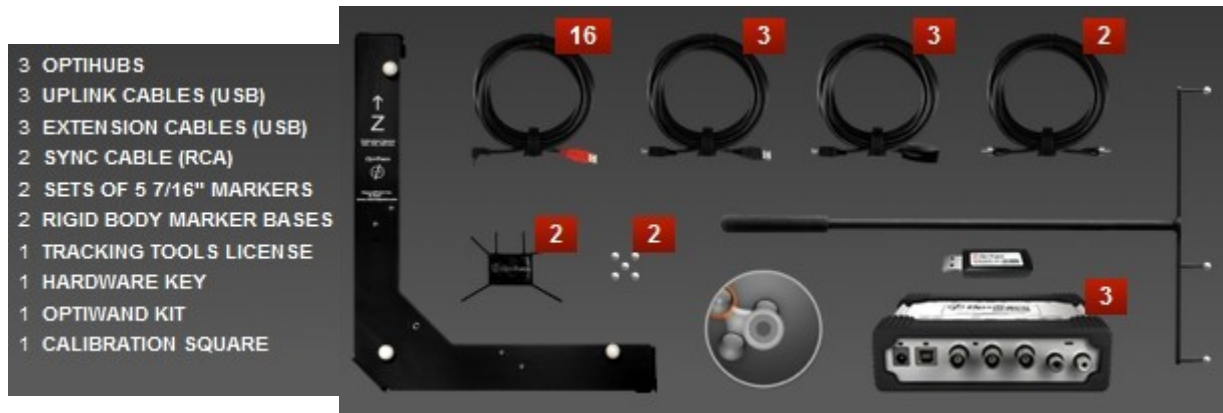
To install this bundle, we also need one Motion Capture System dedicated PC which need performance like below :

System Requirements

- Windows XP SP2 / Vista / 7 (32/64-bit)
- Core i5 Processor
- 256 MB of RAM
- USB 2.0 Hi-Speed ports

Hardware Construction and Installation of Arena Software:

Step 1) First, we should setup 18 cameras. Cameras can be fixed to wall or tripod. Recommended configuration of 18 camera setup is presented in a picture below.
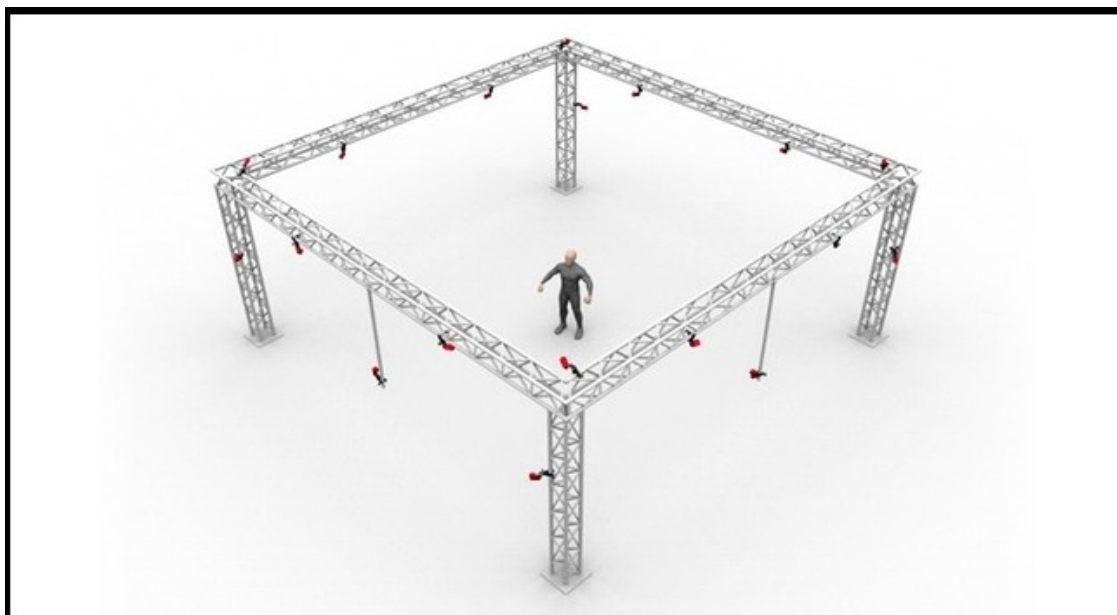
Step 2) Arena Software Installation

You can download Arena software from Natural Point Optitrack web-page (http://www.naturalpoint.com/optitrack/downloads/arena.html).

