Precision Control Software Remote API

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Description

The *Precision Control Software Remote API* is a network interface to the control software using a zeromq socket (http://zeromq.org/). The interface uses a simple zeromq Request-Reply pattern to send commands to the control software. Commands are available to control the vehicle as well as query the current status of the control software.

Command Summary

MODE – set the operating mode of the control software
MOVE – make a vehicle relative move based on direction and magnitude
MOVE_CART – make an absolute vehicle move based on Cartesian coordinates
PSI – set the vehicle heading set point used in trajectory calculations
CLEAR_POS – set the current measured position as the vehicle origin
STOP – stop the vehicle
STAT – return the control software status

Command Descriptions

MODE [IDLE | BENTHIC]

Description:

Set the mode of the control software.

Parameters:

IDLE - Enter a standby or idle mode, position is still measured in this mode.
MIDWATER - Not supported, this mode currently behaves like IDLE mode.
BENTHIC - Attempt to actively hold station on the current measured position.

Example:

```
MODE BENTHIC
```

MOVE [BEARING, DISTANCE, VELOCITY]

Description:

Make a move relative to the vehicles current position.

Parameters:

BEARING - Bearing of move in degrees relative to the vehicle heading.
DISTANCE - Distance of move in meters.
VELOCITY - Velocity in meters/second.

Example:

```
MOVE 0.0, 10.0, 0.5
```

MOVE_CART [X, Y, Z, VELOCITY]

Description:

Make an absolute move from the "origin". The origin is the position that the control software first measured upon start up. The origin can also be reset to the current measured position using the CLEAR_POS command.

Parameters:

X - Move to absolute X/North position in meters.
Y - Move to absolute Y/East position in meters.
Z - Move to absolute Z/Down position in meters. (note: Z control is not enabled)
VELOCITY - Velocity in meters/second.

Example:

```
MOVE_CART 5.0, 10.0, 0.0, 0.5
```

PSI [HEADING_SETPOINT]

Description:

Inform the control software of the vehicles current heading set point. This will be used for trajectory calculations. This is only necessary if the vehicle's heading set point is not available on a data stream (e.g. Ventana). The control software will calculate move trajectories based on one of three heading sources, the vehicles heading, the vehicles heading set point, or the PSI value. The source of this value is set in the "sk_config" file. It is most desirable to use the vehicles heading set point when calculating a new trajectory.

Parameters:

HEADING_SETPOINT - Heading set point in degrees.

Example:

```
PSI 45.0
```

CLEAR_POS

Description:

Reset the software’s origin to (0, 0, 0) meters. This command can only be executed when the software is in IDLE mode.

RATE [VELOCITY]

Description:

Set the rate at which the vehicle will execute a move. This command can be entered while a move is in progress.

Parameters:

VELOCITY - Velocity in meters/second.

Example:

```
RATE 0.35
```

STOP

Description:

Stop the vehicle. This sets the software's goal position equal to the current measured position.

STAT

Description:

Return the status of various controller internal values. This command has a response in the following format,

```
STAT, 1234567, 0.1, 0.2, 0.3, 0.1, 0.2, 0.3, 0.1, 0.2, 0.3, 0.1, 0.2, 0.3, 0.4, 49.7
      [-FLG-]  [----POS----]  [----CMD----]  [----GOAL---]  [-----THRUST-----]  [PSI]
```

FLG field: The FLG field is a bitwise OR of the following controller status flags.

```
MOVING_FLAG     0x00000001
IDLE_FLAG       0x00000002
MIDWATER_FLAG   0x00000004
BENTHIC_FLAG    0x00000008
DVL Active      0x00000010
```

POS fields: measured position of the vehicle in meters X(North), Y(East), Z(Down)

CMD fields: commanded position of the vehicle in meters X(North), Y(East), Z(Down)

GOAL fields: destination of last move command in meters X(North), Y(East), Z(Down)

THRUST fields: vehicle relative thrust commands in a +/- 5 volt range (axial, lateral, vertical, heading)

PSI field: the heading set point of the vehicle in degrees