

# Seeker 与 ROS 的通信

## 一、动捕软件安装与数据准备

1. 在操作系统为 Windows 系统，且位数为 64 位的电脑上，以鼠标右键点击“以管理员身份运行”的方式，依次运行“SeekerDriver1.6.2.x”和“Seeker1.6.2.1\_setup”两个文件（如图 1），前者会弹出 Dos 窗口并很快消失，后者直接点击安装即可，注意请勿更改安装路径（如图 2）；

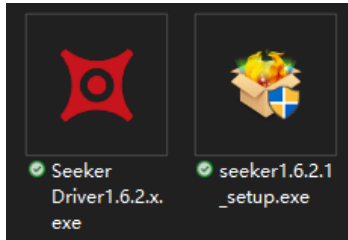


图 1



图 2

2. 安装完毕后，桌面上会出现软件图标（如图 3）；



图 3

3. 在电脑上插入白色的软件加密狗。
4. 鼠标右键桌面上的“Seeker”图标，选择“以管理员身份运行”，打开软件；
5. 使用 Seeker 采集动捕数据，经处理使其能带着 Markerset 加载播放，或者能在实时下显示 Markerset 运行（如图 4），具体操作步骤详见《Seeker 操作说明》。

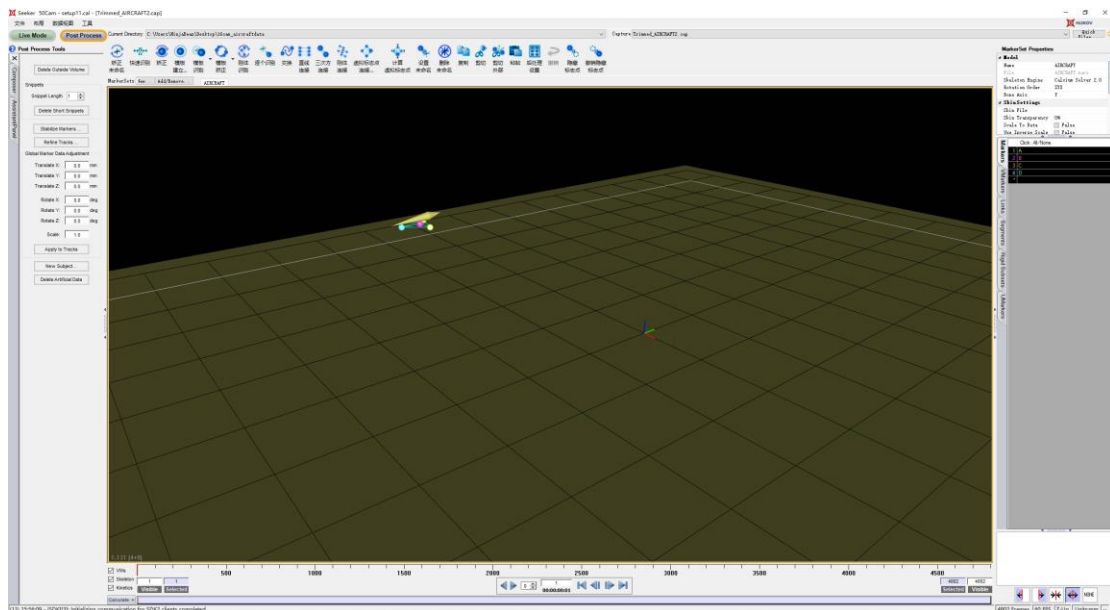


图 4

## 二、数据广播

1. 点击 Seeker 菜单栏“工具——设置”，在“System”标签下的“SDK Streaming”区域，下拉菜单选择 10.1.1.198，并勾选“SDK2 Enabled”选项（如图 5）