Our version is ARENA 1.7.3 and can be updated to new version until our license is effective(Our permission for update will be terminated in August 2012). After then, we can purchase new license or we should keep current version of Arena.

To activate Arena software in our dedicated computer, we should activate our license in Arena web-page first (http://www.naturalpoint.com/optitrack/support/). For more detailed information of this process such as license serial number, please contact Kiwon Sohn (skw1125@gmail.com). We will not include our license serial number in this tutorial for security problem.

One thing which should not forget is that we use Hardware key for activation. Hardware key is small USB shaped device which give a permission of license to computer. Currently, Hardware key is connected to Motion Capture System dedicated computer in Bossone lab. Hardware key always should be connected to computer if you want to install and run Arena in a computer.

After finishing 2 steps above, Arena web-page will give you a license file by email. You should save the file in location which they mentioned in an email.

After installing Arena, you can see 2 shortcut icon in Desktop in your computer. 1st one is activation program and 2nd one is Arena. If this is 1st installation in your computer, you should execute an activation program and type information which you typed in Arena web-page. Don't forget that Hardware key should be connected to your computer always.

After successful activation, you can run Arena software by clicking Arena icon.

Step 3) USB connection

After positioning 18 cameras, we should connect USB cables between OptiHubs and cameras. Each OptiHub can connect 6 cameras. Since we have 3 Hub, we can connect all 18 cameras to Hubs. After connecting Hub and cameras, we also should connect Each Hub and a MOCAP dedicated computer. Last, we also should connect Sync cable between OptiHub. Connecting Sync cable is very important, therefore we recommend looking at system configuration picture which we present below carefully and connect in a same way with a setup in a picture.
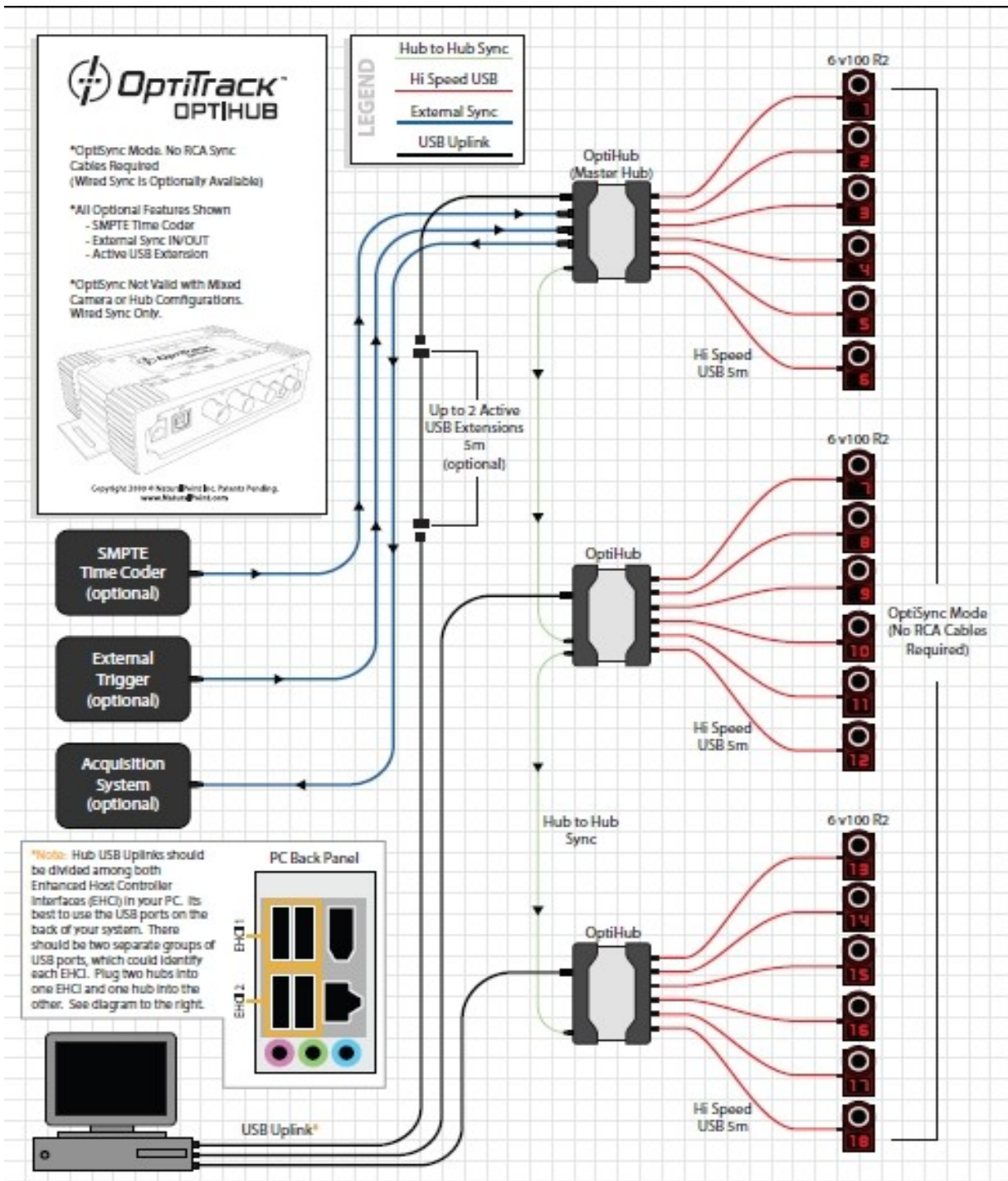
OptiHub should be powered by using converter which Arena Bundle provide. After finishing USB connection, you can see OptiHub and 18 cameras in your computer like this.
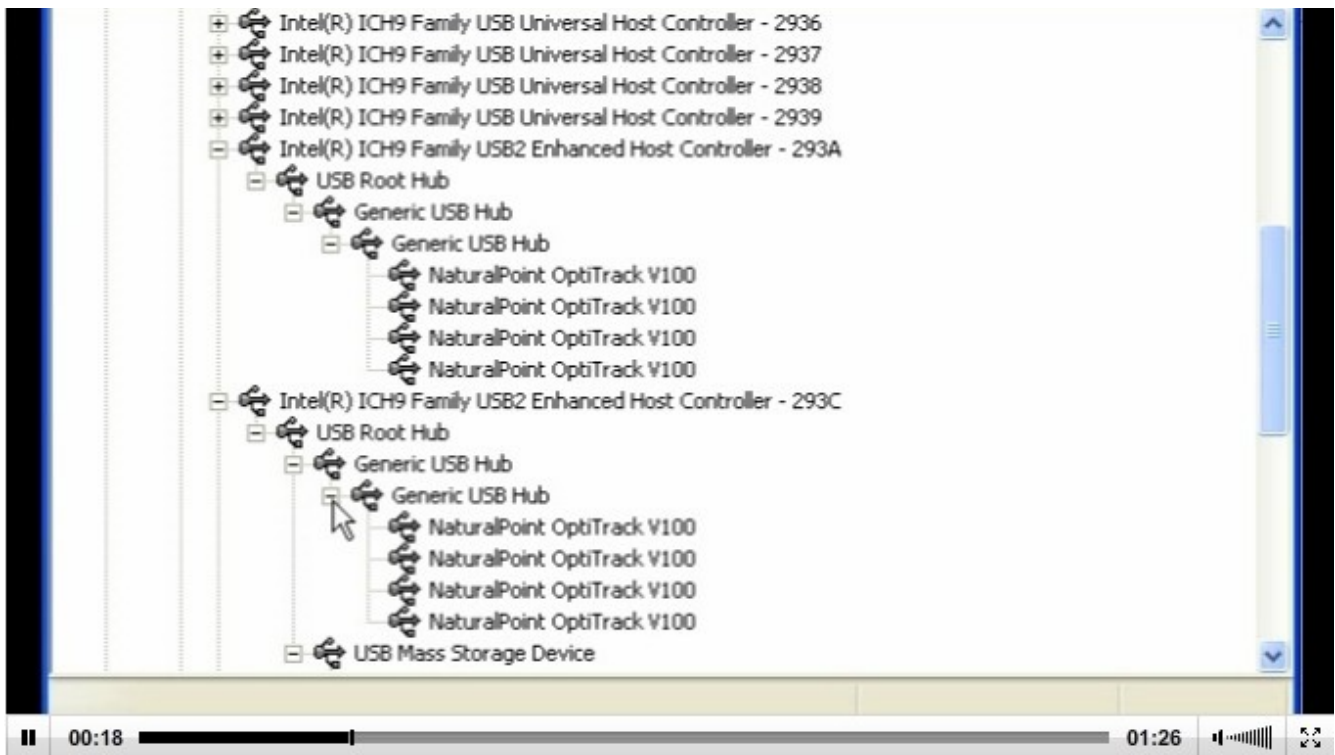

