14 Feb '19

- [x] rotate image
- [ ] auto null
- [ ] edit angles
- [x] edit focus.
- [ ] geo list.

20.14 3.24 1910
45.42 1.35 2020

3.2 PE
20.5 PE86
16.9 Users.
8.6 Win.old
18.6 Win
6.2 Pdata
39.2 Qt.

10 Feb '19

- [x] ~~ftp~~
- [x] VNC
- [x] compile Bode.
- [x] new MEC
- [x] leds
- [ ] leds timeout
- [ ] posn targets.
- [ ] slave mode
- [ ] controls : intermittent
- [x] flat style
- [x] new monkey build
- [x] V'mba cleanup
- [x] new mTurk build

focus int
focus m
focus min, max

angle ypr
slave pos

standby
autonull

LEDs.
cam
gps
vnav. present aligned, fix
gyro

1934 @ 23m
2044 @ ∞

B = 2044
m = -2530

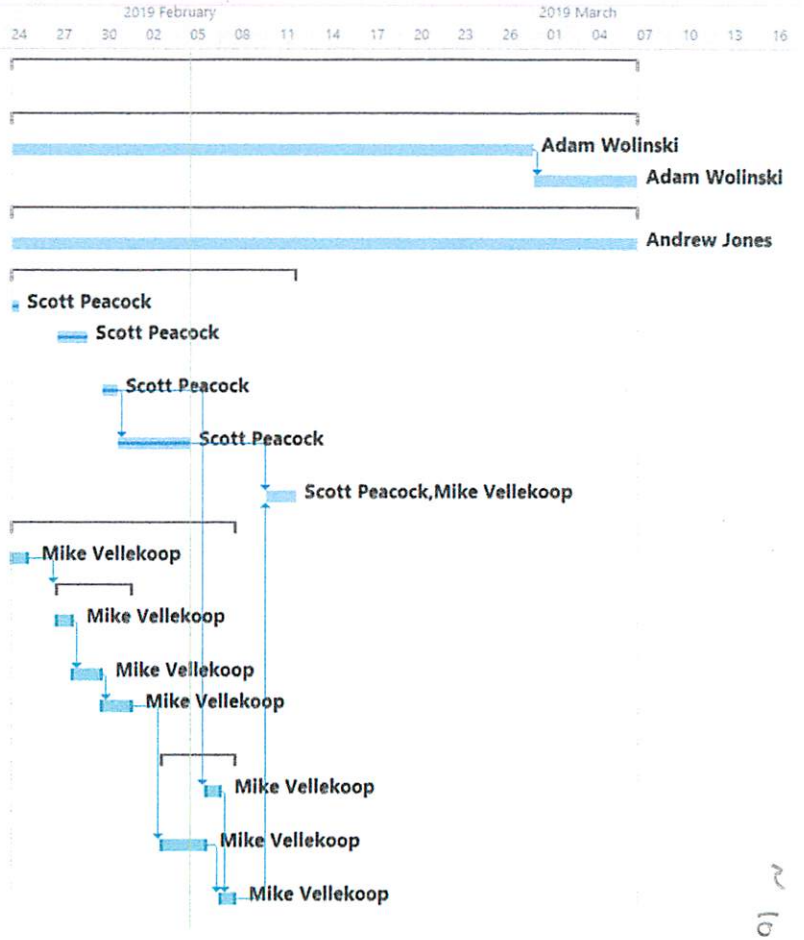
20x20 leds.

~~1912~~
1936 x 1216

Vn solution
Vn err
Vn

1934
1.26
23.37

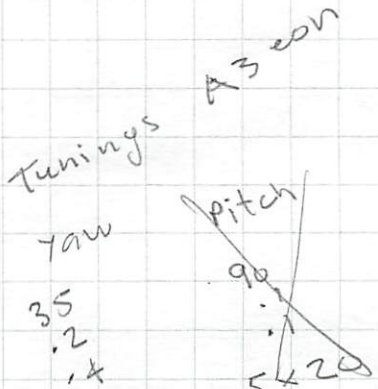
		Task Mode	Task Name	Duration	Start	Finish	Prede	Resource Names
1			**Aethon Gimbal Development - Sprint 1**	**30 days**	**Fri 19-01-25**	**Thu 19-03-07**		
2			**Adam's Tasks**	**30 days**	**Fri 19-01-25**	**Thu 19-03-07**		
3			Design Slipring and Flex	25 days	Fri 19-01-25	Thu 19-02-28		Adam Wolinski
4			Send PCB Design Out	5 days	Fri 19-03-01	Thu 19-03-07	3	Adam Wolinski
5			**Odin Tasks**	**30 days**	**Fri 19-01-25**	**Thu 19-03-07**		
6			Communication with Gimbal	30 days	Fri 19-01-25	Thu 19-03-07		Andrew Jones
7			**Mechanical Tasks**	**13 days**	**Fri 19-01-25**	**Tue 19-02-12**		
8	✓		Creat Gantt Chart	3 hrs	Fri 19-01-25	Fri 19-01-25		Scott Peacock
9	✓		Design Power Harness for Road Test	2 days	Mon 19-01-28	Tue 19-01-29		Scott Peacock
10	✓		Prosilica GT1930LC EF Arrival	1 day	Thu 19-01-31	Thu 19-01-31		Scott Peacock
11	✓		Camera Mount Design & Fabrication	3 days	Fri 19-02-01	Tue 19-02-05	10	Scott Peacock
12			Road Test	2 days	Mon 19-02-11	Tue 19-02-12	11,22	Scott Peacock,Mike Vellekoop
13			**Mike Vellekoop Tasks**	**11 days**	**Fri 19-01-25**	**Fri 19-02-08**		
14			Code in Hard-Stops	1 day	Fri 19-01-25	Fri 19-01-25		Mike Vellekoop
15			**Impove Accuracy**	**5 days**	**Mon 19-01-28**	**Fri 19-02-01**	**14**	
16			Translational Offset to Antenna	1 day	Mon 19-01-28	Mon 19-01-28		Mike Vellekoop
17			Angular Accuracy	2 days	Tue 19-01-29	Wed 19-01-30	16	Mike Vellekoop
18			GPS Smoothing & Extrapolation	2 days	Thu 19-01-31	Fri 19-02-01	17	Mike Vellekoop
19			**Camera Integration - Mike**	**5 days**	**Mon 19-02-04**	**Fri 19-02-08**		
20			Interface trigger signal to camera	1 day	Thu 19-02-07	Thu 19-02-07	10	Mike Vellekoop
21			Integrate Camera Focus from Pi to Prosilica	3 days	Mon 19-02-04	Wed 19-02-06	18	Mike Vellekoop
22			Testing of Camera Trigger & Focus on bench	1 day	Fri 19-02-08	Fri 19-02-08	20,21	Mike Vellekoop

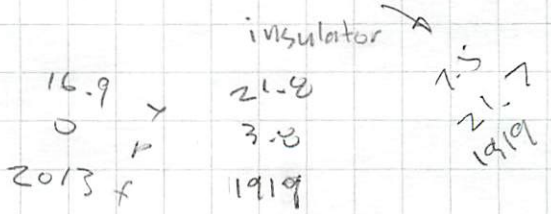


6 Feb '19

- [ ] vimba focus
- [ ] pos mode
- [ ] non linear motor
- [ ] tuning vs roll + pitch
- [ ] step response
- [x] non-console build

mk3 Qtm





exp
24 msec
= not
too
fuzzy

11 msec
a bit
fuzzy.

3 Feb '19

- ☐ position mode
- ☐ VN imu mode
- ☐ vimba + Qt build
- ☐ focus units?
- ☒ stabilization
- ~~☐ more gyros~~
- ☒ taller stand.
- ☒ VN rates
- ☒ roll = 177. -182.7 angle ofs.
- ☒ p 8, .1, .1 30×20 166×10
- ☐ non linear motor out.
- ☒ gyro ofs -.995, -2.01, 1.872

- ☐ hard stops
- ☐ antenna offset
- ☒ boresight
- ☐ gps smoothing, extrap.

- ☐ trigger
- ☐ focus

- ☐ odin
- ☐ multi target

660 f
15 pan
-4 tilt.

662
winner
-4.8
14.2

763 focus
crane

-2.01

10 - 20,000 exposure
500 μRad jitter
blurry when shake.

winners
y 15.5
p 0
foc 762

252 cogs / rotation
36 slots
42

y 15.3
p -5

-5.15

0

pit

52.5
-6.5
740

54.5 yaw
-7.5 pit
740 foc

26 Jan '19

- [x] merge WeeCam/Ae3
- [x] start scope
- [x] better gyro mounting
- [x] blue lines
- [ ] port re-try
- [ ] SD files.

- [x] tabs!
- [ ] osc 2x. ?
- [x] grid, like Bode.
- [x] phase line
- [x] ref line
- [x] 2 charts
- [x] colors like Bode.

40, .05, .40
y 5,20
p. 10, .5, .05
10, 30

22.1
3.7

Allied Vision
GT1930LC
H 10.07 mm
V 8.0
Diag 13.33

f= 400mm
1.4° HFOV

- [ ] Pi - Odin
  - Vimba

Jetson TX-2

APX-15
APX-20

1	black	gnd
2	red	pwr (7-25V)
4	yellow	in1 3.3ttl
6	green	out1

axis	reads	
y	p	-ve.
p	y	-ve.
r	r	-ve.

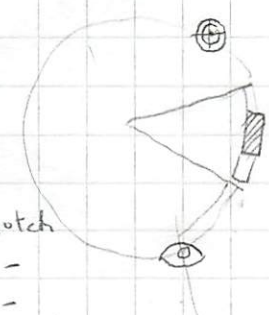
raw.
~~212~~ 215
~~-155~~ -154
0

motors off.
21.8
1.2
177

20.6 yaw
1.11 pit
170 roll
~~695~~ 660 foc.

pitch
r i d
50 2 2
5×30. filt.

pitch
130 20 3
2×40



	P	I	D	LL	notch
y	30	.05	.4	5×20	-
p	8	.08	.05	10×30	-
r	5	.05	.15	32×30	55×10
y	8	.1	.1	30×20	166×10 7

w uwc quote
4
1hr - $1600/hr
$500 Pilot
~~$500~~ Bracket
1hr min.

25 Jan 19

Asus tablet
'goober'

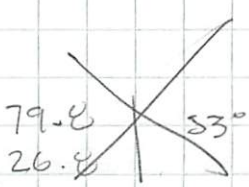
7

134
92

42

.6
19

42°



134 | 42° HFOV.
92

2 m | 1.5 VFOV
75 m | 2 HFOV.

4.8%

24 Jan 19

what sensors GPS/INS.
post proc

mech mfg:
xometry.
from CAD

- [ ] stops slew limited yaw
- [ ] smooth GPS
- [ ] tune
- [ ] 3 vs 2 axis
- [ ] Uwe flight test
- [ ] focus vimba. fire. cam
- [ ]

20 Jan '19

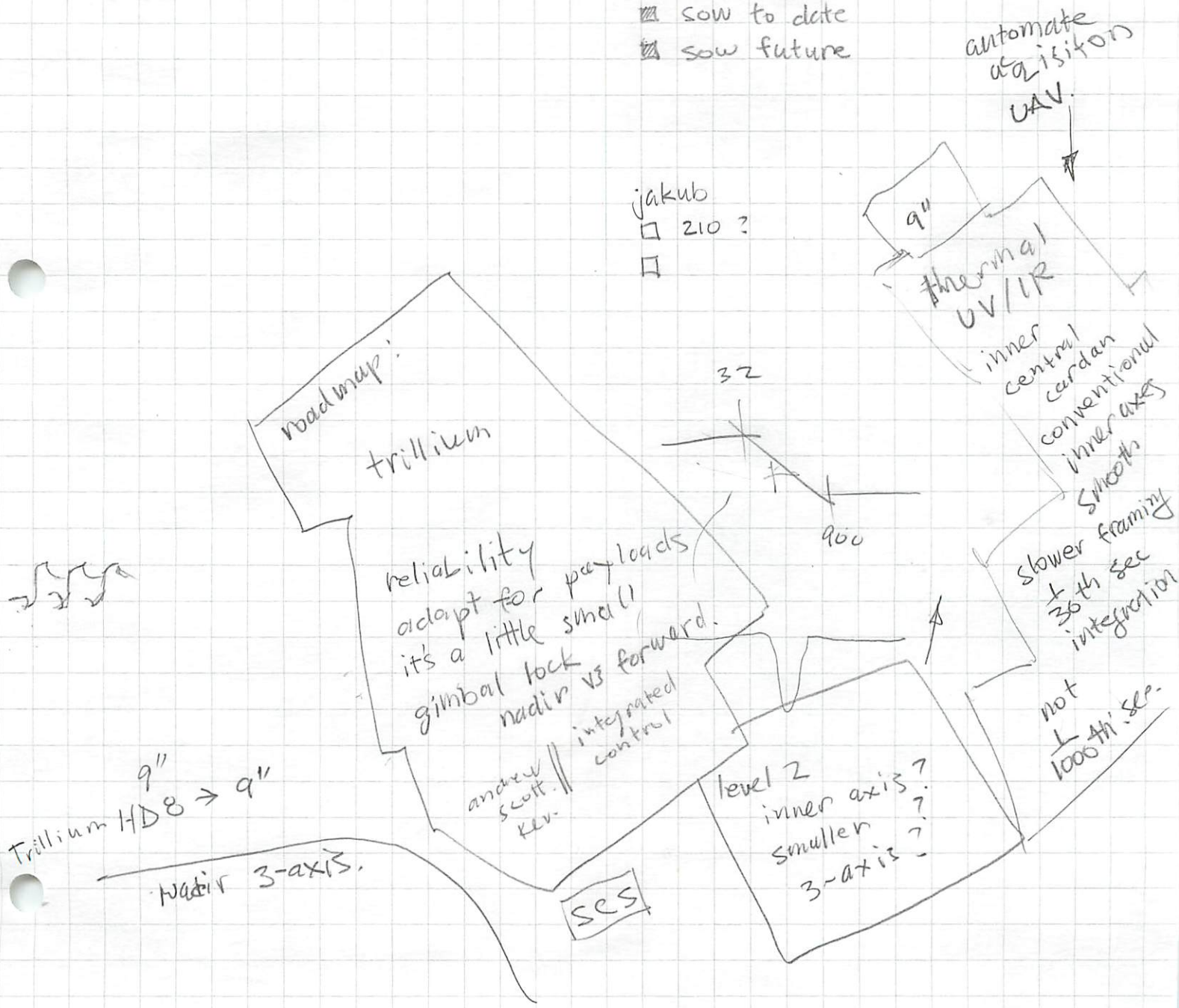
- [x] geo nod
- [x] merge fix
- [x] pitch sin bd overwritten
- [x] rEr offset UI
- [x] load first target
- [x] scale down jitter graph.
- [ ] tune for 12V
- [ ] blue lines
- [ ] inhibit fast sample.
- [x] remove custom ... menu
- [ ] cross hair

Pid.

Y	16	.6	.2
P	12	1.	.5

alastair
- [x] inv.
- [x] sow to date
- [x] sow future

jakub
- [ ] 210 ?
- [ ]



17 Jan '19

- [x] NovaTel
- [x] backup
- [ ] Jacobian
- [ ] roll level
- [x] camera viewer
- [ ] road test box
- [ ] console wired ? LAN
- [ ] zmult off
- [ ] no GRB gui
- [x] paste resolver

16 Jan '19

☐ gyro senses.
naxes = 3.

y +p.
p +y.
r

☐ Jitter
☐ Drift

☐ Freq
☐ Amp
☐ Enable
☐ Remote

2.45
1.45
1.2

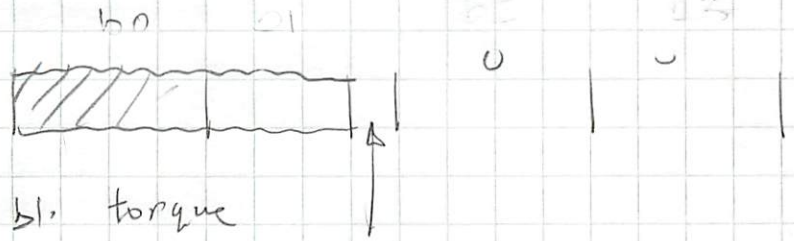
2.46
1.24
1.09

R 184
Y 216
P 148

1 Y
3 P
2 R

14 Jan '19

1mb 2flo 2kHz.



b1. torque

b0	coast
b1	brake
b2	X
b3	X

: 12
: 1
: 1
: 1
: 1
: 16

speed 0
speed 0
coast 1
break 1

1st
high.

