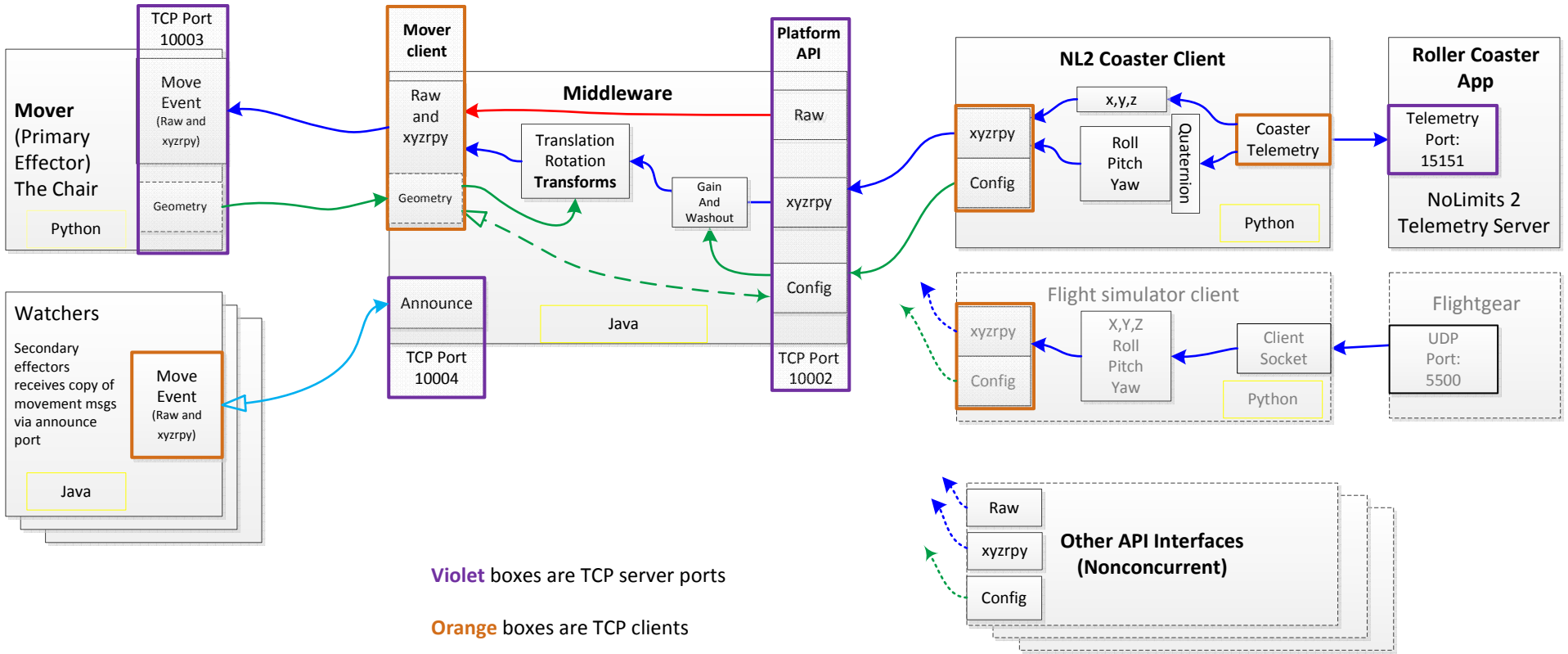
Mdx Platform Architecture Overview



Violet boxes are TCP server ports

Orange boxes are TCP clients

Client methods

Movement methods:

Method identifier:

"raw" - array of raw values indicating length of six muscles

"xyzrpy" – array of six values for xyz translations & rotations

x translation is forward/backward movement (surge)
y translation is side to side movement (sway)
z translation is up/down movement (heave)
x rotation is tilting on front/back axis (roll)
y rotation is tilting on lateral axis (pitch)
z rotation is tilting on vertical axis (yaw)

arguments default to normalized values (range between ± 1.0)
In future, "units":"real" can be included in message to provide real world mm values for translation, degrees for rotation

args: An array of six floating point values

Example: cmd with 10% heave (movement up), -20% roll (bank)

{"jsonrpc":"2.0","method":"xyzrpy","args":[0.0, 0.0, 0.1, -0.2, 0.0, 0.0]}

Configuration Method: - identifier "config"

(each of the following arguments is optional)

"blocking" true/false – (currently only supports false)

"gainX" float multiplier for x values
"gainY" float multiplier for y values
"gainZ" float multiplier for z values
"gainRoll" float multiplier for roll values
"gainPitch" float multiplier for pitch values
"gainYaw" float multiplier for yaw values
"gain" float multiplier for all 6 DOF
- all above gain factors default to 1.0

"washoutX" washout factor for x values
"washoutY" washout factor for y values
"washoutZ" washout factor for z values
"washoutRoll" washout factor for roll values
"washoutPitch" washout factor for pitch values
"washoutYaw" washout factor for yaw values

- washouts default to 1.0
lower numbers increase the rate values will decay to 0

Example: set overall gain to 0.5 and yaw washout to 0.996

{"jsonrpc":"2.0", "method":"config", "gain":0.5, "washoutYaw":0.996}

Effector messages

Get Geometry Reply:

Provided by primary effector when connecting to middleware

(returns physical configuration and capability of the platform)

values:

"effectorName"	String identifying this platform
"baseRadius"	value in mm
"baseAngles"	array of 6 angles
"platformRadius"	value in mm
"platformAngles"	array of 6 angles
"actuatorLen"	float min,max values in mm
"maxTranslation"	float value in mm
"maxRotation"	float angle in degrees