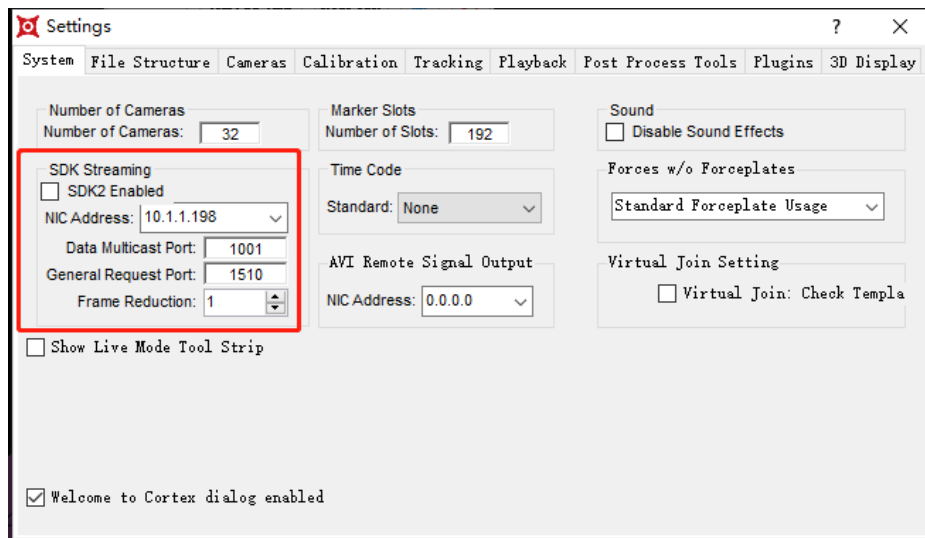


图 5

2. 关闭该设置窗口，在后处理或实时下播放数据；

## 三、VRPN 设置

1. 在 Seeker 软件所在电脑中启动 NokovVrpnServer.exe（进入目录后双击即可），软件会自动检查并连接 Seeker 软件（如图 6）

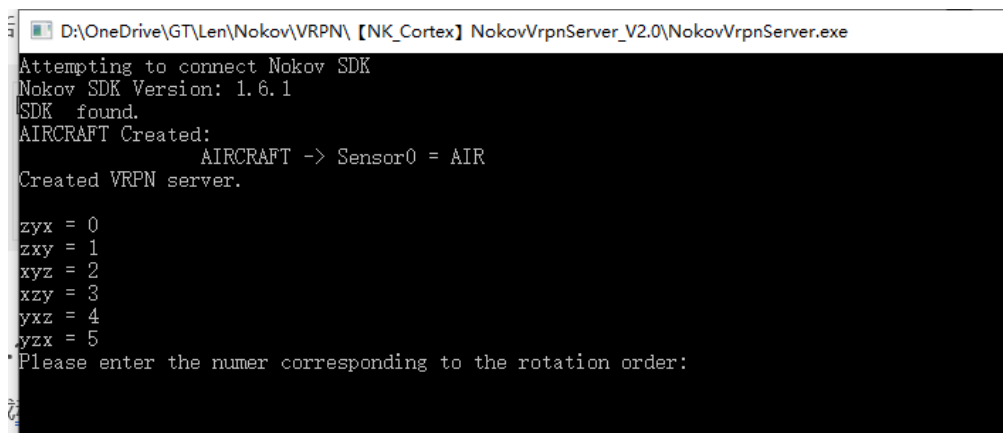


图 6

2. 在 VRPN 界面，选择和 Seeker 软件中刚体数据一样的坐标系（如图 7）；

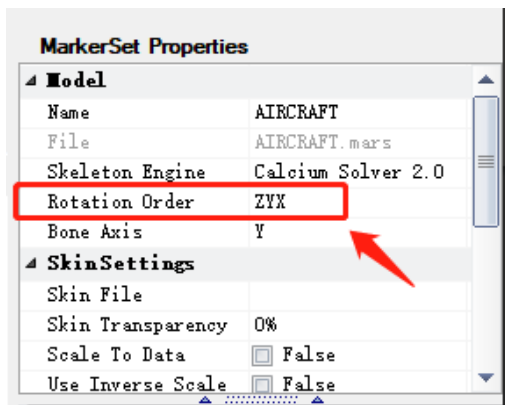
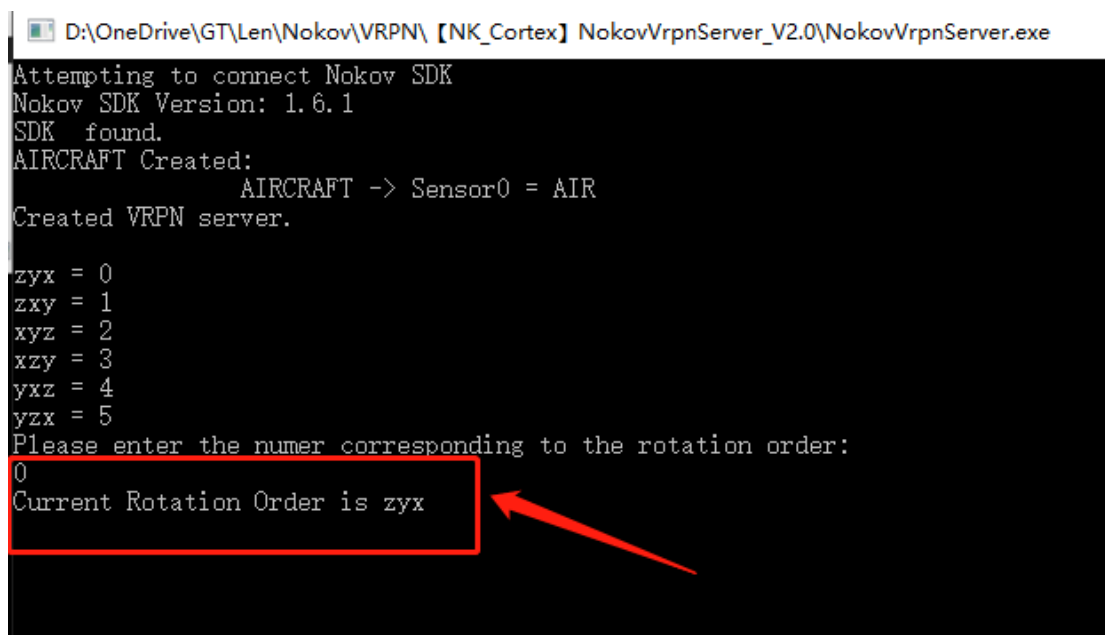


图 7

3. 点击回车，Seeker 软件的 VRPN 服务器即启动（如图 8）。