1100 A

1mbaud
1byte = 10bits × 10^{-6} sec
10^{-5}

2047

0x7FF

Judy 796 0040 7467

3rd floor N
306 North
-private-
2640.78
2100.

Fri 10
10:AM

5

Erica Alexander
GM.
x5274
3330

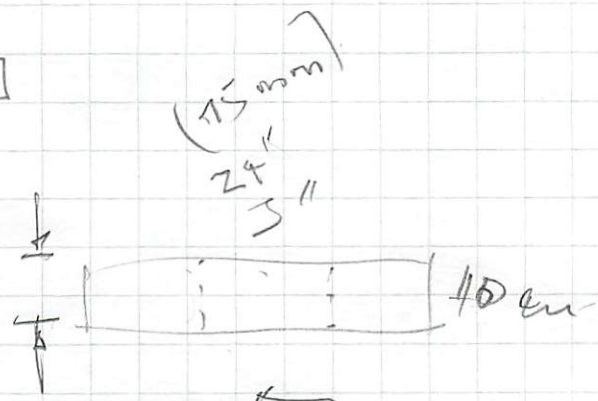
11 Jan '19

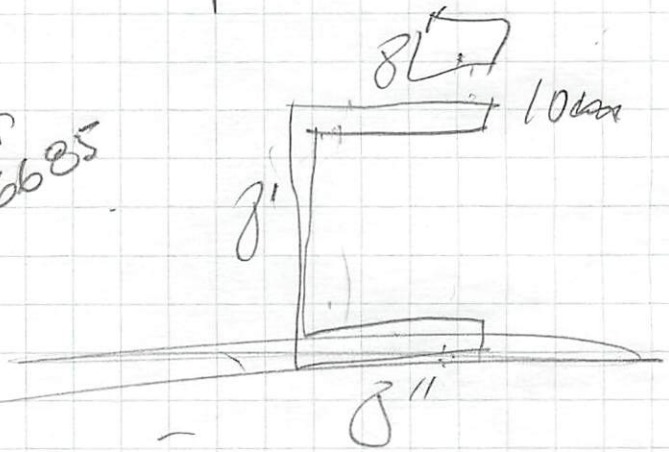
- [ ] strip charts
- [ ] jacobian
- [ ] VN300
- [ ] Adam vs handover
- [ ] alternate gps
- [x] alternate gyro
- [ ] schem for pro mini mods
- [ ] collect pro mini / gyro
- [x] try other VN200

- [x] prudence 5379
- [x] answer GSP

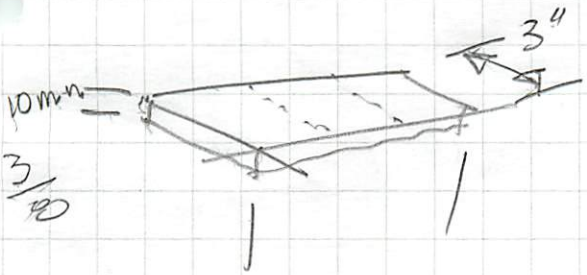
8 Jan '19

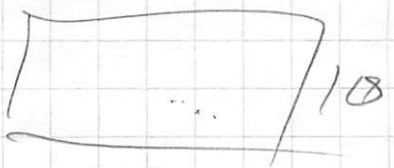
- ☐ target entry on the road
- ☐ NovAtel modes ☐ step, ☐ none, ▨ smooth 1, ☐ smooth 2
- ☐ steering freq
- ▨ remove misc ø
- ▨ multi array of targets [5 set][13 targ]





c.dn bronze 2120 spear 905 827 6685





VN
divisor
= 16

50 Hz

consent form
pers assistance device
Prudence
905 463 7002 5379

Julie
nurse prac
wounds buttock

6 Jan '19

- [x] NovAtel to console
- [x] restore Monkey (pw) Asus-i7
- [x] " iPhone
- [ ] how to correct VectorNav.
- [ ] plot errors.
- [ ] target list
- [x] lens jumbled
- [x] novatel thread in cons ϕ1
- [x] balance wtk reminder
- [x] which cons ϕ1
- [x] drill camera mount
- [x] balance WeeCam
- [x] blocking Qt read: waitForReadyRead(t)
- [ ] timeout = 200 all reads: customize for NovAtel?
- [ ] NovAtel to gimbal
- [ ] latency?

mon
10:30
14:30

timeout = 200

mon
20:00
~~25:45~~
26:00

w/p power

usb

scope.

8 m/s.

30 k/hr 100 Hz 10 msec

100 bytes · $\frac{10 \text{ bits}}{\text{byte}}$ · $\frac{1}{4 \times 115.2\text{k}}$ = 2.2 msec

$8 \frac{m}{s} \times 12 \text{ ms} = 0.1 \text{ m}$

WFS210 WLAN osc

5 Jan '19

Aethon ports

m1	T1	
m2	T2	
m3	T3	
Gyro	T5	
Util /Cons /Pi	T4	
Odin	TUSB	Pi
Vector Nav	T3	
Novatel		Pi

Wee Cam ports

Gyro	T5
Util /Cons	T4
Vector Nav.	T3
Novatel.	

Aethon

- [ ] math 3D
- [ ] 3 axes
- [ ] -AETHON
- [ ] Novatel to Pi
- [ ]

pi ch3rrY
2
3

31 Dec '18

- [x] FTDI = 3V? - yes
- [ ] Try FTDI on serial 4

RTK
PPP
SBAS

< meter realtime.

pt grey
m - U —
zero!
A
aetbon mk3

460 800

	Vn-300
dev	5k
rugg	4500
chip	3k

2m -

heading	antenna spacing
.30	1 m
.15	2 m
.60	½ m

~ Dec '18

atan2(y, x) $\tan^{-1}\frac{y}{x}$

- ☐ elevaton / pitch geo
- ▨ lens comp GRB

range 79.8 - 77.9
Ell readings on roof VN200

109.3
72.5

expected 73.5

MSL = meters above sea level

ELL =

Prudence ext 5349

30 Dec '18

- [ ] Aethon Jacobians YRP
- [ ] Altitude issue YN200
- [ ] Logger
- [ ] record video
- [ ] math 3b
- [ ] OpenGl
- [ ]

Alt on G37 roof
54.5 55m 56m 58.5 62.2

28 Dec '18

- [ ] Qt file read/write
- [x] Green lights for Geo
- [ ] buttons for target
- [ ] save and name targets
- [ ] IIa data type
- [ ]

- [ ] DBIC new boards
- [ ] RF link GPS target
- [ ] Drafting table new surface
- [ ] Book club Jan 27 Half Blood Blues
- [ ] Braun blades
- [x] Vacuum
- [ ] Calendar
- [ ] Google Earth
- [ ] Scaler

- [ ] Aethon road test
  - [ ] target list playback
  - [x] list from Google Earth
  - [x] earth on Asus (in Chrome)
  - [x] compute range
  - [x] display list

26 Dec '18

- [x] Geo page
- [ ] compute passive
- [ ] compute L1/L2 target
- [x] target to teensy
- [ ] buttons
- [x] ~~uncertainty~~. VN state
- [ ] state readout
- [ ]

7 8
/ 1 1 1 / 1 0 0 0

1 / 0 0 0 0 / 1 1 1 0 / 1 0 1 0

23 Dec '18

Road Test

- [x] base for webcam
- [x] inverter
- [x] console self start (~~for use NOCC~~)
- [x] console gui on Ada monitor
- [x] test inverter
- [ ] nav status on screen
- [ ] 2 point target code
- [ ] nav status from VN
- [x] 'rugged' VN connector
- [x] rugged RMP connector /no pigtail
- [ ] multi target
- [x] hones tech
- [ ] type target into util
- [ ] factory reset /other vn200

Christmas

- [x] LCBO certs
- [x] smoking loon x 2
- [x] 8 x 10c
- [x] 11 x choco
- [x] 11 x cards
- [x] wrap supplies · collect
- [x] food bank
- [x] ~~shelter~~ Covenant House
- [x] ~~scrounge book mo~~
- [x] ~~limericks.~~

24th

- [x] answer Jo & Kat
- [x] answer GSP
- [x] milestone cleanup
- [x] read burl post (+ discard!)
- [x] charity 1
- [x] charity 2
- [x] $600
- [x] print mode
- [x] print inventory
- [x] pay bill + file
- [x] ~~hot wheels~~
- [x] by-the-lake.
- [x] wrap.
- [x] zoombrowser
- [x] epson
- [x] clean up.

.

SPI AS5047 CONNECTOR to nucleo #C7 ON encoder # and color#TOP in-line resistors .

	FUNCTION	CHIP PIN	c7					
comp	MOSI	4	3	pc12	3	yellow	-	47
enc	MISO	3	2	PC11	4.	pink	47	-
comp	CS	1	17	PA15	1	red	-	47
comp	CLK	2	1	PC10	2	black	-	47
	GND	13	8	gnd	6	white		
	+3.3	11	12	3,3v	5	gray		

Joystick Hall Chip
363ABB

21 Dec 18

19 Dec '12

- [x] windows update
- [x] ftp
- [ ] heading offset
- [x] gyro offset
- [x] initialize lens controls = 0.5
- [x] glitch on 'geo button'
- [ ] passive range
- [ ] target el, terrain el
- [ ] remove 'indoor mode'.

gyro oks.
--113
1.5e4

console Pi on
"Power Bank"
7:19 4/5 bars
8:29 3/5 bars.

18 Dec '18

- [x] what port is lens serial 1 RX1/TX1
- [x] rx from lens
- [ ] backups of 181218
- [x] tx to lens
- [ ] update Asus i7
- [ ] get lens code
- [ ] ftp.
- [ ] geo targets
- [ ] heading zero button

the Horn Netflix
gstreamer. free desktop.

16 Dec '18

- [x] code merge
- [x] VN200 comm
- [x] burn from HPi7 no 5V.
- [x] fixup LOS error
- [x] geo to Teensy
- [x] geo mode engage
- [x] geo gain + limit
- [x] fewer doubles in geo.
- [ ] geo target mgmt.

- [x] backup gimT.
- [x] backup Pi mTune
- [x] update console mTune
- [x] newest gimT
  - [x] no usb ser
  - [x] new tuning.
  - [x] load.
- [x] merge lens mods mTune
- [x] no longer invert com

- [ ] raw console sws to gimbal
- [ ] passive target
- [x] why raw plot glitch on geo button
- [ ] VN200 heading.

24:30
mon 17 Dec 13:30 - ~~XXL/140~~
(-3)

- [ ] geo from here blue button
  1km range.

43.3735961911
-79.7456
59

- [ ] note: ugly drift = gains too low.
- [ ] spikes on gyro / popcorn sound / logic filter
- [x] note: raw check over written on gui.

169.254.76.133

ch3rry3
pi

Y	P
130	70
1.2	.1
2	0

SN 01000 38476
VN-200T-CR

15 Dec '18

- [x] tangent plane error
- [x] console thru db9 / slipring
- [ ] fujinon cover screws
- [x] report lens fell out of bayonet
- [x] shim weecam pitch bracket
- [x] attach VN-200
- [x] connect VN-200
- [x] debug iris and zoom drive
- [ ] 422 to lens
- [x] quiet tuning
- [x] check lens wiring
- [x] finish geo pos error ~~loop~~
- [ ] start geo rate loop
- [x] ftdi lens
- [x] verify bad zoom servo amp
- [x] report GRB's weights kit
- [x] iris pos loop.
- [ ] autonull improvement
- [x] versions & ports

30 .5 .1
22 .6 0

z	10	f	3
f	3	i	11
i	11	z	10
e.	9	e.	9

		0	2B.
Z	10		1A
F	3	1	1B.
I	11	2	2A
	9.		

VN200 pins.

P308		VN200	
1	TX	3	RX1
2	RX	2	TX1
3	RET	5	GND.
4	5V	1	3.3 to 17V

wired from (J305.1)

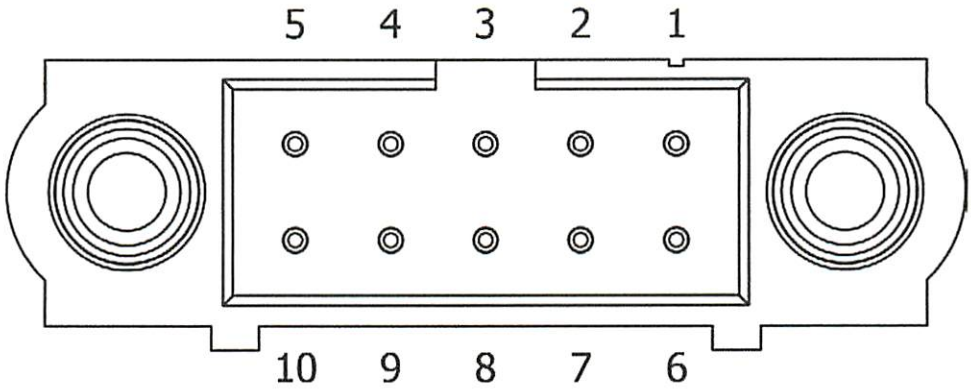
15 Dec 12

2.2 VN-200 Rugged Electrical

VN-200 Rugged Pin Assignments

Pin	Pin Name	Description
1	VCC	+3.3V to +17V
2	TX1	RS-232 voltage levels data output from the sensor. (Serial UART #1)
3	RX1	RS-232 voltage levels data input to the sensor. (Serial UART #1)
4	SYNC_OUT	Output signal used for synchronization purposes. Software configurable to pulse when ADC, IMU, or attitude measurements are available.
5	GND	Ground
6	RESTORE	If high at reset, the device will restore to factory default state. Internally held low with 10k resistor.
7	SYNC_IN	Input signal for synchronization purposes. Software configurable to either synchronize the measurements or the output with an external device.
8	TX2_TTL	Serial UART #2 data output from the device at TTL voltage level (3V).
9	RX2_TTL	Serial UART #2 data into the device at TTL voltage level (3V).
10	GPS_PPS	GPS pulse per second output. This pin is a TTL voltage level (3V) output directly connected to the PPS (pulse per second) pin on GPS receiver A.

VN-200 Rugged External Connector



Friday 14 Dec '18

- [x] write up HCH
- [x] pay bills
- [x] milestone cleanup
- [x] collect mTune edits from Aethon
- [x] set up geo on HP win10
- [x] more GUI vars
- [x] check 3x3 vs SU-code

- [ ] aethon Teensy + gyro
- [ ] aethon VN200
- [ ]

J306	dongle	DB9	dongle	old cable	J306	serial cable
TD−	RXD+	6	Y	R	1	bu
RD−	TX D+	8	O	W	3	gy
RD+	TxD−	9	R	G	4	bk
ret	gnd	5	Bk	sh	5	gn
TD+	RxD−	7	W	Bk	2	v

console serial cable

J306	DB9	
5	5	sh
1	6	data
2	7	data
3	8	data
4	9	data

dongle — serial cable (color code) — J306 — DB9

	b (1) 0		
R ——	bk (2) 1	4	9
	r (3) 2		
	o (4) 3		
	y (5) 4		
Bk ——	gn (6) 5	5	5
Y ——	bu (7) 6	1	6
W ——	v (8) 7	2	7
O ——	gy (9) 8	3	8
	w (10)		

Aethon 12:30 met: 14 Dec '18
17:30

☐ nav.