In Arena program, if you click Select Camera button on right toolbar, you can see new pop up window which has name "Select Cameras". In a window, you can select cameras which you want to use.
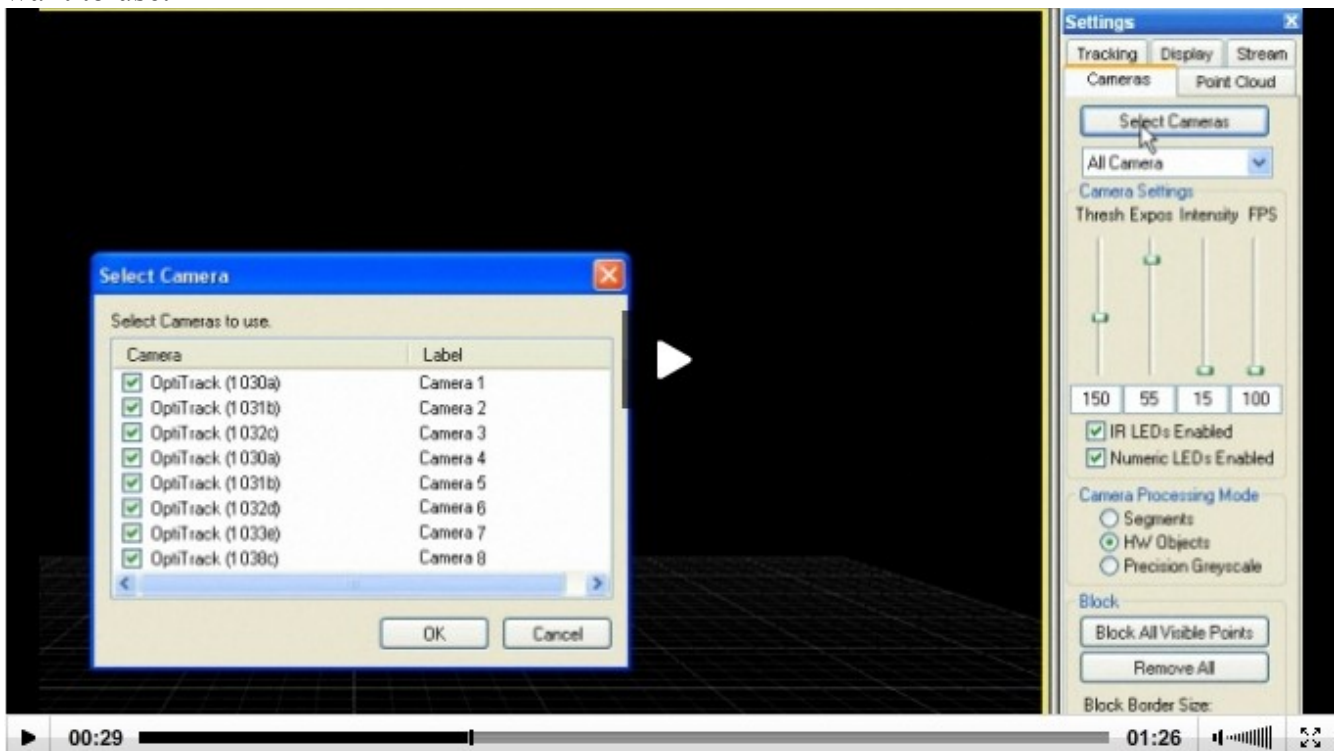
Step 4) Camera Angle setting.