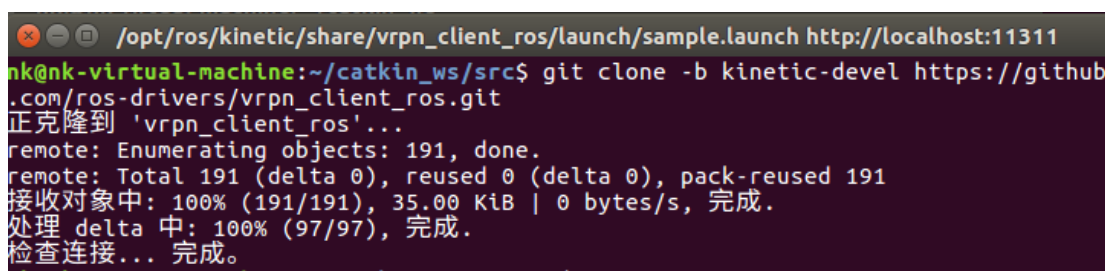
```
D:\OneDrive\GT\Len\Nokov\VRPN\【NK_Cortex】NokovVrpnServer_V2.0\NokovVrpnServer.exe
Attempting to connect Nokov SDK
Nokov SDK Version: 1.6.1
SDK found.
AIRCRAFT Created:
AIRCRAFT -> Sensor0 = AIR
Created VRPN server.

zyx = 0
zxy = 1
xyz = 2
xzy = 3
yxz = 4
yzx = 5
Please enter the numer corresponding to the rotation order:
0
Current Rotation Order is zyx
```