AJ1
AJ2
SP
AW

FM call today.
on the floor meeting.

no injury
Led alarm
check more often
pad
lower

12 Dec '18

- [x] backup
- [x] Aethon demo
- [x] Milestone cleanup
- [x] graph VN200
- [x] 50 Hz VN200 $\frac{800}{16} = 50$

- [ ] Open GL
- [ ] check Wescam math
- [ ] video overlay
- [ ] Jacobians

gim

[ ]

NED (geodetic) to ECEF

Gui:

dem
LLE gimbal
LLE target
velocity
target sim velocity
target sample / offset.

Qt: z@hm cut3Y zard
ST " bullsh4rT

VN-200

11 Dec '18

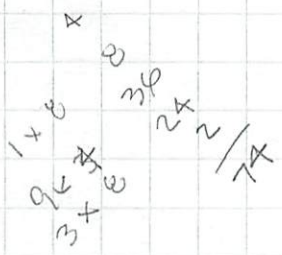
10 × 74

276 46.
294 49.

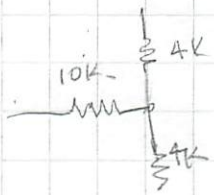
fields.

8	12	1	vel
7	24	1	posn
6	12	1	anatc
5		0	
4	12	1	ypr
3		0	
2	8	1	
1		0	t

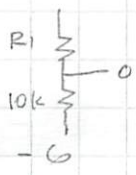
68
4
2
74



Time GPS
ypr
Angular Rate.
Pos
vel



3.3

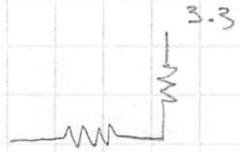


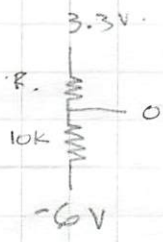
$R_1 = \frac{10k \times 3.3}{6.} = 5.5k.$

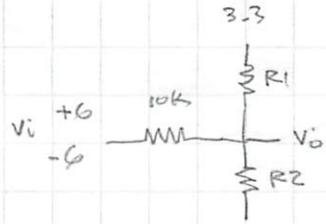
R_2

2-2
3-3
5-5

$\pm 6V. \rightarrow \begin{matrix} 3 \\ 0 \end{matrix}$







$V_i = 6 \quad -6$
$V_o = 3 \quad 0$

$\frac{V_o - V_i}{10K} = \frac{V_o}{R_2} + \frac{3.3 - V_o}{R_1}$

$\frac{}{10k} = \frac{3}{R_2} + \frac{0.3}{R_1}$

$\frac{-6}{10K} = \frac{0}{R_2} + \frac{3.3}{R_1}$

$R_1 =$

8 Dec '10

Lens

- FIZ vs ZFI in mTune
- AIP cross talk
- cal

880	33	f
1023	0	i
39	976	z

7 Dec '18

Lens

- [ ] cal feedback
- [ ] wiring vs code
- [ ] lens workflow

		is		was		should be
F		D2	DIR-1	1.IN2	D4 ✓	Z
F	✓	D3	PWM-1	1.IN1	D3 ✓	Z D3
I		D4	DIR-2	1.IN4	D5 ✓	F
I	×	D5	PWM-2	1.IN3	D9 ✓	F D11
Z		D6	DIR-3	2.IN2	D6 ✓	I
Z	×	D7	PWM-3	2.IN	D10 ✓	I D10
E		D8	DIR-4	2.IN4	D7 ✓	E
E	✓	D9	PWM-4	2.IN3	D11 ✓	E D9
		D10	J603.1			
		D11	NC			

D3	1.IN1	1.IN1	focus
D9	2.IN3	2.IN3	spare
D10	2.IN1	J603.1	zoom
D11	1.IN3	nc	iris

measured!

pwm		cut	
D2	1.IN2		
D3	1.IN1		
D4	1.IN4		
D5	1.IN3	✓	
D6	2.IN1	✓	
D7	2.IN2		
D8	2.IN4		
D9	2.IN3		
D10	J603.1	✓	
D11	NC		

mods

cut
- D10 - J603.1
- D5 - 1.IN3
- D6 - 2.IN1

add
- D10 - 2.IN1
- D11 - 1.IN3
- D5 - J603.1

final

f	1.IN1	PWM	D3
f	1.IN2	DIR	D2
i	1.IN3	PWM	D11
i	1.IN4	DIR	D4
z	2.IN1	PWM	D10
z	2.IN2	DIR	D7
e	2.IN3	PWM	D9
e	2.IN4	DIR	D8

AIP READINGS

ccw

f	541-543	899-900
i	541-543	1023
z	987	596-597

error list on 18NOV18

Lens Wiring
wee cam to new Lens board

6 Dec '12

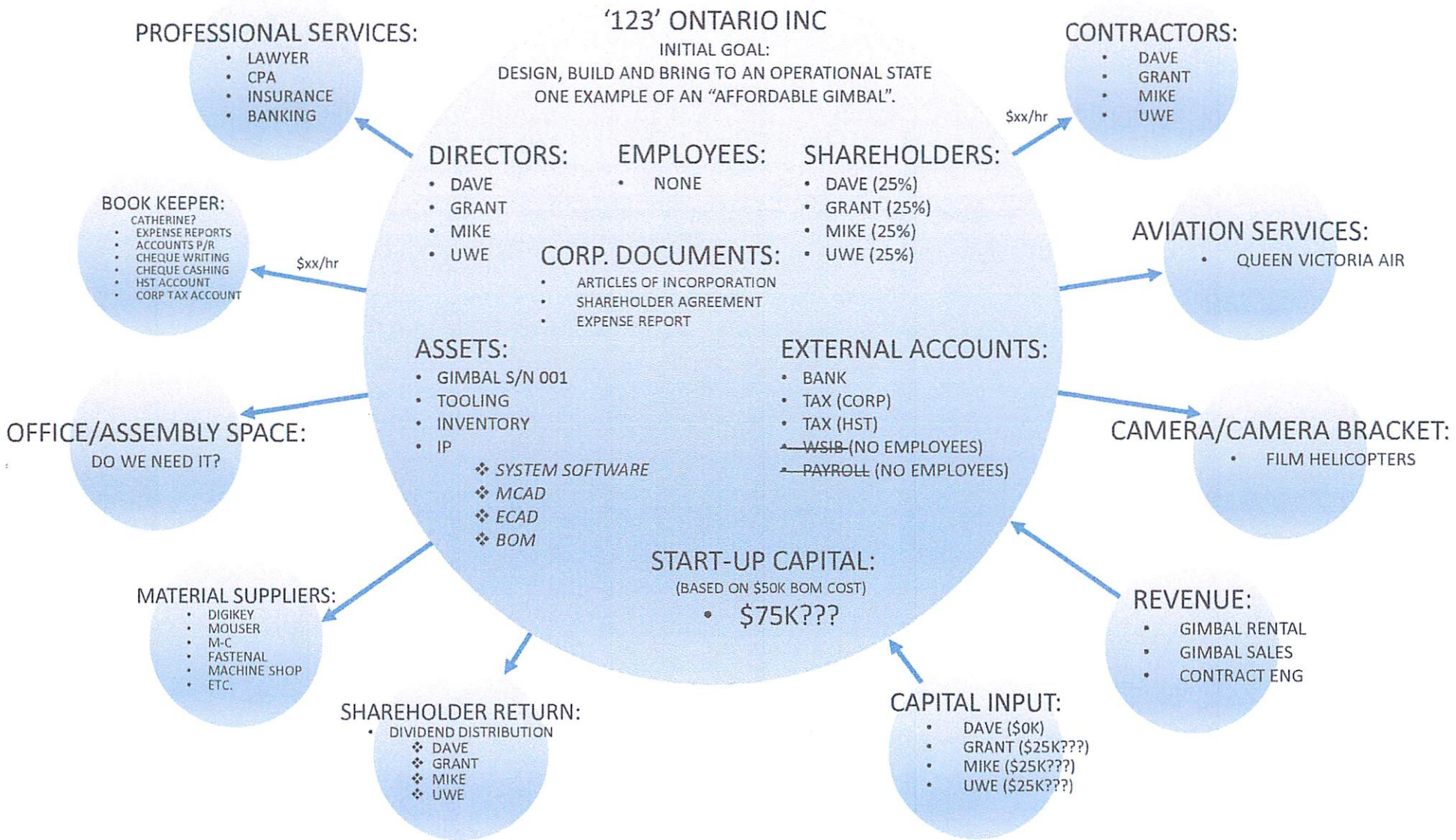
115 3	1	y	32 × 30	No notch
22 .6	0	p	32 × 30	No notch

1. vector in world space. - subtract gimbal xyz from target.
2. vector in gimbal space.
   mult by dcm

			OLD		GLD Z,F,I	pin	new F,I,Z
	1	PRO	GND	3 x brown	LENS_0V	2	
	2	PRO	VCC	3 x orng	LENS_5V	1	
I	3	PRO	A2	red	CH3A	iris blu 13	
F	4	PRO	A1	red	CH2B	iris wht 12	
Z	5	PRO	A0	red	CH2A	zm wht 14	
I	6	SA2	OUT2	blk	S2 OUT2	ir b 22	S1.4
I	7	SA2	OUT1	red	S2 OUT1	ir r 21	S1.3
F	8	SA1	OUT3	blk	S1 OUT4	f b 20	S1.2
F	9	SA1	OUT4	red	S1 OUT3	f r 19	S1.1
Z	10	SA1	OUT2	blk	S1 OUT2	24	S2.2
Z	11	SA1	OUT1	red	S1 OUT1	23	S2.1

pots

F	A0
I	A1
Z	A2
X	A4


'123' ONTARIO INC
INITIAL GOAL:
DESIGN, BUILD AND BRING TO AN OPERATIONAL STATE
ONE EXAMPLE OF AN "AFFORDABLE GIMBAL".
PROFESSIONAL SERVICES:
• LAWYER
• CPA
• INSURANCE
• BANKING
CONTRACTORS:
• DAVE
• GRANT
• MIKE
• UWE
$xx/hr
DIRECTORS:
• DAVE
• GRANT
• MIKE
• UWE
EMPLOYEES:
• NONE
SHAREHOLDERS:
• DAVE (25%)
• GRANT (25%)
• MIKE (25%)
• UWE (25%)
BOOK KEEPER:
CATHERINE?
• EXPENSE REPORTS
• ACCOUNTS P/R
• CHEQUE WRITING
• CHEQUE CASHING
• HST ACCOUNT
• CORP TAX ACCOUNT
$xx/hr
CORP. DOCUMENTS:
• ARTICLES OF INCORPORATION
• SHAREHOLDER AGREEMENT
• EXPENSE REPORT
AVIATION SERVICES:
• QUEEN VICTORIA AIR
ASSETS:
• GIMBAL S/N 001
• TOOLING
• INVENTORY
• IP
❖ SYSTEM SOFTWARE
❖ MCAD
❖ ECAD
❖ BOM
EXTERNAL ACCOUNTS:
• BANK
• TAX (CORP)
• TAX (HST)
• ~~WSIB~~ (NO EMPLOYEES)
• ~~PAYROLL~~ (NO EMPLOYEES)
OFFICE/ASSEMBLY SPACE:
DO WE NEED IT?
CAMERA/CAMERA BRACKET:
• FILM HELICOPTERS
START-UP CAPITAL:
(BASED ON $50K BOM COST)
• $75K???
MATERIAL SUPPLIERS:
• DIGIKEY
• MOUSER
• M-C
• FASTENAL
• MACHINE SHOP
• ETC.
REVENUE:
• GIMBAL RENTAL
• GIMBAL SALES
• CONTRACT ENG
SHAREHOLDER RETURN:
• DIVIDEND DISTRIBUTION
❖ DAVE
❖ GRANT
❖ MIKE
❖ UWE
CAPITAL INPUT:
• DAVE ($0K)
• GRANT ($25K???)
• MIKE ($25K???)
• UWE ($25K???)

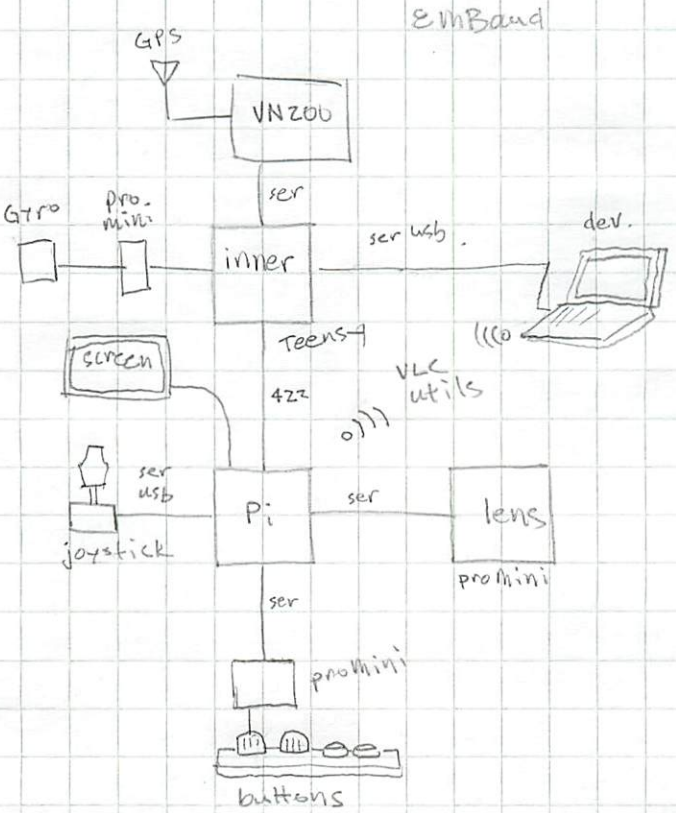
4 Dec 18

WeeCam

- [x] Flexi gyro wire
- [ ] Filter graph
- [x] FFT Graph glitchy
- [x] com4 no-wait
- [x] console choose TTY
- [ ] VN200
- [ ] Filter doesn't work
- [ ] Lens drive
- [ ] geo math.

Aethon

- [ ] VN200
- [ ] geo math
- [ ] comms



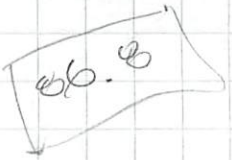
Serial USB

Serial 1, 2 64byte fifo HW

Serial 4-6 HW-

cons 4

gyro 5



121200

110200

10/sec

2 Dec '12

Aethon

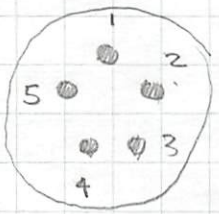
- [ ] VN200
- [ ] geo
- [ ] wiring
- [ ]

Monkey SCS

- [ ] VN200 log setup.
- [x] PWM
- [x] +ve gyro
- [ ] com4 non block
- [ ] geo xforms
- [x] close inner loop.
- [x] serial USB, burn from console

Pwm pins

	IN1	IN2	PWM
Y	12	24	20
P	25	26	21
R	27	28	22

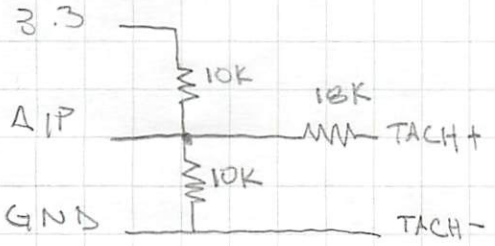


1 M+
2 3V
3 pot
4 0V
5 M-

Weecam pins.

1	tach +
2	m+
3	m-
4	tach -

tach scaling



	P	I	d
Y	50	1	.1
P	50	.5	.2

- [x] gains save:
- [x] commit
- [ ] backup
- [x] document EE

outer dome

0-3	.015
-.035	-.035
-.01	-.010

(1)877 499 9555 275516
claire. ManuLife.

pots

- [x] read pots
- [x] dome tach
- [ ] notch filter fix
- [x] roll amp fix
- [x] dome axis

AI20 Yaw [x]
" 21 pit [x]
" 22 roll

27 NOV '18

- [ ] +ve gyro
- [ ] 10kHz interrupt
- [ ] pwm out.
- [ ] ribbon to gyro
- [ ] no-wait com4 writes

.2 µs.