Though 18 cameras are fixed to wall or tripod, you still should adjust angle of each cameras. For setting angle, you should execute Arena 1st. Then, you select 18 cameras like what we explained in previous section.
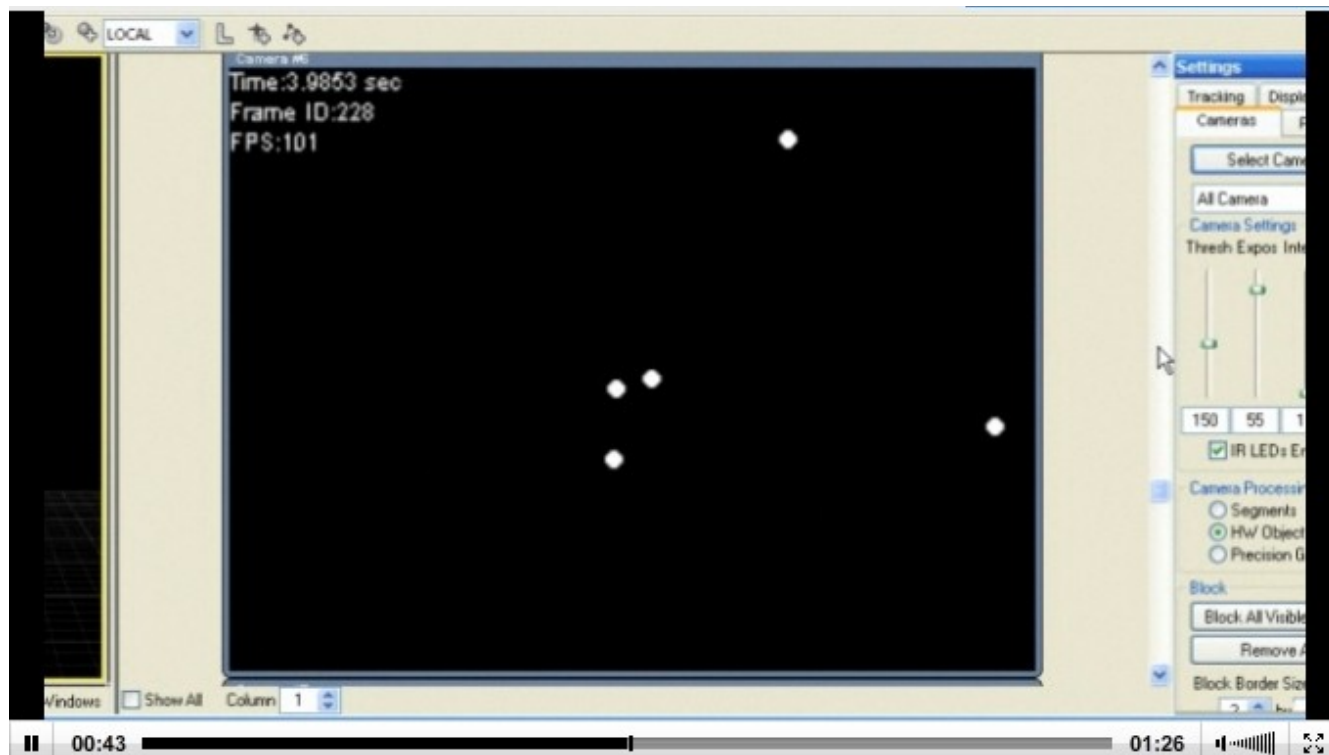