图 8

#### 四、ROS 下与 Seeker1.6.2 软件的通信测试

1. 运行环境：  
ROS: kinetic  
Ubuntu: 虚拟机 16.04
2. 运行目的：  
通过 Seeker 软件和 VRPN 获取 markerset 或者刚体等的信息，并传给 ROS。
3. VRPN 客户端的下载及网络配置，使用虚拟机运行（如图 9-11）
  - `cd ~/catkin_ws/src`
  - `git clone https://github.com/clearpathrobotics/vrpn_client_ros.git`
  - `sudo apt-get install ros-kinetic-vrpn`



```
/opt/ros/kinetic/share/vrpn_client_ros/launch/sample.launch http://localhost:11311
nk@nk-virtual-machine:~/catkin_ws/src$ git clone -b kinetic-devel https://github
.com/ros-drivers/vrpn_client_ros.git
正克隆到 'vrpn_client_ros'...
remote: Enumerating objects: 191, done.
remote: Total 191 (delta 0), reused 0 (delta 0), pack-reused 191
接收对象中: 100% (191/191), 35.00 KiB | 0 bytes/s, 完成.
处理 delta 中: 100% (97/97), 完成.
检查连接... 完成.
```

图 9

```
/opt/ros/kinetic/share/vrpn_client_ros/launch/sample.launch http://localhost:11311
nk@nk-virtual-machine:~/catkin_ws$ sudo apt-get install ros-kinetic-vrpn-client-ros -y
[sudo] nk 的密码:
正在读取软件包列表... 完成
正在分析软件包的依赖关系树
正在读取状态信息... 完成
将会同时安装下列软件:
  ros-kinetic-vrpn
下列【新】软件包将被安装:
  ros-kinetic-vrpn ros-kinetic-vrpn-client-ros
升级了 0 个软件包, 新安装了 2 个软件包, 要卸载 0 个软件包, 有 95 个软件包未被升级。
需要下载 1,198 kB 的归档。
解压缩后会消耗 8,560 kB 的额外空间。
获取:1 http://packages.ros.org/ros/ubuntu xenial/main i386 ros-kinetic-vrpn i386 7.33.1-1xenial-20190607-180745-0800 [1,091 kB]
获取:2 http://packages.ros.org/ros/ubuntu xenial/main i386 ros-kinetic-vrpn-client-ros i386 0.2.2-0xenial-20190608-005923-0800 [107 kB]
已下载 1,198 kB, 耗时 5 秒 (209 kB/s)
正在选中未选择的软件包 ros-kinetic-vrpn。
(正在读取数据库 ... 系统当前共安装有 325853 个文件和目录。)
正准备解包 .../ros-kinetic-vrpn_7.33.1-1xenial-20190607-180745-0800_i386.deb ...
正在解包 ros-kinetic-vrpn (7.33.1-1xenial-20190607-180745-0800) ...
```

图 10

```
/opt/ros/kinetic/share/vrpn_client_ros/launch/sample.launch http://localhost:11311
将会同时安装下列软件:
  ros-kinetic-vrpn
下列【新】软件包将被安装:
  ros-kinetic-vrpn ros-kinetic-vrpn-client-ros
升级了 0 个软件包, 新安装了 2 个软件包, 要卸载 0 个软件包, 有 95 个软件包未被升级。
需要下载 1,198 kB 的归档。
解压缩后会消耗 8,560 kB 的额外空间。
获取:1 http://packages.ros.org/ros/ubuntu xenial/main i386 ros-kinetic-vrpn i386 7.33.1-1xenial-20190607-180745-0800 [1,091 kB]
获取:2 http://packages.ros.org/ros/ubuntu xenial/main i386 ros-kinetic-vrpn-client-ros i386 0.2.2-0xenial-20190608-005923-0800 [107 kB]
已下载 1,198 kB, 耗时 5 秒 (209 kB/s)
正在选中未选择的软件包 ros-kinetic-vrpn。
(正在读取数据库 ... 系统当前共安装有 325853 个文件和目录。)
正准备解包 .../ros-kinetic-vrpn_7.33.1-1xenial-20190607-180745-0800_i386.deb ...
正在解包 ros-kinetic-vrpn (7.33.1-1xenial-20190607-180745-0800) ...
正在选中未选择的软件包 ros-kinetic-vrpn-client-ros。
正准备解包 .../ros-kinetic-vrpn-client-ros_0.2.2-0xenial-20190608-005923-0800_i386.deb ...
正在解包 ros-kinetic-vrpn-client-ros (0.2.2-0xenial-20190608-005923-0800) ...
正在设置 ros-kinetic-vrpn (7.33.1-1xenial-20190607-180745-0800) ...
正在设置 ros-kinetic-vrpn-client-ros (0.2.2-0xenial-20190608-005923-0800) ...
```