180 MHz.

36 clocks. / 2 writes.

.5 × .1 = .05 µs.

$\frac{1}{180\,MHz} = \frac{1}{180}$ µs

.05 9 clocks / 2 writes.

Aethon (11AM-6PM) 29 NOV '18

CONNECT2aethon!

mike be mike & methodical ...

~~mike st1~~ mike st1

openstm32.org

STS Workbench For

(11AM -) 30 NOV '18

- [x] VN200 - demo
- [ ] VN200 - config bin from Teensy
- [ ] - read bin. lat, lon, elev.
- [x] Pi2 - VNC ypr
- [x] - FTP $\dot{y}\,\dot{p}\,\dot{r}$
- [ ] mu-co debugger

$\circ T(3)$
$\dot{T}(3)$

$\circ V(3)$ $TV(3)$
$\dot{V}(3)$ $\dot{TV}(3)$

20 NOV '18

Aethon

prep Asus i7
- [ ] sync Code dir
- [ ] sync monkey dir
- [x] burn from Asus i7
- [x] util on Asus i7
- [x] gyro to teensy
- [ ] re-distribute Qt exe

- [x] work space
- [x] old gyro
- [x] gyro cable
- [ ] branch for Aethon
- [x] commit Teensy
- [ ] sync util vs console Pi
- [x] 3V or 5V for Pro Mini -- 5V ✓
- [ ] install.txt - Asus i7

Monkey: nav test.

- [x] Qt on HPi7
- [x] Teensy on HPi7
- [ ] glitchy sine wave
- [ ] non-blocking serial + write
- [ ] PWM
- [ ] timer

shopping list
- [ ] Dad's (Costco)
- [ ] Toblerones + cookies
- [ ] Pastilles

		Austin	T	C
$	☐	Emily	T	C
$	☐	Andrew	T	C
		Mehak	T	
		Kaley	T	
$	☐	Peter	T	C
Goat	△	Dave	L	C
"	△	Angela	L	C
"	△	Mo	L	C
	△	Gordon	T	C
	△	Ingrid	T	C
		Mom	T	C
		Rafael	T	—
			13	10

Choc		Steve
Choc	Cup	Jo
Choc	Cup	Kat

T = Tob / Lett / Past

12 NOV '18

Calendar

- ☐ hoskin return 27th: 10 days
- ☐

Today

- ▨ clean up
- ~~☐ start GST~~
- ▨ walk (?)
- ☐ inner loop WeeCam
- ☐ Pwm Teensy
- ☐ Timer Teensy
- ▨ pay Hydro
- ▨ Katya
- ☐ clean up files Asus17 code monkey
- ☐ FTDI to Teensy / PC
- ☐ params mgmt
- ☐ baby PC
- ☐ geo xform
- ☐ openGL in Qt
- ☐ util in PC
- ☐ caves / leaves
- ☐ GSP TO GO

P306 inner

				FTDI		
swap ↕	blk	1	T-	8	R-	white
	red	2	T+	5	R+	yellow
swap ↕	grn	3	R-	3	T-	red
	wht	4	R+	4	T+	orange
	shld	5	0V	1	GND	black

EE fixes list

gyro swapped SDA/SCK

gyro 3.3V not 5.0V

outer MAX3491 pin 4 to DOP/pulldown

lens " " "

FTDI 422: cross +/-

servo amps - 3V - enable, m1 D1, m2 D1

- teensy PWM m1 D2, m2 D2

Lens D10 - 2 - IN1 D6 - NC / cut D5, D6, D10 /
D11 - 1 - IN3 D5 - J603.1

schem error: DIR-4 becomes PWM-4

40 + 36

43 + 36

3'7 + 2'7

52 Hz

.02

.0005

40+ sloper

17 Nov '18

- [x] card reader
- [ ] ~~wheezy~~ stretch console
- [ ] pwm WeeCam
- [ ] revive db16
- [ ] nav into console
- [x] start car up
- [x] shower first
- [x] try big monitor
- [ ] going mobile
  - [x] case for Asus i7
  - [x] camera dot Ai7

- [ ] fairport conv. ill keep it with mine

- [ ] edit vstudio
- [ ] burn Teensy ☐ win7 ☐ raspbian
- [ ] Qt ☐ win ☐ lin

- [ ] new drives
  - [ ] HP-i5 200
  - [x] XP AMD 160
  - [x] Asus i7 500

14 Nov '18

1 ms. 5Hz.

VN200.

VN300 uart1 —○— uart1.

PPS —○— PPS.

uart2.
gyro.

uart1 firmware.

5 USB-RS422-WE-LLLL-CU

The USB-RS422-WE cable is un-terminated; it has bare and tinned wires.

The LLLL specifies the length of the cable in cm. The CU specifies the colour of the cable and the colour of the USB connector. The cable can be either Black or transparent. The USB connector comes with transparent plug because of the LED implemented inside but can be sold in black colour as well. For simplicity, the LLLL and CU have been dropped from the following descriptions.

5.1 USB-RS422-WE Connections and Mechanical Details

The following Figure 5.1 shows the cable signals and the wire colours for the signals on the USB-RS422-WE cable. The Figure 5.2 shows dimensions in millimetres.

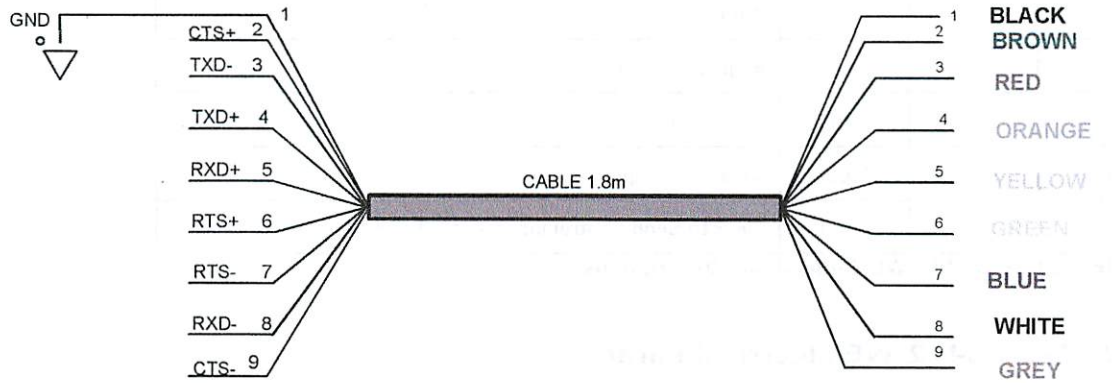


Figure 5.1 USB-RS422-WE Connections

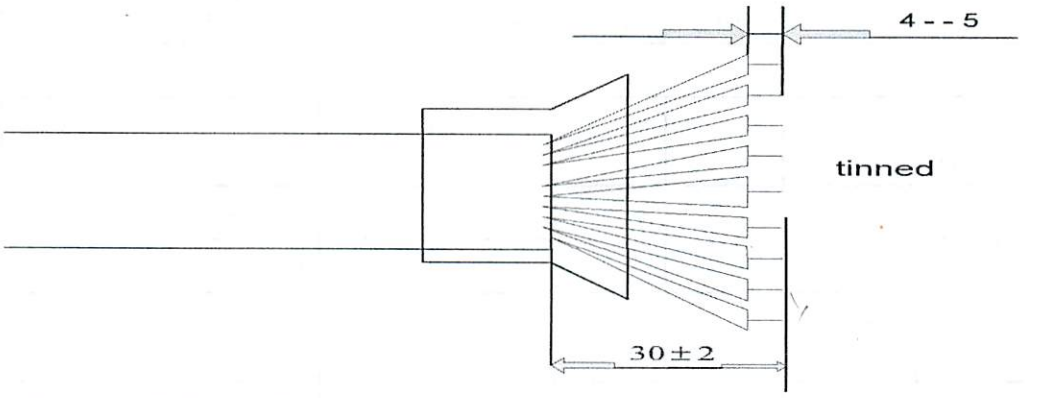


Figure 5.2 USB-RS422-WE Mechanical Details (dimensions in mm)

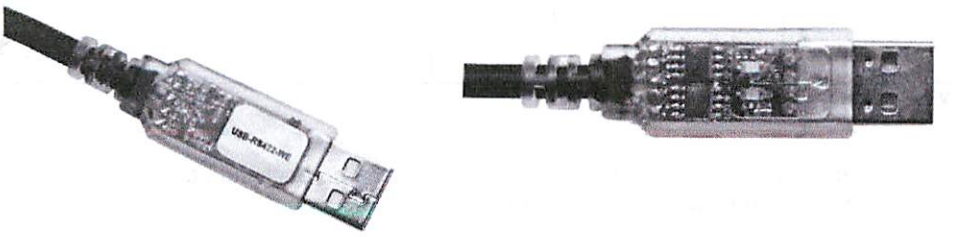


Figure 5.3 USB-RS422-WE Cable images

5.2 USB-RS422-WE Cable Signal Descriptions

Colour	Name	Type	Description
Black	GND	GND	Device ground supply pin.
Brown	CTS+	Input	Clear to Send Control + (B), Input
Red	TXD-	Output	Data – (A) Output
Orange	TXD+	Output	Data + (B) Output
Yellow	RXD+	Input	Data + (B) Input
Green	RTS+	Output	Request To Send Control + (B), Output
Blue	RTS-	Output	Request To Send Control – (A), Output
White	RXD-	Input	Data – (A) Input
Grey	CTS-	Input	Clear to Send Control input – (A), Input

Table 5.1 USB-RS422-WE Cable Signal Descriptions

5.3 USB-RS422-WE Electrical Parameters

Parameter	Description	Minimum	Typical	Maximum	Units	Conditions
Receiver Input						
VCM	Common-mode input voltage range	-7		+12	V	
IN	Input Current			1.0	mA	VIN = +12V
				-0.8		VIN = -7V
VTH	DIfferential Threshold Voltage,VTH	-0.2		+0.2	V	
VIHYST	Input Hysteresis		20		mV	
RIN	Input Resistance, RIN	12	15		kΩ	
Transmitter Output						
VOD	DIfferential Output Voltage, dVOD	1.5		5	V	With RL = 54Ω. CL = 50pF *

Table 5.2 USB-RS422-WE I/O Characteristics

* - The 54 ohms is the equivalent of two 120 ohm termination resistors placed on each side of the transmission line and the input impedance of 32 receivers on the line.

14 Nov '18

Connect 2 aethon!

dhcp.

CONNECT 2 aethon!