Then you can see 18 small windows on right position of window like below.
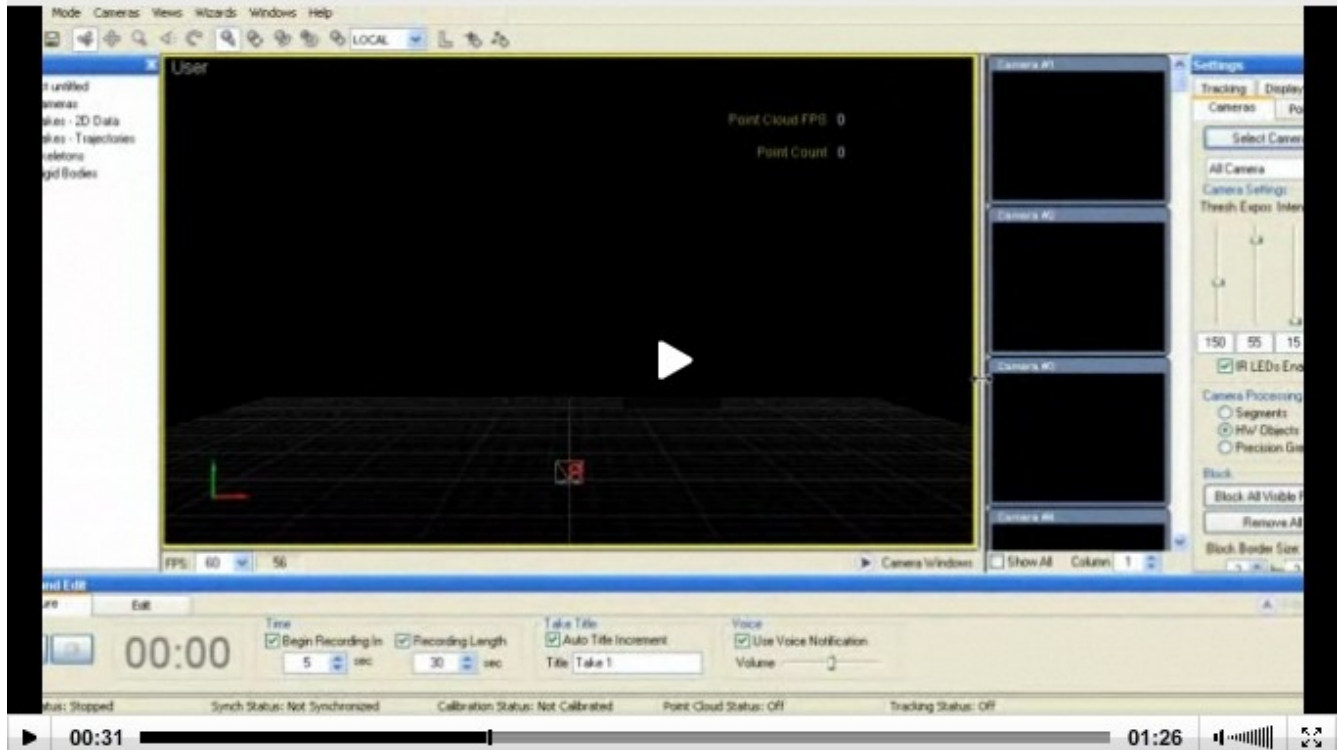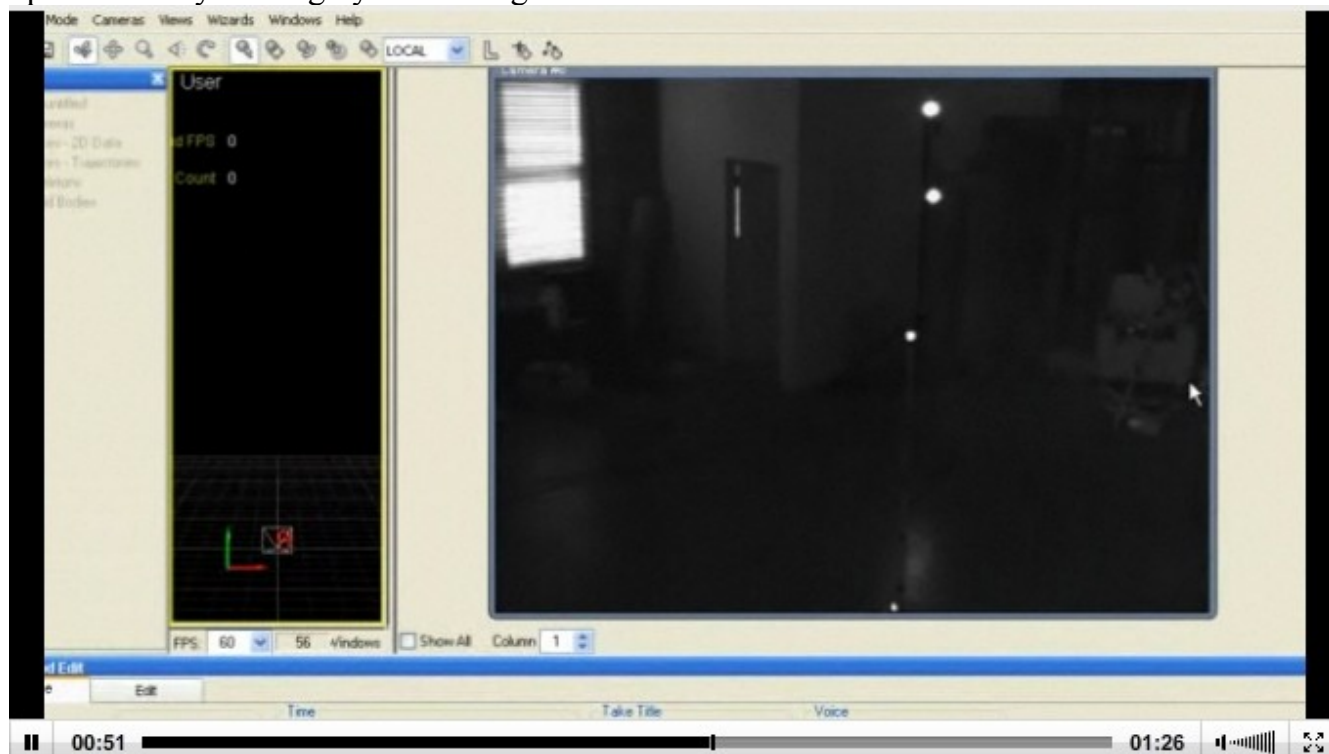

