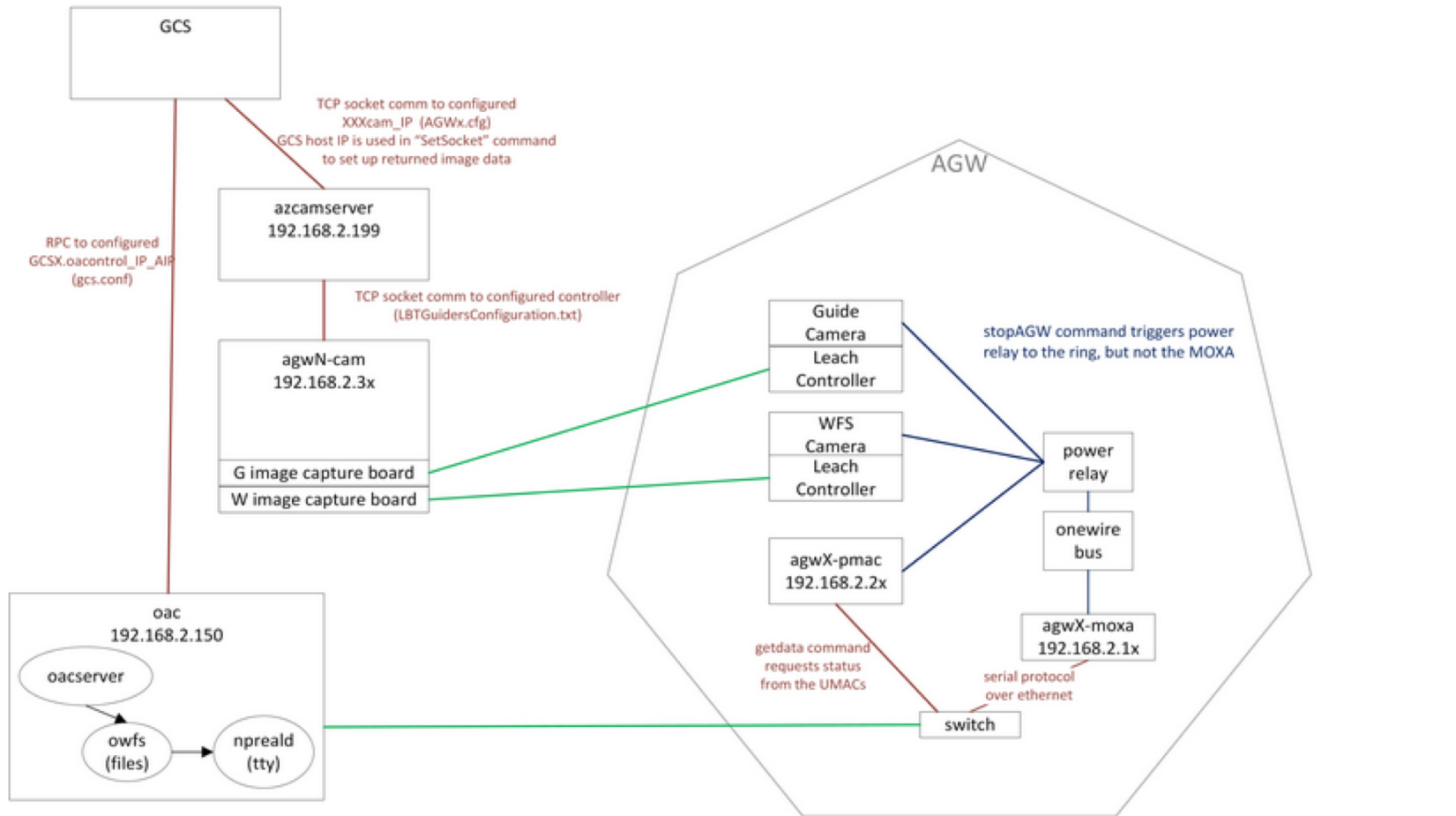


# Off-Axis Control (OAC)



- fiber
- ethernet
- power, serial

# AGWs

Location	Unit
Left front (LUCI 1)	1
Right front (LUCI 2)	2
Left direct (PEPSIPOL 1)	3
Right direct (PEPSIPOL 2)	4
Left direct (MODS 1) <sup>***</sup>	5
Right direct (MODS 2) <sup>***</sup>	6
Left fiber (PEPSIPFU 1) <sup>^^^</sup>	7
Right fiber (PEPSIPFU 2) <sup>^^^</sup>	8

<sup>\*\*\*</sup>Not controlled by OAC but are required to be in the config file

<sup>^^^</sup>Do not have an XY stage

# Configuration

- OAC configuration for all AGW units is `/lbt/oacontrol/current/etc/oacontrol.conf`
  - Changes are automatically committed and pushed to git
  - IP addresses for MOXA, HK, UMAC
  - Parsed with help of LALR (bison,flex)
  - Alignment
  
- MOXA npreal2d configuration file is `/lbt/oacontrol/current/etc/npreal2d.cf`
  - One wire device info for each AGW

# Firmware (LUCI and PEPSI)

- \*.pmc, \*.dld, and \*.cfg files
- Each AGW has a set of common files and one specific file
  - AGWn\_vvv.dld is the specific file where n and vvv is the unit number and version number
- `makefirmware` and `makefirmware_newDPRAM` create final .cfg file
- Instructions how to upload the firmware are in Wiki

# Transformations

- PCS transforms RA,DEC into focal plane XY
  - Alt, az, rotator position taken into account
  - TPK/SLAlib/tcspk work
- GCS transforms focal plane XY into OAC XY
  - different origin
- UMAC transforms XY into Theta, R and command the motors

# Operations

Command	Action
<code>/etc/init.d/oac</code>	oacontrol start/stop script
<code>startAGW -u N</code>	requests the Moxa Terminal Server to turn the power on inside the AGW unit, specifically to power the camera controllers and the UMAC motor controller computer
<code>stopAGW -u N</code>	turns off the power in AGW
<code>home -u N [-m M]</code>	home the stages; use -m21 for AGW 1-4 and -m20 for AGW 7-8
<code>getdata -u N [-n]</code>	use -n for the AGW with new HK
<code>getxy -u N</code>	get XY position
<code>setxy -u N -x X -y Y</code>	command probes to move to a given XY position
<code>getposition -u N</code>	get Theta, R (motor) position of the AGW

# PMAC Variables

- I – initialization
- P – general purpose
- Q – specific to a coordinate system
- M – user access to memory and I/O

```
pmacsend [-s <host>] -u <UMAC> [commands...]
```

```
$ pmacsend -u1 I128
```

```
48
```

```
$ pmacsend I128 = 16
```

```
$ pmacsend I128
```

```
16
```



# Build

- Make environment mirrors TCS
- Build requires LBTO telemetry collections library, bison, flex and EPICS
- Installs in /lbt/oacontrol/xxx where xxx is the version number
- Version 5.2, released in March 2019, added AGW3+4 channel for ALH, implemented EZCA, log formatting

# Software architecture

- oaccontrol server
  - Runs on OAC computer
  - Multiple threads (two per RPC call \* AGW - RPC and worker thread \* number of AGWs)
  - /etc/init.d/oac script to start/stop
  - Accepts RPC calls (rpcgen transforms .x files into c/h..)

# TODO

- Telemetry data
  - Add support to clioac (newGCS)