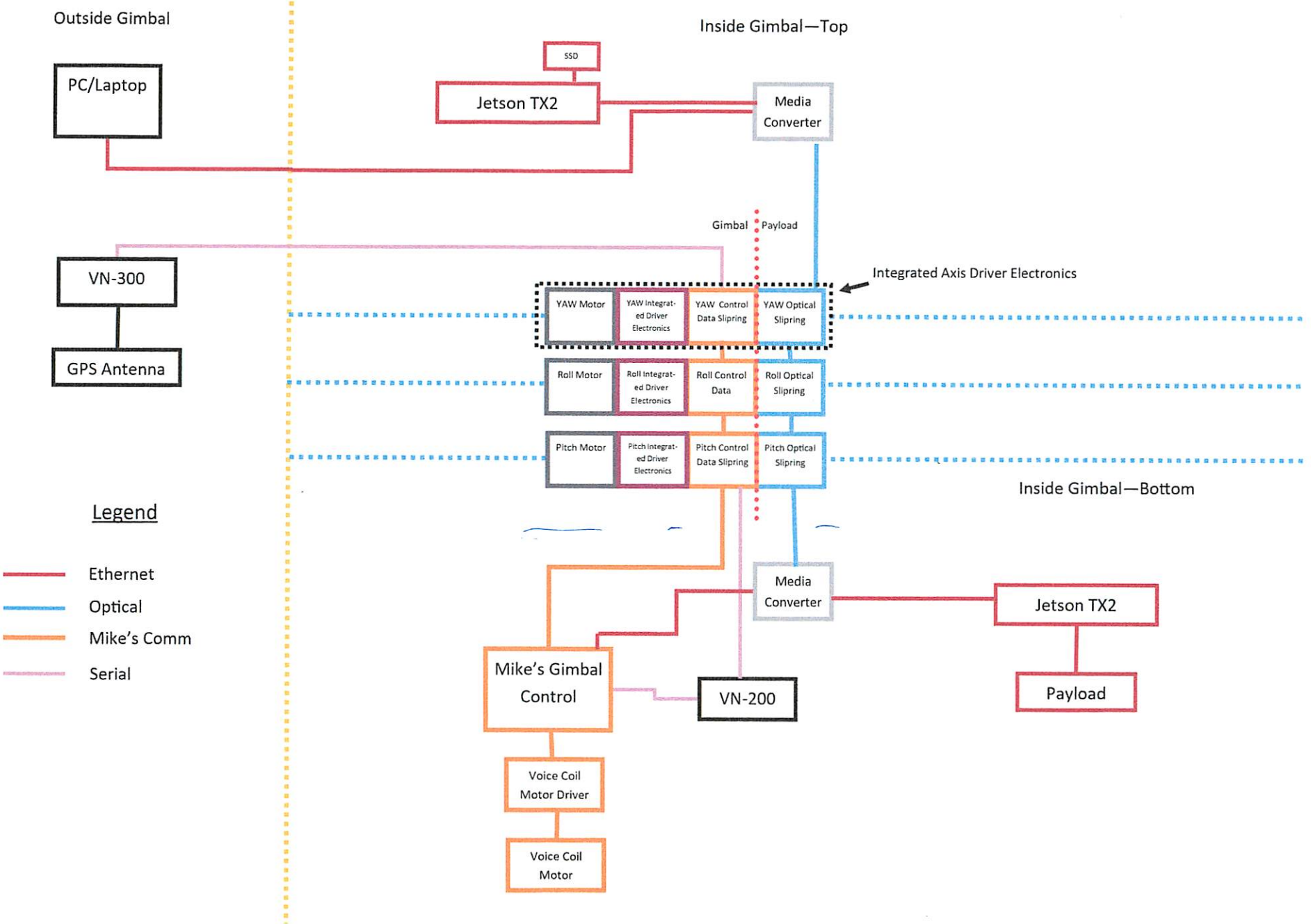
wifi guest

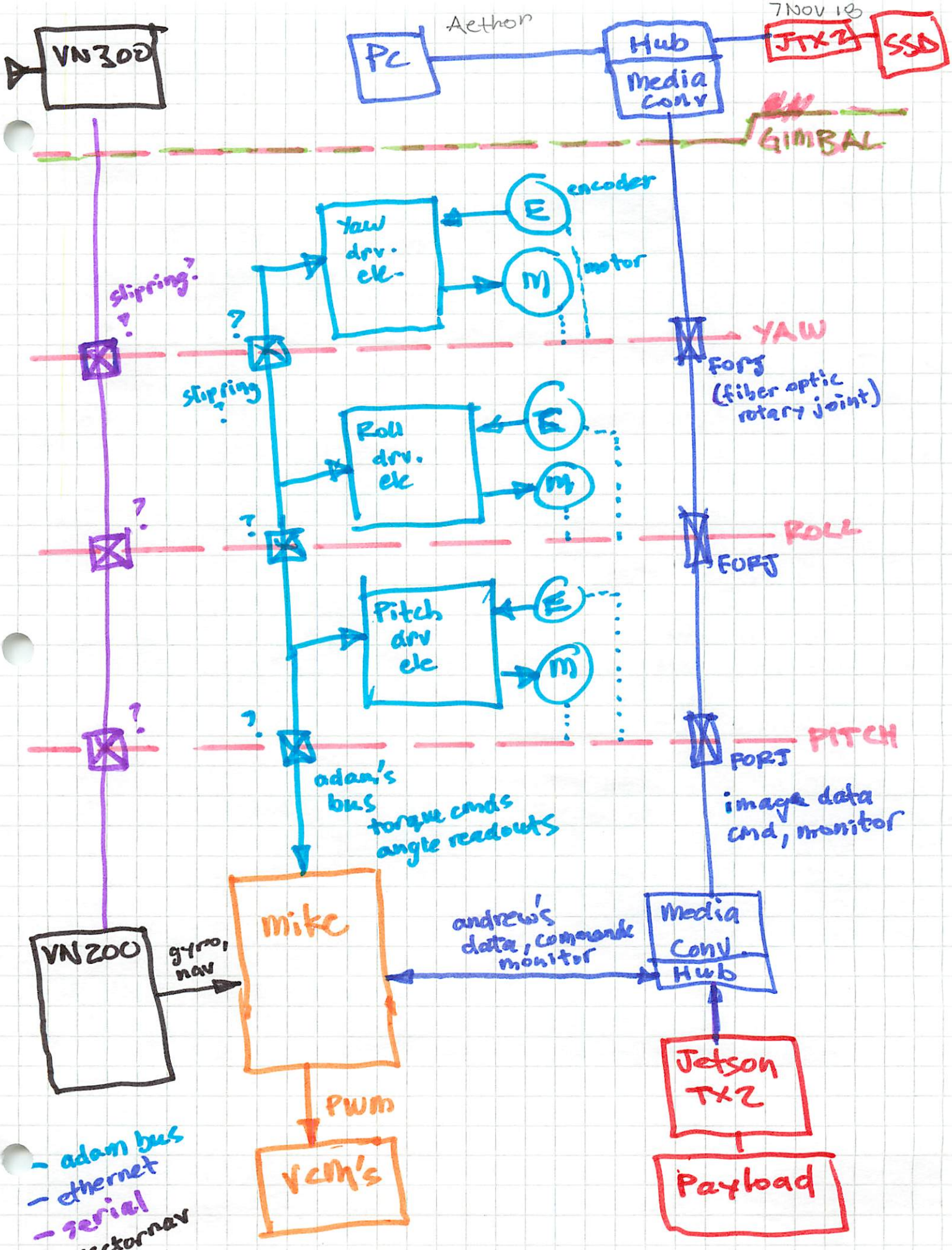
stm32

my TV.
55 LA 6205

14 NOV '18

Proposed Aethon Gimbal Signal Flow—Wired—20181107

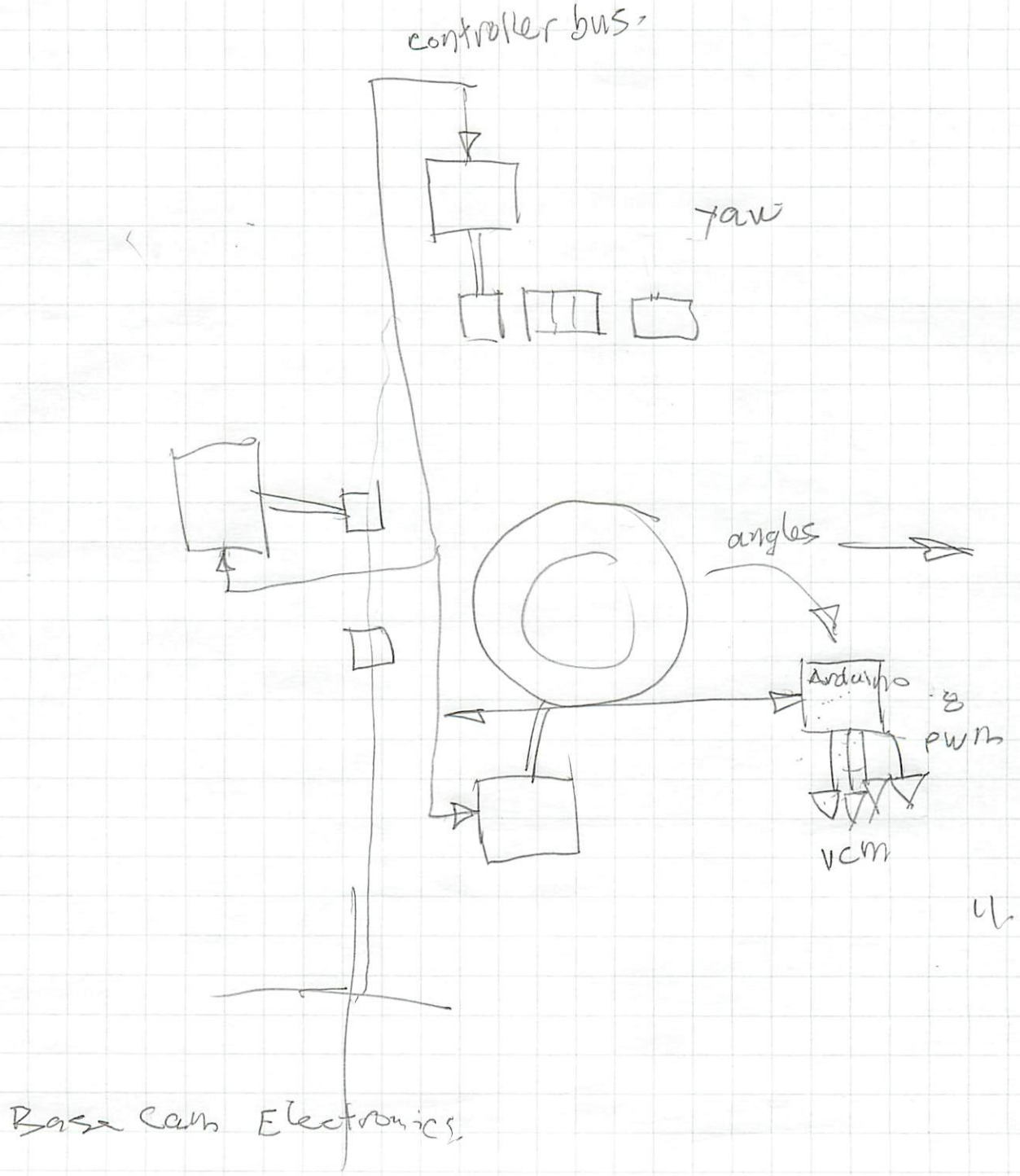



7NOV 18
Aethon
VN300
PC
Hub
Media Conv
JTX2
SSD
GIMBAL
encoder
Yaw drv. elc.
E
M
motor
slipring?
?
YAW
FORJ
(fiber optic rotary joint)
stipring?
Roll drv. elc
ROLL
FORJ
Pitch drv elc
PITCH
FORJ
adam's bus
torque cmds
angle readouts
image data cmd, monitor
mike
VN200
gyro, nav
andrew's data, commands monitor
Media Conv
Hub
Jetson TX2
Payload
PWM
vesc's
- adam bus
- ethernet
- serial
- vectornav

Aethon

6 Nov '15

14th
1 pm



4.

6 Nov 18

Vector nav. call.

APX 15

.15 to .3 deg.

VN200 inside
VN300 airframe.

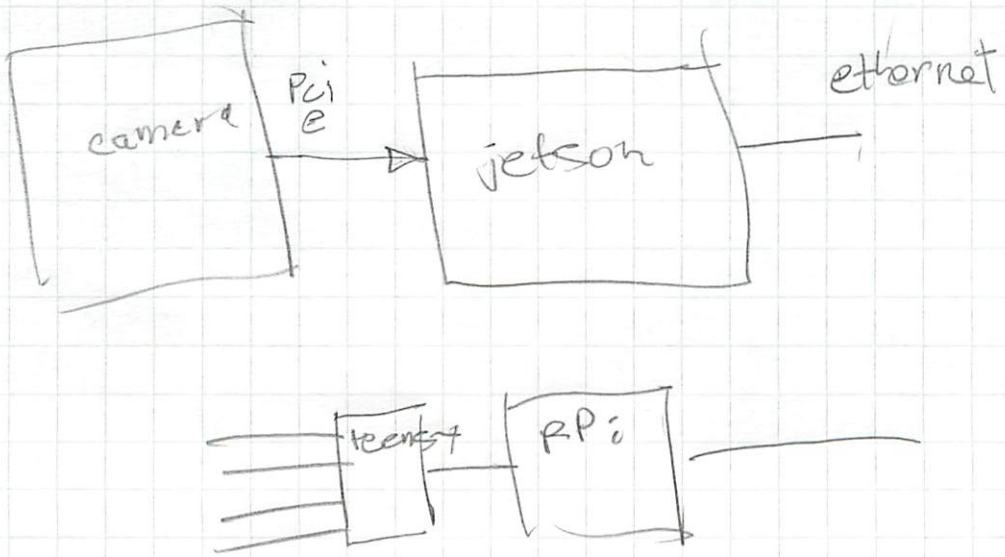
RTK

ajones @aethontech.com
ajenkins @aethonaerial.com

vectornav.
jakub +
lasse

Jetson TX2.
Linux.

AJenk
AJones
AWel
Scott Peacock.



Solutions

9

T	■	B	■	O	■	G	E	N	E	S	I	S	■	■
A	G	A	I	N	■	O	■	I	■	H	■	A	■	■
C	■	L	■	S	T	A	I	R	W	E	L	L	■	■
T	R	A	C	E	■	T	■	V	■	A	■	E	■	■
I	■	N	■	T	H	E	S	A	U	R	U	S	■	■
C	■	C	■	■	■	E	■	N	■	■	S	■	■	■
S	T	E	P	P	E	■	N	A	U	S	E	A	■	■
■	A	■	■	A	■	D	■	■	■	A	■	P	■	■
E	M	B	A	R	R	A	S	S	■	T	■	P	■	■
N	■	E	■	T	■	R	■	A	R	I	S	E	■	■
T	E	R	R	I	F	I	E	D	■	A	■	A	■	■
R	■	Y	■	A	■	N	■	L	O	T	U	S	■	■
Y	U	L	E	L	O	G	■	Y	■	E	■	E	■	■

10

R	U	S	S	I	A	N	■	B	E	A	D	S	■	■
E	■	E	■	N	■	E	■	■	N	■	■	P	■	■
F	I	G	■	R	E	C	O	N	C	I	L	E	■	■
U	■	M	■	U	■	K	■	■	L	■	■	L	■	■
S	T	E	W	S	■	■	M	■	O	P	A	L	■	■
A	■	N	■	H	O	V	E	R	S	■	■	■	■	■
L	O	T	S	■	I	■	N	■	E	P	I	C	■	■
■	■	■	H	A	N	G	U	P	■	L	■	U	■	■
T	A	K	E	■	K	■	■	A	R	A	B	S	■	■
I	■	■	A	■	■	B	■	M	■	C	■	T	■	■
D	I	R	T	C	H	E	A	P	■	A	G	O	■	■
A	■	■	H	■	■	A	■	A	■	T	■	D	■	■
L	I	N	E	N	■	M	A	S	T	E	R	Y	■	■

11

B	A	R	R	E	N	■	H	A	T	R	E	D	■	■
U	■	■	■	N	■	S	■	U	■	■	■	A	■	■
T	I	D	D	L	Y	W	I	N	K	S	■	G	■	■
T	■	U	■	A	■	I	■	T	■	T	■	G	■	■
I	G	N	O	R	A	N	T	■	C	A	P	E	■	■
N	■	G	■	G	■	G	■	P	■	T	■	R	■	■
■	L	A	B	E	L	■	C	A	B	I	N	■	■	■
C	■	R	■	D	■	H	■	R	■	S	■	B	■	■
O	V	E	N	■	D	I	S	A	S	T	E	R	■	■
■	■	E	■	J	■	V	■	D	■	I	■	I	■	■
■	■	S	T	O	N	E	C	I	R	C	L	E	■	■
E	■	■	■	E	■	S	■	S	■	■	■	F	■	■
R	E	P	A	Y	S	■	C	E	N	S	U	S	■	■

12

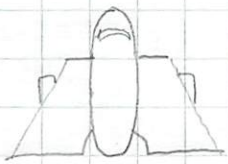
T	A	K	E	A	W	A	Y	■	B	A	B	E	■	■
O	■	I	■	S	■	B	■	■	■	I	■	M	■	■
T	H	R	I	L	L	E	D	■	■	D	■	B	■	■
I	■	I	■	E	■	T	O	R	P	E	D	O	■	■
N	O	B	L	E	■	■	D	■	■	■	■	S	■	■
G	■	A	■	P	R	O	G	N	O	S	I	S	■	■
■	■	T	■	■	U	■	E	■	■	U	■	■	■	■
T	H	I	C	K	N	E	S	S	■	P	■	E	■	■
H	■	■	■	■	L	■	■	C	O	P	R	A	■	■
A	S	S	U	M	E	D	■	Y	■	L	■	S	■	■
N	■	A	■	■	T	O	R	T	O	I	S	E	■	■
K	■	L	■	■	■	D	■	H	■	E	■	L	■	■
S	I	T	E	■	F	O	I	E	G	R	A	S	■	■

20 Oct '18

Travel
Scan
Tinker
Create
Help.
Nest
Exercise
Social.

Don't
Trump news.
Post on Reddit
Solitaire.

DO:
FLS
buy online.
Teens + RP:
Eco.
Road Trip
Camera. store.



19 oct 18

- [x] mom bill
- [x] bills
- [x] groceries
- [x] mom budget +300/mo 100k@2% 110k cash
- [ ] mom tech? wifi
- [ ] scan pics
- [ ] clean up boxes
- [ ] Mom pic frame
- [x] check leaf dates 12 NOV 3 DEC
- [ ] HCH survey

- [ ] collect monkey names
- [ ] new name
- [ ] "no zero" - review
- [ ] daily routine
- [ ] geo.
- [ ]

20 Oct '16

hamilton — works.
mountain
alder shot

--- tec
--- cam
--- works
--- scope
--- trics
- graphic
- ic

mworks

Lakeshore
Lakeside
↳

uvi

Scenic
mountview.

Lake

K

A

Cenic
c-nic

sector
section

delta
sigma
alpha

Tuhinga. (maori for torque)

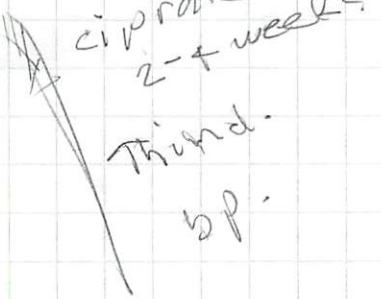
21 Aug '18

- [x] FTDI locate
- [x] Gyro code via Console Pi
- [x] scope gyro frames 1MHz, 2kHz
- [x] serial to inner / gyro. RxS
- [x] cons 422 locate
- [x] cons 422 pinout
- [x] branch Teensy
- [ ] Teensy serial
- [ ] Teensy timer
- [ ] Teensy → console util.

July
thyroid 6 weeks
lactulose discont.
cream discount.
incr thyroid med.

30 Jun '18

- [ ] timer process
- [x] shower gift
- [x] shower rsvp
- [ ] shop house painters
- [x] ding dong
- [ ] wedding clothes
- [ ] wedding gift / card



HP-i7

- [x] svn
- [x] vse
- [x] arduino
- [x] teensyduino
- [x] thunderbird
- [x] sandbox
- [x] favorites
- [x] vnc
- [x] filezilla
- [x] speakers
- [x] photo
- [x] SP backup
- [ ] Loops backup
- [x] chrome
- [ ] calibre
- [x] kobo
- [ ] due, pro mini
- [ ] Ease US
- [ ] backup.
- [ ] outlook
- [x] archive email.
- [ ] itunes
- [ ] FLS
- [ ] NI
- [ ] win Amp

office:
sellinor nurs supv.
Agncs.

1 Jun '18

- [x] teensy dev
- [ ] revive weecam
- [ ] monkey name

- [x] check scotia $5000
- [ ]

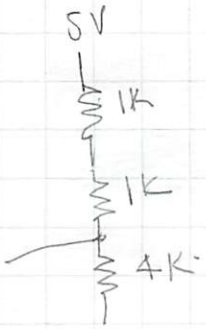
1K
2K

$\frac{2}{3} \times 5$

$RC = \frac{1}{200}$

2K $C = \frac{1}{4 \times 10^5}$

2.5×10^{-6}



$f = (\frac{1}{2})\pi RC$.