图 11

4. catkin\_make 操作 (如图 12-13)

- cd ~/catkin\_ws
- catkin\_make

```
/opt/ros/kinetic/share/vrpn_client_ros/launch/sample.launch http://localhost:11311
nk@nk-virtual-machine:~/catkin_ws$ catkin_make
Base path: /home/nk/catkin_ws
Source space: /home/nk/catkin_ws/src
Build space: /home/nk/catkin_ws/build
Devel space: /home/nk/catkin_ws/devel
Install space: /home/nk/catkin_ws/install
####
#### Running command: "cmake /home/nk/catkin_ws/src -DCATKIN_DEVEL_PREFIX=/home/nk/catkin_ws/devel -DCMAKE_INSTALL_PREFIX=/home/nk/catkin_ws/install -G Unix Makefiles" in "/home/nk/catkin_ws/build"
####
-- Using CATKIN_DEVEL_PREFIX: /home/nk/catkin_ws/devel
-- Using CMAKE_PREFIX_PATH: /opt/ros/kinetic
-- This workspace overlays: /opt/ros/kinetic
-- Using PYTHON_EXECUTABLE: /usr/bin/python
-- Using Debian Python package layout
-- Using empy: /usr/bin/empy
-- Using CATKIN_ENABLE_TESTING: ON
-- Call enable_testing()
-- Using CATKIN_TEST_RESULTS_DIR: /home/nk/catkin_ws/build/test_results
-- Found gmock sources under '/usr/src/gmock': gmock will be built
-- Found gtest sources under '/usr/src/gmock': gtests will be built
-- Using Python nosetests: /usr/bin/nosetests-2.7
-- catkin 0.7.18
```

图 12

```
/opt/ros/kinetic/share/vrpn_client_ros/launch/sample.launch http://localhost:11311
-- Generating done
-- Build files have been written to: /home/nk/catkin_ws/build
####
#### Running command: "make -j1 -l1" in "/home/nk/catkin_ws/build"
####
Scanning dependencies of target vrpn_client_ros
[ 16%] Building CXX object vrpn_client_ros/CMakeFiles/vrpn_client_ros.dir/src/vrpn_client_ros.cpp.o
[ 33%] Linking CXX shared library /home/nk/catkin_ws/devel/lib/libvrpn_client_ros.so
[ 33%] Built target vrpn_client_ros
Scanning dependencies of target vrpn_tracker_node
[ 50%] Building CXX object vrpn_client_ros/CMakeFiles/vrpn_tracker_node.dir/src/vrpn_tracker_node.cpp.o
[ 66%] Linking CXX executable /home/nk/catkin_ws/devel/lib/vrpn_client_ros/vrpn_tracker_node
[ 66%] Built target vrpn_tracker_node
Scanning dependencies of target vrpn_client_node
[ 83%] Building CXX object vrpn_client_ros/CMakeFiles/vrpn_client_node.dir/src/vrpn_client_node.cpp.o
[100%] Linking CXX executable /home/nk/catkin_ws/devel/lib/vrpn_client_ros/vrpn_client_node
[100%] Built target vrpn_client_node
nk@nk-virtual-machine:~/catkin_ws$
```

