Coordinate System

Global Frame

The global frame is such that the x,y origin is at the pinger, and z=0 is at the surface. Positive z is up. Yaw is relative to magnetic north. Pitch and Roll are relative to the gravity vector.

Axes

- X+ - front of the sub
- Y+ - left of the sub
- Z+ - above the sub

Rotations

- Yaw+ - Counterclockwise around Z+ axis (this is opposite of magnetic) (Yaw **Left** positive)
- Roll+ - Counterclockwise around X+ axis (Roll **Right** is positive)
- Pitch+ - Counterclockwise around Y+ axis (Pitch **Down** is positive)

TF Frames

- `world` - Global frame defined above
- `cobalt` - The frame defining the sub's orientation relative to the `world` frame based upon the localization node output.
- `cobalt_sim` - The frame defining the sub's orientation relative to the `world` frame based upon Gazebo's output.

TF Graph

A visual representation of the TF tree will be placed here in future.