$200 = \frac{1}{2}\pi RC$.

10K, $\frac{200}{10K} \cdot \frac{2}{\pi}$

C =

1K
220.

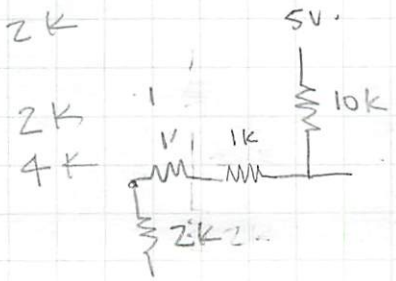
10K
20K;
1K
2K

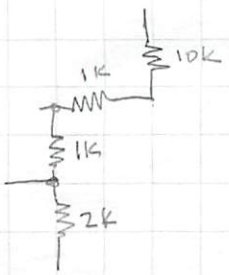
$f = \frac{1}{2\pi RC}$ $R = 1K$ $f = 200$

$C = \frac{1}{2\pi Rf}$

$= .8\,mF$

10K
.08mF





11K

10K
4K

300

$C = \frac{10}{2\pi} \cdot \frac{3 \times 10^{-2}}{3}$

$0.5\,mF$

17 Apr '18

- ☐ scotia cheq — 6k chequing / 4k money master
- ☐ Maurice cheq
- ☐ RBC bills / xfers
- ☐ library book
- ☐ ATM deposits
- ☐

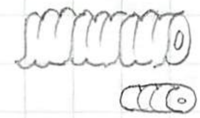
3:15 lcbo.
3:30 leave
4:45

Samuel Harris

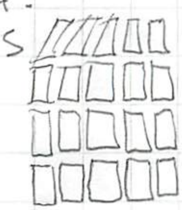
name.

telstar

wine

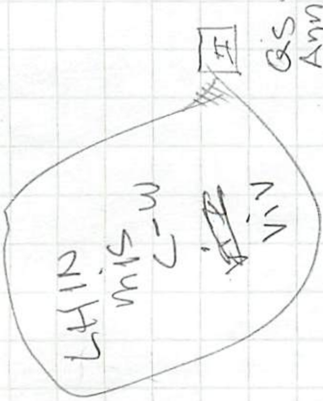


QTG.
$90 US



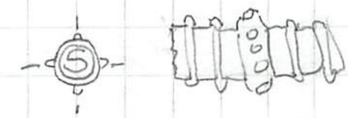
GS FHT
Ann → LTC
Carson
905 453 1453

105
E 104



San Antonio

90 × 10
900



$64 per diem

pereira
Adm coord.
Kelly
30 184
pick up a
Val

wedge
spinner

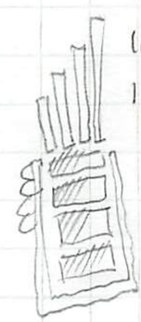
speed
spin
arc

moto
geo
orbit

AXIOM
methodical
spatial
polynomial
geometric
euler
electric
mach
macchu

-ity
-motion
-tron
-tric
-ic
-icity
-trode
-star

10 days
14 days
14,000 ?



axi-tron

Judy placemark
central W LHIN
Faith OB over
Faith : Noreen Frederick
905 4593333
5232
796 0040
7467

3322-

218k.

8 mar '18

- [ ] standby button mTune
- [ ] null
- [ ] drift knobs
- [ ] temperature / gyro cal
- [ ] pan fade-in
- [ ] selectable graphs
- [ ] blue filter lines
- [ ] dynamic gain
- [x] revert vmu
- [x] aip rate lim undo

- [ ] zoom stops
- [ ] span
- [ ] focus loop
- [ ] lens cal

Teensy
- [ ] choose IDE

-ia velouria
-een velveteen
-ette leatherette
-tron

eye tronics
retina

fr

2.374
-1.05-1

vector 3200 -verse

00
01 1
10 1
11 1
00 -3

04 21
00 00

opto mech

rational

polyhedron

axial

exo
inter
science

istic

(bits & 3) << 6
(bits & 12) << 4

quantum

radian

tangent

stasis

onics
eering
tion

tele

euler

7 Mar '18

~~Variense~~

- mTune ttyACM0
- initial state ?

1399

9 20 24

AMAO

6 Mar '18

- [x] Test vmu931
- [ ] Full demo
- [x] answers for GRB
- [ ] Teensy

- [x] DLY gift
- [ ] mom tech
- [x] return shaver blade
- [x] pay Koodo
- [x] sort tax
- [x] print tax rcpts, PV-Labs
- [x] tax to MNP
- [ ] turbo tax

~~vmu931~~

- [x] windows?
- [x] qt
- [x] Pi ttyACM0

~~[x] device mgr~~
[x]

Paul L call

US
$90./hr
fp.
AVIO
dsc.

3kHz
500
DNI

NZ - fokker
tom bennet. ex-UAL.
fulvio
16 th. 1.5
100 k.

macros.

refurb load units.

26th.

7days
5days.

FSE: Flight Sim Eng
Denver
$46M.
2026.
road slow-
security.

C5 - UAL
FS1 now.
update.
fully CAE
new DNI
mech +
cal.
mid April.
need Fokker

ttyACM0

2@ aol.

2 Mar '18

- [ ] desk lamp
- [ ] vr phone

3050 fast 8 kHz
6050 " "

- [x] DLV bday
- [ ] machine learning crash course
- [x] email book club
- [x] mom cash
- [x] hair cut
- [x] groceries
- [x] taxes MNP
- [ ] taxes mom

- [ ] webcam

Feb '18

- [x] demics
- [ ] friends electric
- [ ] moonflower

scrutiny 363

caution.
192.168.0.136 LAN
.108 wifi

12:15
12:45
1:30

20 mw 110 acre

ipoint -

o oo cc
tmin
tmax

26 Feb '18

activity

random walk

- [x] new cheap gyro — [x] try 1 install, code — ~~[ ] try 2~~ " "
- [ ] vertical ref box — [x] shop
- [ ] nav box — [ ] shop
- [ ] simulate with angles
  - [x] clean up analog — [x] code, caps
  - [ ] get encoders — [ ] shop
- [ ] video stabilization — [ ] research, code

- [x] license sticker
- [x] st bday
- [x] random walk
- [ ] mom tech
- [x] lcv cash update
- [x] haircut
- [x] dish soap
- [x] groceries
- [x] poll Vellekoops
- [x] call Sandra

Hz	i2c						stock	wee	DBIS	broken
		i2c	2	OSEPP	BAL-01	MPU6050	2			
		i2c	3	OSEPP	GYROS-01	MPU3050		1	1	1
1600	400 fast	i2c	1	Pololu	MiniIMU9v5	LSM6DS33	1			

$30 devkit.

LSM6DS3H 6 mdps/$\sqrt{Hz}$ 1600 Hz. with temp sens.
" 33 7 " " no "

google digikey AHRS.

buy AHRS under $100

varimike__

robomike__

17 Feb '18

- [x] drive readout
- [x] jitter "
- [ ] standby button
- [ ] null "
- [ ] drift knobs
- [ ] pan fade-in
- [ ] auto channel graphs
- [x] send js when tweaking gain
- [x] glitches
- [x] sine drive
- [ ] blue filter lines
- [x] message checksums
- [x] balance wee cam
- [ ] dynamic gain
- [x] js on timer

- [x] AIP noise on GUI
- [x] ~~LAN something~~
- [ ]

weecam

- [x] 200 4 ~~0~~ 1
  120 4 1 1
  kP kI kD Lim

- [ ] video feedback

chrome
new tab + go.
ctrl-shift click

0 V1
1 V3
2 CS

11534 2dde
834 342

16 Feb '18

200 + 1

[[full WeeCam demo]]

- ☐ zoom stops
- ☐ span
- ☐ better focus loop
  - ☐ velocity term
  - ☐ send tuning constants
  - ☐ strip chart scrolls, scales.
  - ☐ also iris.

- ☐ clean tilt readout.
- ☐ connect zmult gains.

- ▨ balance the payload.

- ☐ gui - db.
- ☐ db in gimbal.

pitch noise.

with Pi:

2 deg.
1.5 x 50 mV.
2.6 kHz

3.3V = 330°
7.7°

-1V.

385 kHz

4.5 x 2 µs
111 kHz
without Pi.

without FTDI
1.3 x 2 µs.

db element.

```
struct s.
  float x[2]
  float y.
  char st[3][LEN]
  int id[7]
  int type
end.

s s7[7];
```

pwm on
7.5 ms.
2 x 50 mV.

without (unconnected) cable that went to FTDI
4.5 ±2 µs.
1.0 ± 50 mV. pk-pk

15 Feb '18

*

baud.

57600

feedback

15 + 4×4×4

79 bytes × 10 bits / 57600 = 14 msec.

72.9 Hz.

57600 / 10 = 5760 bytes/sec.

5.76 kHz
30 kHz.
poll on tx
poll on rx.

loop.

2000 hz.

sec / 2000 × instr / .125 μs =

8 MHz / 2000 = 4000 instr.

400 lines. / 2 for interrupt load = 200 lines / 4 channels

50 lines.

30 khz. 30 kHz / 2 kHz = 15

8 kHz / 256 = 31.25 kHz.

/ 16 = 1.95 kHz

loop:

FIFO Rx = 2

Tx = 1.

is tx head > tx tail
if tx ready.
txtail → tx Hw.
txtail ++

if ~~rx rdy, rx int~~
if ~~rx head ≠ rx tail~~
rx Hw → rx head.
rx head ++
mask rx head (circular)

~~applZard61~~
applZard
Zard Vark 13 ehm
1 July 1967
Blazing Saddles
Kilima Hawaiians
Pet Sounds

13 Feb 12

AIP
set clock prescaler
select mux — Timer 1 OV 0 cycle
start conversion — " 0 "
read — " 1 "

zoom	AIP	encoder
focus	AIP	"
iris	AIP	"
ext.	AIP	"

256 × 0.125 µs = 32 µs 31,250 Hz
serial port. 86 µs. 11520 bytes/s

scheduler loop.

poll serial
115200/10.

PORTB
SERSTAT
SERBYTE
ADCSTAT
ADCL
ADCH

head ptr
tail ptr.

12 Feb '18

- [x] no Alastair
- [x] call mum re Judy
- [x] Judy in phone
- [x] iPhone dump
- [x] iTunes
- [x] Win10 → HP-i5
- [x] get cash $1800
- [x] mum cheque
- [x] mum xfer
- [x] start car
- [x] drive-clean
- [x] "autochk cannot run"

- [x] try modes.
- [x] which timers?
- [x] sync timers
- [x] gap for AI_READ
- [x] reproduce Arduino standard.
- [x] cs10, 11 off, invert, on
- [x] scope pwm.
- [x] mode
- [x] read A/P @ 30kHz.

ADCSRA prescale = 16
26 us.
33 us.

mode 1.

7. × 0.5us = 3.5 us.	length of an interrupt + scope DoP

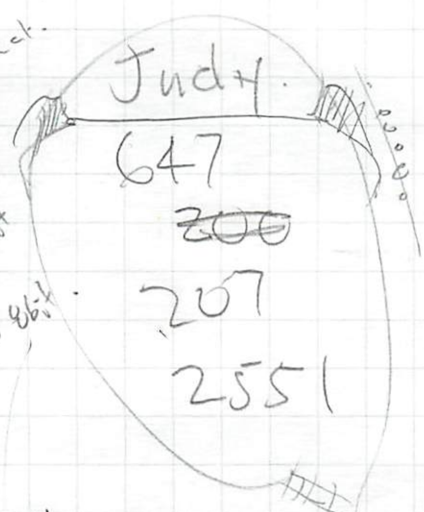
standard promini
TCCR1B 64 prescale.
CS11
CS10

0 - 8 bit
0 14
1 8
2

6.7 × 10 us.

8 bit phase correct.

TCCR1A
WGM10. 8bit
TCCR2A
WGM20 8bit.



14
WGM11, 12, 17.

m
w
3
3×5×20
4×
4×

shape
3n00pl

TCCRxA

			OCR
2	2B	com2B1	2B
-	0B	com0B1	0B
-	0A	com0A1	0A
F	1A	com1A1	1A
I	1B	com1B1	1B
E	2A	com2A1	2A

32 us.

	pwm	timer	bits
zoom	3	2B	8
-	5	0B	8
-	6	0A	8
focus	9	1A	16
iris	10	1B	16
ext.	11	2A	8

9 Feb '18

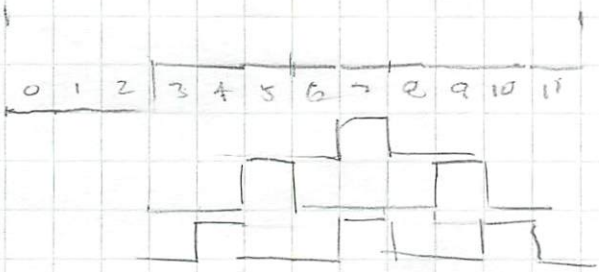
KCRW eclectic
Jake Bugg - Green Man

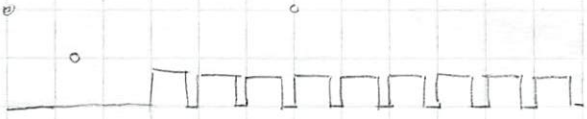
2 kHz.
50 kHz $\frac{1}{50k} \times 8m = 160$ instr. 20 ms.

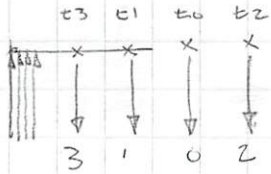
25:1 A1 AI 4 pots
1 1 tach

500 Hz.

3:9.







which bit, how long.

3	t3	0111
1	t1 - t3	0101
0	t0 - t1	0100
2	t2 - t0	0000

1	B1	OCR1A
2	B2	OCR1B
9	B1	OCR1A
10	B2	OCR1B

8 Feb '18

1000 Hz loop 1000 µs
30 kHz pwm 33 µs

	pre	µs
Aip	64	104
	32	52 ← 65 recommended
	16	26
	8	13

resolution
$\frac{30,000}{1000} = 30$

new setpoint.
0 - reset denominator
compute 1st bit
1 - hold, inc denom.
2 - "
3 - compute bit:
is(avg > setpoint) ? (0:1)
count ups.
count denom.

don't start all pwms at once.
min offset = ?
.125 µs instruction.
33 µs frame.

$33 * \frac{8m}{2m} = 132$

256

$\frac{1}{30,000} \times 8m$

266

AsusTablet
dumpTY33
.163.

8×33 264 instructions.

i2c

$\frac{8m}{400k} = 20.$

8bits = 160 instr
20 µs.

pulse 33 µs.
i2c byte 20 µs.
aip read 52 µs.

proMini 3	8 MHz
proMini 5	16 MHz
Due	84 MHz.
proTrinket3	12 MHz
proTrinket5	16 MHz

7 Feb '18

Alastair

Wescam 16. with Nikon
early may.
Mon:

6 Feb '18

☐ instruction time 8MIPS
☐ AIP read. time

ideally 1000hz loop
pwm freq 30kHz.
pwm res

$\frac{8 \times 10^6}{30 \times 10^3}$ = 266 instr @ 30kHz.

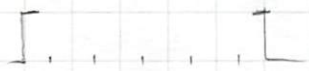
8mHz → .125 μsec

conversion AIP.

pw 2:128, 13 cycles
↑ fast ↑ slow 8mHz

fast	26	3.25 μsec	conversion
slow	1664	208 μsec.	conversion

1kHz 1000 μsec
30kHz 33 μsec



loop:
8.5 × 0.2 ms = 588hz.

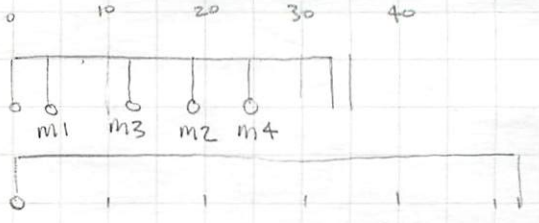
@ 1kHz.
kill all pwms.
read all AIPs.