This information can be used by clients to limit movements to achievable values or to scale normalized messages to real world values

Example fragment:

{"jsonrpc":"2.0", "reply":"geometry", "effectorName":Platform Sim", "baseRadius":400, baseAngles":[140, 207, 226, 314, 334, 40], ….}

Movement event:

identifier: "moveEvent"

"rawArgs" - array of six raw values indicating length of muscles

"xyzrpyArgs" – array of six values for xyz translations & rotations

x translation is forward/backward movement (surge)
y translation is side to side movement (sway)
z translation is up/down movement (heave)
x rotation is tilting on front/back axis (roll)
y rotation is tilting on lateral axis (pitch)
z rotation is tilting on vertical axis (yaw)

"extents" – array of four values for real world effector measurements of:

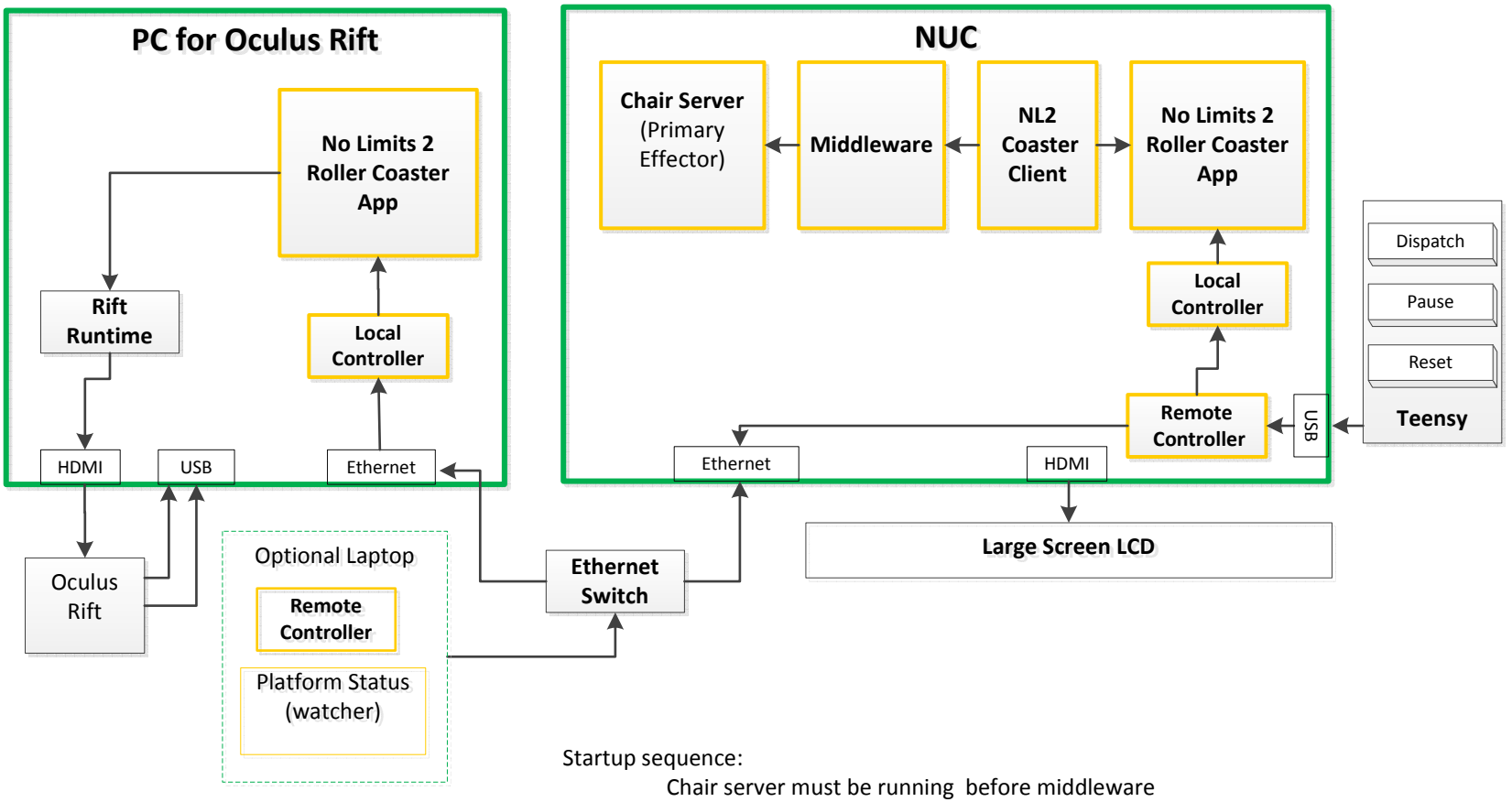
max translation mm
max rotation angle
min actuator length
max actuator length

Extent values are provided by the primary effector when connecting to middleware

Example: cmd with 10% heave (movement up), -20% roll (bank)

{"jsonrpc":"2.0","method":"moveEvent","rawArgs":[0.1, 0.2, 0.1, -0.2, 0.1, 0.0], "xyzrpyArgs":[0.0, 0.0, 0.1, -0.2, 0.0, 0.0], "extents":[40,25,700,800]}

Infrastrucure for Skills



Startup sequence:

Chair server must be running before middleware
NL2 App (in telemetry mode) must be started before Coaster cLient
Middleware must be running before NL2 Coaster client
Local controllers must be running before remote controller

Remote control requires coaster to be in manual dispatch mode
F4 opens control panel (set transparency to max)
position panel on bottom right of screen so reset button is in lower left corner