ICAVE

Service Documentation: ART (Advanced Realtime Tracking) System

Last Updated: 10-26-2020

Summary: The following provides documentation for properly servicing the ART tracking calibration used by the ICAVE for its realtime tracking functionality. A breakdown of the current setup will be provided along with the software configuration for the ART tracking software.

Breakdown:

The ART system has a main hardware controller on the server rack of the ICAVE. Four trackers sit above the 5 projector screens and are routed to ethernet ports behind the controller.

ART Controller:



(Need picture of the tracking sensors)

The ART controller is connected to the Head Node where its managed by DTrack2.

DTrack 2: Software manager for the ART controller. Allows configuration and calibration management of the tracking system.

DTrack2 v2.14.0 max. 4 cameras / max. 4 bodies	
DTrack2 Settings Calibration Display Tools About	
Start c01 _/_ c02 _/_ >> sync 🗶 - 🖷 -	📉 - 💼) Warmup start
Monitor 2DOF tab 01	8 ×
Marile 2005 week white Mariles 2005 is a d	
Monitor 200+ most active Monitor 200+ tab 01	
Event Display	8 ×
Event Display Measurement Tool Display Fingertracking Display Flystick Display Data Display	
	Configuration '10-7-2020' on Controller 'atc-301511022'

Note: DTrack3 is available.

Configuration: These are settings presets for the system that can be accessed from the DTrack2 menu dropdown:

DTrack2 v2.14.0 max. 4 cameras	Configurations		? 💌
DTrack2 Settings Calibration	Description Owner		Locked
(<u>_</u>) <u>_</u>	10-7-2020		🚡 no
Licenses d	default		no
Configurations	standard		no
	standard backup		no
Start M Search <u>h</u> ardware F2 Controller standby Controller <u>r</u> eboot	Delete New Edit	Lock	Apply Export
Quit Q			Restore
			Exit

The configuration settings are handled by the settings dropdown: These for the most part are left unchanged from the default configuration. These exceptions are as follows:

Synccard: This is used to setup the synching ratio used for the 3D glasses' shutter.

Synccard Settings	? 🗙			
r				
Model	Serial			
Synccard3	00246			
Synccard3	00221			
sync input video/TTL signal automatic input detection not supported frequency [HZ]				
supported Synccard modes				
external video signal, for validated shutter glasses, divisor 2				
	OK Cancel			

We are using: external video signal, validated shutter glasses, divisor 2

Body Administration: The registered mocap bodies are configured here along with their calibrations. Currently the registered bodies are the tracked 3D glasses and the Logitech gamepad.

ID	Active	Name	Ca	libration	Filter	Delete	Reset]
1	V	XPAND 3D Glasses	e	Custom	default	×	3	
2	V	Logitech F710	0	Custom	default	×	3	

Output: Sends the tracking data to a specific output channel. We have set the first channel to active and setting default checked information to the head node which is running DTrack2.

v active	send to 192.16	8.5.160	UDP port	
	mult	icast (224.0.1.0 - 239.255.255.255)		
Ident	tifier	Descriptio	on	
√ fr		frame counter		
🗸 ts		timestamp		
🔽 6dcal		number of calibrated bodies		
V 6d		6DOF standard body		
✓ 3d		3DOF marker		
6df2		Flystick		
🔲 6di		6D inertial body		
act as rou	iter for tr	acking output		

Calibration: The tracking is calibrated using DTrack2 and two calibration instruments: A "wand" and a axis / scale "marker".

Marker: The marker provides an axis and origin to define the space for the calibration. For the purposes of the ICAVE, it needs to be placed at the center of the space.



Placement:



Wand: Used to generated the point cloud used to make the area map of the calibrated area.



Room Calibration: The marker distances is set to 410 and the coordinate system specified is power wall, as this is what getReal and track3d use. A duration of 2 minutes is used for the calibration time to ensure nearly full 100% coverage of the calibration.

Pears Calibration						
wand length [mm] 410.00						
**	marker distances	Room Calibration Set 410 👻				
	A (1-2) [mm]	384.0				
	B (1-4) [mm]	114.0				
+x	C (1-3) [mm]	225.0				
coordinate system						
Power wall		▼				
duration 120.0 🐳 Set to default						
Date and time of the last room calib	ration: 2020-10-08T03:04	4:22				
Hide details Transfer Calibrate Exit Room calibration duration differs from the default of 30 s!						

During calibration, a countdown will start, the individual holding the wand must twirl it slowly while traversing the space. Its best to start from the outside perimeter and slowly work your way in circular fashion to the inside.

DTrack2 Settings:

Results of proper calibration:

Projectors are the numbers 1-5. C represents where the marker was placed. E represents the entrance to the ICAVE.

8

Monitor 2DOF most active



Þ	Room Calibra	tion Result	8	×
	ameras		×	
	Camera	Residual	Used Frames	
	c01	0.29 mm	100%	
	c02	0.28 mm	99%	
	c03	0.28 mm	99%	
	c04	0.29 mm	99%	
,	wand residual	0.26 mm		
	wand range	3.89 mm		
			OK Cancel	

Body Calibrations: Bodies are calibrated using the Body Calibration window. From there either the glasses or Logitech gamepad are selected for calibration and calibration can be started. To calibrate have the object present within the ICAVE and move it around so that the trackers can observe the body composite of the ball sensors from multiple angles.

۱۸/	in	d	0		•
vv		u	U	vv	•

Body Calibration	? 🔀
Target Library Custom	
body	
XPAND 3D Glasses (standard body 01)	
type <u>standard</u> ▼ cgordinate system due to room - zero in marker ▼	
Load file(s) Save file(s)	Zalibrate
(Exit