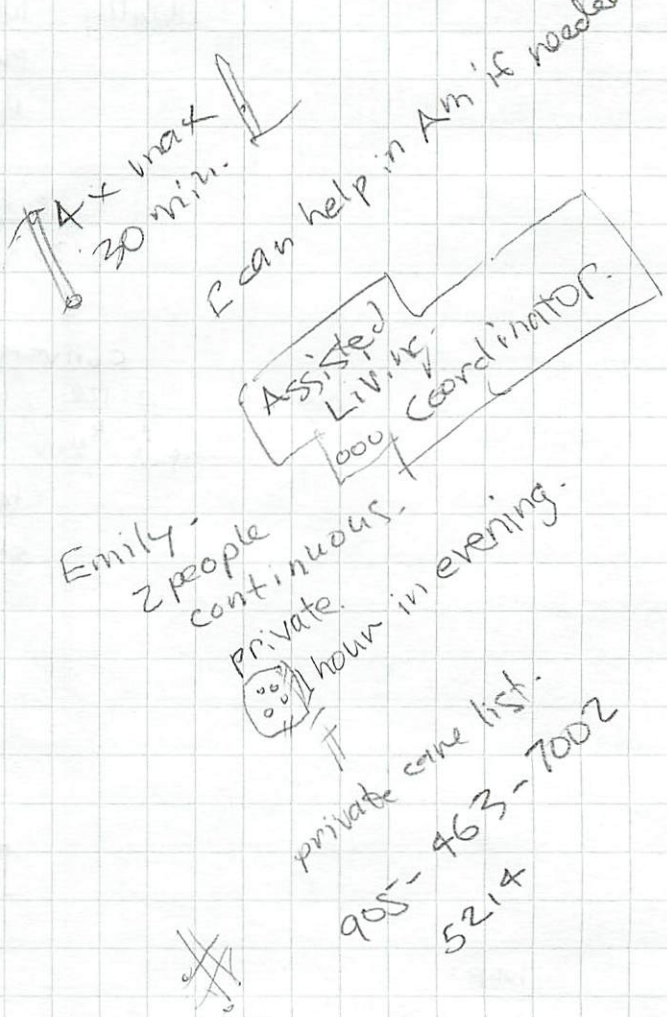
conversion
6 × 20 ms = 120 ms. 250 ms.

Atmega 328 200k recommended

8 MHz / 200k = 40 32 prescaler ×13 = 52 ms
64 " ×13 = 104 ms

15 kHz.




4x max
30 min.
I can help in AM if needed.
Assisted Living Coordinator.
Emily.
2 people
continuous.
private.
hour in evening.
private care list.
905-463-7002
5214

Weecam pitch AIP.

$1.5 \times 5mV \times 10 = .075V \times \frac{360}{3.3} = 8.2°$

2-7 < 1ms

Noise: ☐ sync AIPs
☐ buy caps & chokes

pos
err
drv.
pwm

4 Feb '18

- [x] Chrome
- [ ] Linux - baby PC

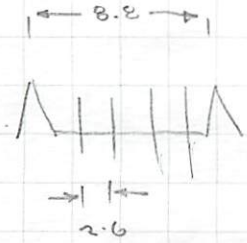
- [x] milestone (DVD player) clean up
- [x] pay Mom CRA online
- [x] bring assessment CRA
- [x] cash mom cheque CRA
- [x] mom $800
- [x] mom LCBO
- ~~[ ] Andrew~~
- ~~[ ] Katey - buy~~!
- [x] classify AA-A batteries
- [x] Judy + ICY cash
- [x] Pay koodo & union gas

Lens
- [x] strip chart
- [ ] fast plot via gyro frame
- [ ] db in Arduino
- [ ] db into Qt GUI.

Mom Technology
- [ ] bluetooth speakers
- [ ] audio books
- [ ] email
- [ ] command center
- [ ] video conferencing.
- [ ] mini printer
- [ ] wifi

Gimbal
- [ ] buy parts
- [ ] super Trinket
- [ ]

10ms @ 10x
1ms/div.



2.5
1.5
10mV @ 10x
100mV/div.

90 = 4 x 200 mV.
0.8V.

Monkey
- [ ] name
- [ ] stock footage ideas
- [ ]

3x(8.8) taller

2.6 384 khz
8.8 113 khz.
3x8.8 38 khz

General
- [x] optimum
- [x] itunes
- [ ] resume 5k

tty
AMΔΦ
SΦ
gim ACMΦ
lens USBΦ

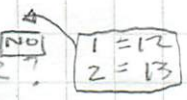
$2.5 \times 100mV \times \frac{360^\circ}{3.3V} = 27^\circ$

$.25V = 27^\circ$

Lens

2 Feb '18

- [x] scope pins
- [x] DAC → scope?
- [ ] clocked process



5.3 × 0.2 ms 1.06 process 1.52 ms = 633 Hz.

2.6 × 0.2 ms .52 delay

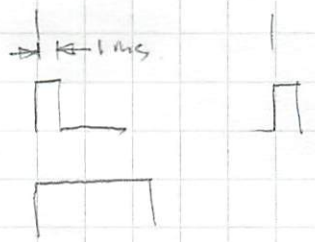
Transmit.

5.4 × 2 = 10.8 ms

9.8 × 10 ms 98 ms 10.2 Hz updates.

frame

57600 bits/sec × byte/10 bits × 10.8/10000 = 62 bytes



92.5 Hz possible.

Actual buffer

hdr = 12

tail < 2

4×4×3

62 bytes.

lens_feedback_t

sys/power/state

-rw-r--r--

15901

PrazettA

31 Jan '18

- [ ] db object
- [ ] lens span
- [ ] lens loop

	pwm
	+ve
	38
	34
	0

	pot	lens	lens	Pot
z	38	⊕ 102mm	⊖ 7.3 mm	977
f	882	⊕ >00	⊖ 1m	34
i	1023	⊕ <1.9	⊖ >C	0

	fwd	back/closed	mid.
z	.63	.36	.495
f	0	.999	
i	0	.999	

	0	100	kPwm
z	977	38	+
f	34	882	−
i	0	1023	−

CCRA - LHIN central west region

passphrase'

~~a b c - D E F - g h i - J K L - M N O~~

× GNOME ✓
XFCE
KDE ✓
Cinnamon ✓
MATE ✓
~~LXDE~~

root ixnay2018
Mike_V skinh3td

squinky1942

lightdm versus ?

MikeV
mikev → ixnay2018
~~skinh3td~~

wiffle P∅∅m
abc123 15900

24 Jan 18

- [x] LDB build for Weecam
- [x] re-commission WeeCam
- [x] fast PWM - LdB
- [x] backup
- [x] outer axis stability
- [ ] noisy pitch angle
- [x] standby button
- [x] lens: closed loop
- [ ] lens: cal.
- [x] pitch glitch HS 1

- [x] weecam Wide (remove tape roll)
- [x] weecam mobile (-er)
- [x] frame grabber
- [x] dome tach

PWM uno mini

E 3 2B "
5 0B "
6 0A "
9 1A "
F 10 1B "
I 11 2A

gyro. white 19 rx1
red 5V
blk. gnd

- [x] splitter
- [x] windows vs wiring Pi
- [x] font size.
- [x] joystick sense

5V. gyro 3.3V
SA1 pot1
~~SA2~~ pot2

- [ ] dual monitor Pi

- [x] backup
- [ ] controls_c mapping
- [ ] bode graphs
  - [x] samples
  - [x] fft
  - [ ] filters
- [ ] bode settings
  - [x] display
  - [x] send.

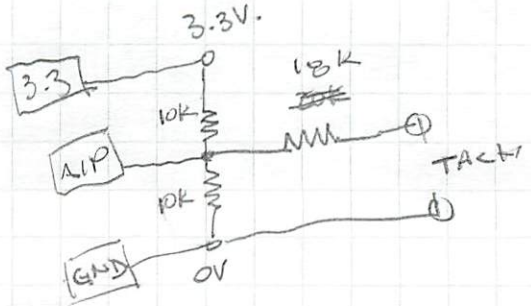
GND gyro
SA1
~~SA2~~
pot1
pot2

1920 x 1080
1920 x 1200

- [x] mtune vs cpu log16( )

gyro offset weecam

Y	-.856	-.857	-.859
P	.393	.399	.395



124

2 4-3 ms.

Aethon

1. 30 Jan '18

Geo D, History

4th $/mile - anticipate turnes
1560 Reigl
Survey Grade
300k miles for cadillac CS
2014

$1.5M for smaller lighter
powerline.

Checked luggage
wescam mount)
Autonomous can go on drone.

Vancouver 10 guys processing big data.

Leading Edge Geomatics

Helios-1 Reigl/Nikon 1.1 sec/frame
added 25MPix + 2x 45° mirrors.
18kg.

patterson
composites
mississauga

80mm
1. cm resolution
& theres a limit

close-up - stabilized binoculars
- hand held still camera.
- expensive.

8" ball.

Helios 2 - with gimbal
Cineflex

hover, descend	5 meters from line	pilot 2 observers 2min/tower

vegetation
bird nests.

14" Cin Elite with military Geo feature.
lever arm fail Geo.

Accurate pointing tracking.

westcoast. 200kR.
8" gimbal.
400mm prime.
1m. (200 with 1.4 extender

2 axis vs 3 axis look down

Trillinor.

zoom?

Customer = heli co.

efficiency: same hours
more data.

also do repairs.

documented evidence.

year to year comparison.

California fires.

① hi-q version

② small IR-UV inspection
q"
torque vs snout || existing.
2 axis 8" gimbal

scalable.

5"

q"

regulation

weight waiver

log distance waiver

PV - expensive.

Cine - slew geo

Trillium

Adam

3 axis q"

no inner.

50-60lb.

wescam 10"

FLIR 10"

weather

sun angle

cloud cover -

Scout B-330 Drone-

~~Cadet~~ Skeldar || other makers.

Schibl.

50 kg payload.

2019

cheap Lidars for cars → prototypes.
Adam to upgrade

1/mo

21 Jan '18

- [ ] caps
- [ ] chokes
- [ ] 22 gauge hookup wire
- [ ] 26 pin M d-com wee cam
- [ ] 44 pin F " 16D.

A1. IN1
A1. IN2
A1. GND
A1. IN3
A1. IN4

A1. IN1 6 pwm 0
A1. IN3 7 "
A2. IN1 8 "
A2. IN3 9 "
A1. IN2 2 DIR 0
A1. IN4 3 "
A2. IN2 4 "
A2, IN4 5 "

A. weecam lens
make schem

B. 16D lens

C. 16D roll

win10 | WORKGROUP
6rv7Mw6sg8
skinh34d
mikeV
velkop

Preston Fiz

D. Qt Bode.

117.6 68
115.9 69
115.2 114.3 70

69.4 @ 8mHz.

E. Noise. Tues
order on ~~Mon~~ night, rec Wed thu.
get mv2
batteries
dome motor has .01 uF

69 115,942

70 114.3

scope
4.58 x 2 ms
109.2
0.95

scope
4.1 x 2 ms
121.95
1.06

8 Jan '18

util / gui

- [x] subclass shapes - click
- [ ] load / save
- [ ] widget size in Pi
- [ ] standby indicator
- [ ] cTune style graphs
- [ ] bode plots
- [ ] set params
- [ ]

- [ ] how to hide tech
- [ ]

lod

- [ ] connect roll
- [ ] buy coil, cap
- [ ] lens drives
- [ ] horizon
- [ ] tune outers
- [ ] tune inners, vib test

arduino x4

A1 gim
A2 gyro
A3 console
A4 lens

arduino

- [ ] 3 axis inner
- [ ] gyro missing frames
- [ ] lens controller A4
- [x] console knobs A3

53mΩ 4.CA 100 µH
1nF 100V

- [x] bob
- [x] tires
- [x] handbrake
- [x] alignment
- [ ] diet - fibre vs fat
- [ ] 5km resume walks
- [ ] warm gloves
- [ ] shoes : worn heels
- [ ] plumbing
- [ ] salvation Army trip
- [ ] hand towel install

D 0-7
B 8-13

serial0 → ttyS0
" 1 → ttyAMA0

ps -A
kill (1322)
top.

cons 01

16 Jan '18

- [x] read GPIO
- [x] fix js-encoder
- [x] separate consio thread
- [x] shutdown mTune
- [x] hex format mTune

Wed:

10:30 – 11:00

- [x] alastair meeting
- [x] mom meeting
- [x] GSP tues
- [x] mv2 mon

th3Hotn3ssX login

Y

15800 ~~X~~ main

15900 web

192.168.0.156

Fz:

~~TT4147~~

~~+4147~~

4147

3.3V logic.		
in	out.	
~~(or more)~~ 2.0	2.4V.	H
~~(or less)~~ 0.8	0.5V	L

27 Dec '17

- [x] Qt build in Pi
- [x] Pi revert to ~~wheezy~~? jessie
- [ ] util send from treeview
- [x] joystick
- [x] backup
- [x] jessie x2

	Pi (old)	Pi (new)
lsb_release -a	9.3 stretch	8.0 Jessie
Qt C	4.2.0	3.2.1
Qt	5.7.1	5.3.2
©	2008-2016	2008-2014
built.	(20161124 32bit)	11 may '16

- [x] Qt new thread
- [x] send to gimbal

- [x] crash when not debug. SIGBUS
- [ ] gyro misses frames (vs commas console) error
- [x] gyroNull [1] Invalid
- [x] subclass gui shapes (for mouse click)
- [ ] control gains + dynamic
- [ ] load/save
- [ ] graph bode, dft, fft
- [ ] graph Tek style.
- [ ] roll axis hw
- [ ] roll axis sw
- [ ] tune ~~from~~ using mTune
- [ ] standby GUI
- [x] imu frames error
- [x] tabs in Pi Qt
- [x] autocheck cannot run
- [ ] unstable outers (rate limit pots)

pw ch3rrY ch3rrY2
VNC enab
SSH "
arduino wget...
bo
apt-get qt5 ...

ifdef _linux_
if _WIN32

Q-OS-WIN
_WINCE

SIGBUS
unaligned address.

const char*

Blizzak LM60	225/45R18	95H
	245/45R18	100H

r	245/40 ZR19	98Y	pilot super sport
f	225/45 ZR19	96Y	

13 Dec '17

- [ ] db - no int.
- [ ] db - num decimal points
- [ ] db - string type (?)
- [ ] db - util / console / gimbal
- [ ] live treeview (?)
- [ ] load / save par
- [ ] bode
- [ ] send / edit.
- [ ] db - send 'connect'

- [ ] joystick
- [ ] roll axis
- [ ] tune gimbal
- [ ] Gui

- [ ] order coil + cap

header 12
pid. 7×4×2
fit ((2×9)+(1×2)) ×2×5
outr 3×4×2
2

12
56
100
24
2
194

12 dec 1295576.43.

7×12×12×2

16: 534
17: 534
214
44
30
74
16
278
24
758
280
27

QGraphicsItem
paint
bound... Rect

26 Nov '17

- [x] pay cogeco
- [ ] debug comms
- [ ] (or) revert

- [ ] compant name
- [ ] stock footage

3 Dec '17

- [ ] qt layout
- [ ] joystick
- [ ] qc Pi

how to display all
tree?
algo view widgets.?
db widget → table → element

1. ⇔ 1,1,1. table, row, col., ptr, type

t,r,c, → i

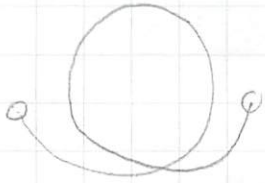
t : n

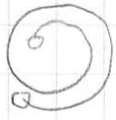
t,r,c,e. → i
i → t,r,c,e.

table. name
nr
nc
i_{rc} × nr × nc

element t,r,c,e.
name
type.
pointer.