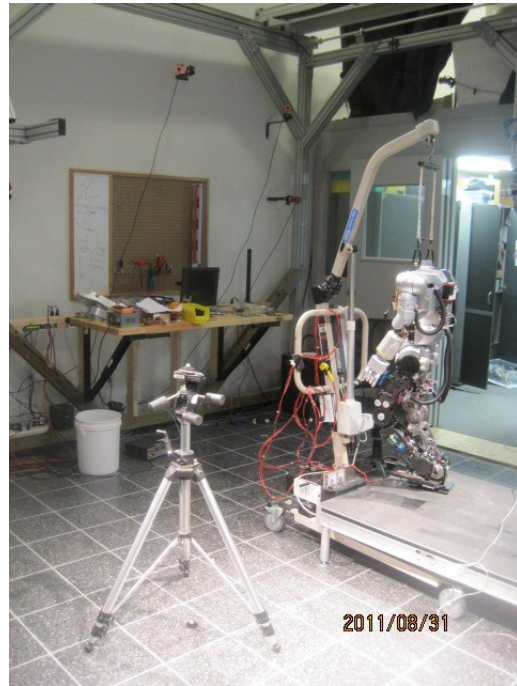Then, you push play button on Capture tab in bottom toolbar of window.
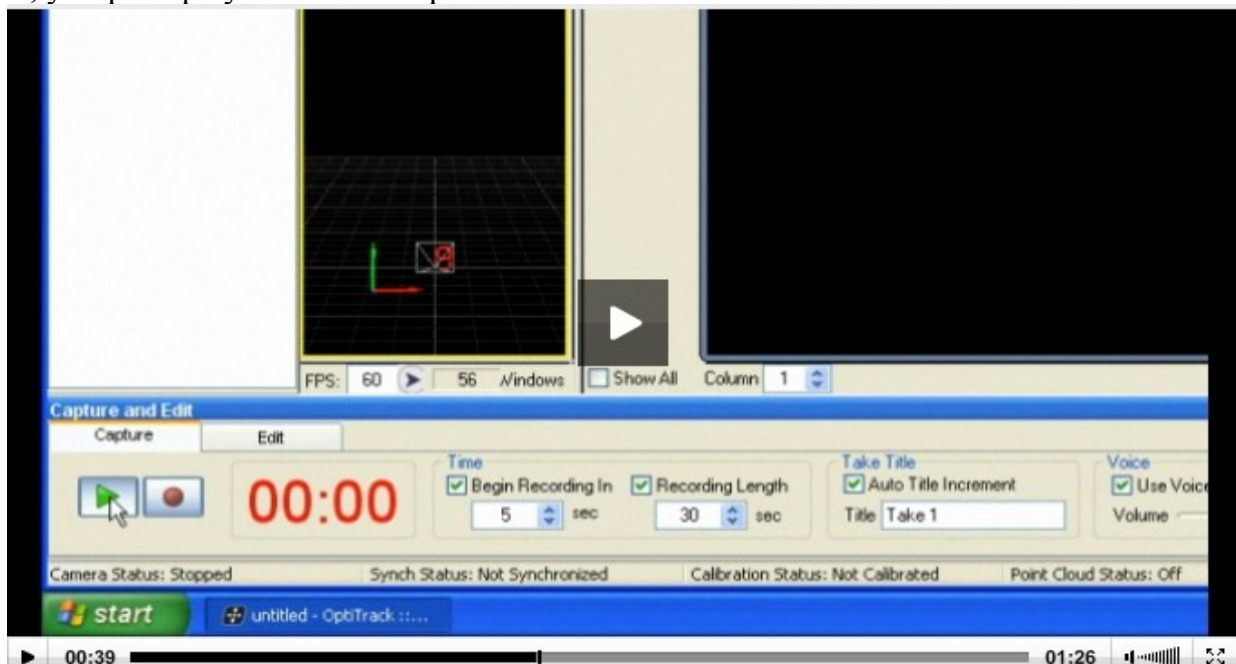
You can see each 18 small windows show capturing information and captured image.

For better quality of image, you can right click small window and select gray-scale image option. Then you see gray-scale image of a window like below.

In middle of capture area, locate 2 markers like below :

1 marker should be located in height of human hip and another marker should be on the ground. Do not forget that both of 2 markers should be located in middle of capture area.

Using 18 small windows in Arena software, check every cameras are looking at these markers. Then adjust angle of camera so that 12 cameras (which are located in 8 or 9 feet height) have a marker (which is on top of tripod) be positioned in middle of small window.

Last, adjust angle of 6 cameras (which are located in 6 feet height) have a marker (which is on the ground) be positioned in middle of small window.

Now you finish basic setup of Arena Motion Capture System. Next tutorial will introduce how to use this system and how to stream data to other computers which need motion data.