图 13

5. Ping 一下 10.1.1.198，确认和 Seeker 软件所在的主机网络是否连通，虚拟机 IP 可设置为 10.1.1.194；
6. 输入以下命令：`roslaunch vrpn_client_ros sample.launch server:=10.1.1.198`，以启动 `vrpn_client_ros` (如图 14-15)；虚拟机打印出图 15 中最后三行内容 (其中 SapphiArt 字样为 Markerset 名称，实际使用时此处会根据 Seeker 软件中的 Markerset 名称而变化)，说明连接成功；  
需要注意：IP 设置一定要对，防火墙一定要关；

```
/opt/ros/kinetic/share/vrpn_client_ros/launch/sample.launch http://localhost:11311
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$ roslaunch vrpn_client_ros sample.launch server:=10.1.1.198
... logging to /home/nk/.ros/log/bcc928e6-18e8-11ea-9eff-000c2988ccd7/roslaunch-nk-virtual-machine-10048.log
Checking log directory for disk usage. This may take awhile.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://nk-virtual-machine:40647/

SUMMARY
=====

PARAMETERS
* /rostdistro: kinetic
* /rosversion: 1.12.14
* /vrpn_client_node/broadcast_tf: True
* /vrpn_client_node/frame_id: world
* /vrpn_client_node/port: 3883
* /vrpn_client_node/refresh_tracker_frequency: 1.0
* /vrpn_client_node/server: 10.1.1.198
* /vrpn_client_node/update_frequency: 100.0
* /vrpn_client_node/use_server_time: False
```

图 14

```
/opt/ros/kinetic/share/vrpn_client_ros/launch/sample.launch http://localhost:11311
* /rosversion: 1.12.14
* /vrpn_client_node/broadcast_tf: True
* /vrpn_client_node/frame_id: world
* /vrpn_client_node/port: 3883
* /vrpn_client_node/refresh_tracker_frequency: 1.0
* /vrpn_client_node/server: 10.1.1.198
* /vrpn_client_node/update_frequency: 100.0
* /vrpn_client_node/use_server_time: False

NODES
/
  vrpn_client_node (vrpn_client_ros/vrpn_client_node)

ROS_MASTER_URI=http://localhost:11311

process[vrpn_client_node-1]: started with pid [11004]
[ INFO] [1575863718.523118732]: Connecting to VRPN server at 10.1.1.198:3883
check_vrpn_cookie(): VRPN Note: minor version number doesn't match: (prefer 'vrpn: ver. 07.34', got 'vrpn: ver. 07.29 0'). This is not normally a problem.
[ INFO] [1575863718.527753150]: Connection established
[ INFO] [1575863719.531658785]: Found new sender: SapphiArt
[ INFO] [1575863719.532300993]: Creating new tracker SapphiArt
```

图 15

7. 重新开一个终端，输入 `rostopic list`，可以看到话题 `/vrpn_client_node/**` (Markerset 名称) `/pose` (如图 16);



```
nk@nk-virtual-machine: ~/catkin_ws
---
nk@nk-virtual-machine:~/catkin_ws$ rostopic list
/rosout
/rosout_agg
/tf
/vrpn_client_node/SapphiArt/pose
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
[INFO] [1577610033.909018507]: Found new sender: SapphiArt
```

图 16

8. 输入 `rostopic echo /vrpn_client_node/***(Markerset 名称) /pose`，即可看到接收到的数据（如图 17）。

```
nk@nk-virtual-machine: ~/catkin_ws
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$
nk@nk-virtual-machine:~/catkin_ws$ rostopic echo /vrpn_client_node/SapphiArt/pose
header:
  seq: 304088
  stamp:
    secs: 1577610953
    nsecs: 863049625
  frame_id: "world"
pose:
  position:
    x: 71.392403
    y: 873.096191
    z: 67.880806
  orientation:
    x: 0.0120145443837
    y: -0.0271592023468
    z: -0.00166500491602
    w: 0.999557530215
---
header:
  seq: 304089
  stamp:
```

图 17