- [ ] text ⇔ db ⇔ gui
- [ ] gui ⇔ db
- [ ]





module
table list. pointers, numels tables.
element list. pointers, numels

4000
$80

dyna
vista.

1 Nov '17

- [ ] opti VNC x4vncviewer
- [ ] opti Qt
- [ ]

15 Oct '17

- [x] arduino ide
- [ ] mini-IMU9
- [x] memory for Pi1
- [x] setup Pi1
- [ ] upgrade Pi1

8 Nov '17

- [ ] Qt serial
- [ ] qt widget
- [ ] Qt refresh

lsb_release -a

pi2 jessie 8
pi stretch 9.1

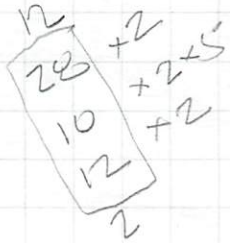
2 Oct '17

200% × 4 × 512 × 8 =	9.102 kHz.	ms.	
10 µs. noise.	100 kHz.	100	
(3×8)//(84MHz) 0.3 µs.	13 MHz	10	noise.
		100	pwm
		1000	

3 × 8 @ 84MHz

wed 16 Aug '17

- [x] msg size in header
- [ ] -max, -min
- [x] revert



Sun 12 Aug '17

database

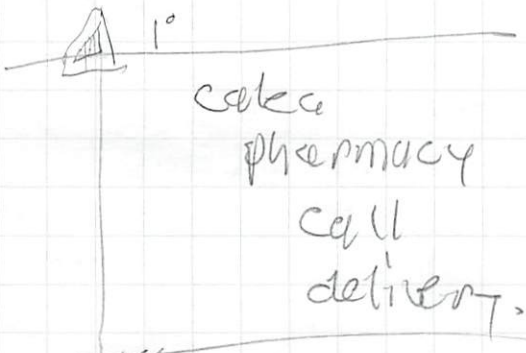
- [ ] strip out pv framing
- [ ] add monkey framing
- [ ] load & save
- [ ]

thu 7
3:3a
36 vodden 307

quiet life.

24

zardmyst13



money cone grant ads
staple take you
free tea got.
prison without
pillow talk sylvia

905-796-0040
ext 7165

LHIN. Ont health integration network.
CAC
eCAC

Bloviating Gasbag

monumental Mumbog

1.283.072.74

Amrit.

Thu 10 Aug '17

database
- [x] tree view project
- [ ] framing
- [ ] no comms
- [ ] 'tiny db'

svn server
- [ ] which computer

$\frac{10,000}{115200} \times 10 = 0.868\text{sec}.$

Sun 6 Aug '17

- [x] preserve dev env
  - [x] try vs 2005 install 000-020
  - [x] backup/restore different h/w
  - [x] new win pc
  - [ ] ~~buy vstudio~~ .

- [ ] encoder noise
  - [x] unplug Y,P,V
  - [x] scope

Fri 3 Aug '17

rl compensation

$i = \frac{1}{1+Ts}\, i_{dem}$

$= i + k(i_{dem} - i)$ $\quad k = \frac{dt}{T} \approx .02$ (dt .0005)

22°C 10 Ω = .01 sec
1 mH
32°C 20 Ω .02 sec

50 Hz · 40:1
2000 Hz

60 1
120 0.5
2000 $\frac{60}{2000}$

problems:
- pitch encoder noise.
- yaw cable / imbalance 50%.
- pitch lens imbalance 50%.

plot friction, imbalance
yaw offset 2°

x11vnc -once
-ssl

umount /media/pi/---

Mon 31 Jul. '17

- [x] review 70380
- [ ] bode sweep
- [x] open drive ~~☐ centering~~ ☒ drive
- [x] shake
- [x] step
- [ ] save pars
- [x] RL compensation
- [x] save/load RL terms
- [x] shake after RL comp.
- [x] reference RL
- [x] swap ref.
- [ ] trip on high drive.
- [x] bumpy filter plot
- [x] scaled_t out

Weecam

	pwm	d1	d2
Y	6	22	23
P	7	24	25
Don	8	26	27

A2	JSY
A3	JSP
A0	Tach Dome
A1	Tach VSW
A6	angle Y
A7	angle P

- [ ] white noise & optimization
- [ ] graph rl filter
- [ ] find GA filters
- [ ] db, util
- [ ] strip chart
- [ ] descam

to shake ISD.

- [ ] tune util
- [x] step
- [ ] trip-outs
- [x] swap ref
- [ ] save/load

- [ ] connect roll servo.
- [ ] connect shaker
- [ ] calibrate shaker

192.168.0.171

how to enable ss ub 16.

ifconfig.

x11vnc -once.

optiplex -360:0

port = 5900

	Kp	KFF.	Tach
P	.12	-.06	.01
Y	0.15	.03	-.01

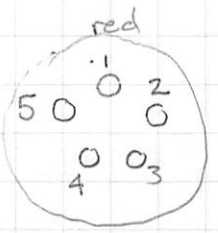
outer P. -32 reads, @ 0 deg.

-120° at -90°

Sat 29 Jul '17

Wecam yaw/pit

- scale angles
- scale joystick
- dome motor



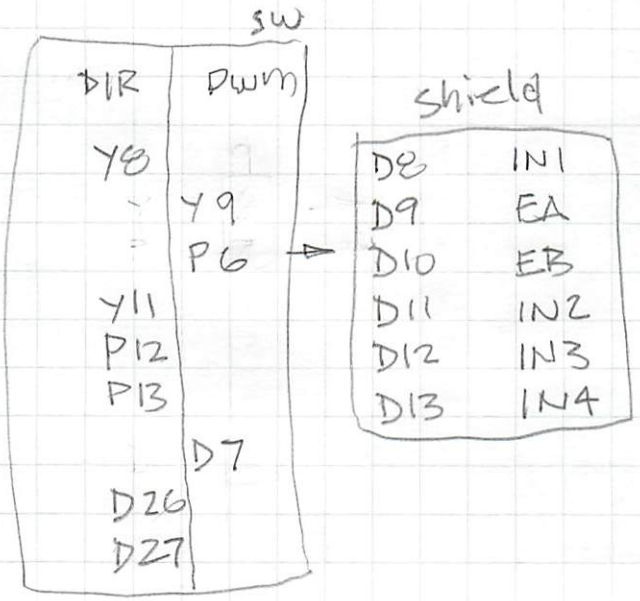
lemo male

1	m+
2	+pot
3	angle
4	-pot
5	m-

~~fan~~	1	tach +	A0
dome	2	m +	
	3	m -	
	4	tach -	GND

Hs channels.
6,7,8,9
X

pwm	8
d+	26
d-	27



tach Dome A0.
vsw A1

wed 26 Jul '17

- [x] webcam test bed for utils
- [ ] what language for utils
- [ ] bode plots
  - [x] sine drive
  - [x] dft
  - [x] gyro filt in/out
  - [x] gyro bandwidth
  - [ ] optimise lead term
  - [ ] current readout.
  - [ ] autofilt

- [x] lens servo amps
- [ ] 422/485 xceiver
- [ ] dc-dc
- [x] frame grabber
- [ ] logic analyzer
- [ ] pc scope
- [ ] band saw
- [ ] drill press
- [ ] tool box
- [ ] flip-flops

- [x] car antiskid problem
- [x] tire pressure
- [x] gas for lawn mower
- [x] info for Georgian Bay
- [x] groceries

sine drive
- [x] GUI
- [x] gen
- [x] analyze

wed 24 Jul '17

- [x] pro mini 3v sa4al
- [ ] cut grass
- [x] power wash deck Pat
- [x] summer tires
- [x] print receipt
- [x] measure torque

Inner axis torque 160 · 31 Volts

yaw

405 g

$4.75 + \frac{(12/16)}{2}$ + 4 + $\frac{6}{8} + \frac{3}{8} = 5\frac{1}{8}$

$+\frac{1}{16} = 5\frac{3}{16}$.

5346 g-cm

(5350) g-cm

pitch

	g		in	cm
nup	283	×	$5\frac{3}{16}$	13.2
ndn	215	×	$6\frac{11}{16}$	17.0

$L = 2\frac{7}{16} + 3\frac{14}{16} + \frac{6}{16}$

$= 6\frac{11}{16}$

3736 nup
3655 ndn
3696 av.
(3700) g-cm

Sun 23 Jul '17

lens drives

	pot	tach	enc	pwm
z	1	1	1	1
i	1		1	1
f	1	1	1	1
ext	1		1	1
filt	1		1	1
lcomp	1	1	1	1

aip 9
enc 9 (18dip). 12 dip.
uart 1.
pwm 6.

	PWM	AIP	DIO
arduino micro	7	12	20-

Sat 22 Jul '17

- [x] log
- [x] cleanup
- [ ] checkin
- [x] backup
- [x] plan
- [x] cleanup II

milestones

2. ☐ shaker 15 μR
4. ☐ flight level horizon
1. ☐ demo, all tuned
3. ☐ truck w/lens control

small P/S
75000 / 1250000 = 6%

APU
46,000 / 360,000 = 13%

46,000 / 170,000 = 27%
APU + filt

49,000 / 230,000 = 21%
5V cap

46,000 / 180,000 = 26%
APU filt
no cap

12.5kHz

10kHz
slew limit
APU
3500 / 420,000
0.6%

10kHz
3200
480000
small PS

16d

- ☐ lens drives
- ☐ console
- ☐ best tuning
- ☐ cine payload

monkey

- ☐ ee
- ☐ console

same

46 21%
232

Pololu 46
320 14%
small PS

APU no filt
46 17%
270

- [x] remove master/slave
- ☐ tune outers
- [x] insert Pololu
- ☐ 5th axis
- ☐ measure torque
- ☐ 5V pro mini
- ☐ shaker
- [x] APU
- ☐ 16bit checksum
- [x] pololu slew limit

- ☐ harden for shaker / road.
- ☐ gyro stats
- ☐ params mgmt
- ☐ utils
- ☐ iPhone console
- ☐ company ID

To buy

- ☐ rs485 hw
- ☐ isolator
- ☐ isolated P/S
- ☐ console hw
- ☐ 5V pro mini

slew 1.5-6 μs, low
0.2-1.45 hi

sat 22 Jul '17

baud register

8 mHz Pro Mini (F_CPU / 4 / baud) - 1 / 2

84 mHz Due (System Core Clock / baud) >> 4

.05

Fri 21 Jul '17

- [x] pro mini programming setup
- [x] try large cap on i2c
- [ ] try master/slave
- [x] try i2c slip ring
- [ ] pro mini
  - [x] i2c wiring
  - [x] ftdi wiring
  - [x] power wiring
  - [x] uart wiring
  - [x] gyro project
  - [x] monkey project - master RX
  - [x] original mpu3050
  - [x] get time usec
  - [x] bode interface
  - [x] indicator pin D8, D9.
  - [x] LED.
  - [x] micros()
  - [x] scope test
  - [x] util vs gyro.
  - [x] win compile
  - [x] checkin svn
  - [x] checksum not working
  - [x] missing frames

A5 SCL grey
A4 SDA white

32 bits.

micros.

2 kHz $\frac{1}{2000} \times 10^6 = 500$ usec.

```
init
  told = micros()
  tnew = t
while
  1
```

500 000 84 MHz. 168.
62500 8 MHz 16

```
tnew = micros() + dT.
while tmicros
diff = micros() - tnew
if diff >= 0
  tnew += dT.
```

```
t=
t+ = t - to
t = micros()
time
```

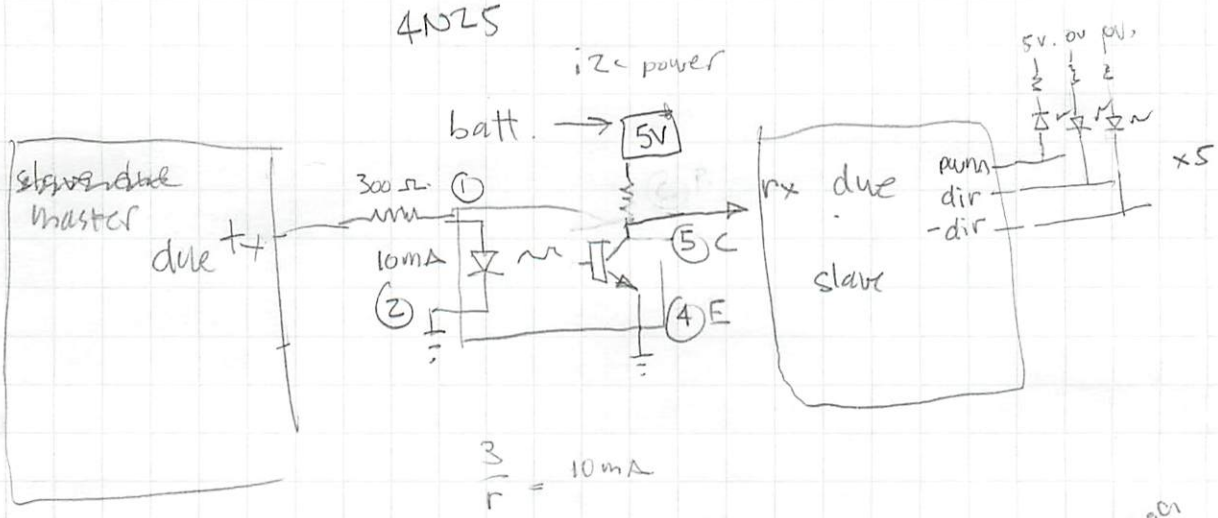
$10 = \left(\frac{8\ MHz}{f} - 16\right)/2$

$20 = \frac{8}{f} - 16$

$36 = \frac{8}{f}$ $f = \frac{8^m}{36}$

20 Jul '17

4N25



$$\frac{3}{r} = 10\,mA$$

$$r = \frac{3 \times 1000}{10} = 300\,\Omega$$

mega proto

23893

20.

adum 5210

~ 19 Jul '17

GIM - J1
- roll pot
- roll motor

RLD - J1
- Yaw pit) motor
- Yaw pit) pot

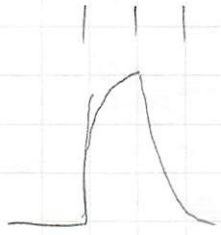
VSW - P1

foot
- fooe good
- foot hung.

- ☐ 3v from pin — source 15mA. — sink 30.5 mW / 3.3 V = 10mA
- ☐ isolated i2c.
- ☐ different imu.
- ☐ opto i2c breakout
- ☐ opto PWM breakout.
- ☐ giant cap.

30 kHz

4n25 — 4µs.



HIIA1
3µs. → 6µs.

250k Baud

150k baud

gyro: header 2
ypr 2×3

250k / 8bytes × 10bits = 3125 Hz. (4n25)

150k / 80bit/s = 1.8kHz (HIIA1)

motors. ~~#5 xavier~~ dir 1
mot 5 → 8bytes.
hdr 2

10 Jul '17

better
paydirt
lode star
true
right
top spin
correct
straight edge
true line.
new wave
top/upper

upstart

a
e
i
o
u

controlled
coordindted cine products

Arri

AeroVis

gyro
gimbal
stabilized

system
lab
group
products
corp.

Point
Steer
Steady
Aim

Mech

Stability Gimbal Corp.
Stability Cine Group.
Gyro Cine

Gyrobotic
Gyro motion
tation

TrueGyro
GyroNorth
GyroStar

Steady

SiTech
silvertech
steertronic
Steaditron

Monkey
Eagle
Crow.
Weasel
Snow Badger

Cine——— Sea Badger

Up Side
Right

- cam

GyCam
Gyro Camera

10 Jul '17

Today

- [x] license plate
- [ ] planning
- [x] $400
- [x] nap
- [x] mom
- [ ] scale for torque test
- [ ] cardigan
- [ ] Maurice gift

mom

- [ ] cardigan ○
- [ ] telepresence
- [ ] p-touch
- [ ] scotia ○
- [ ] audio book ○
- [x] chiropodist ○
- [ ] tax form ○
- [x] $400 ○
- [ ] cash $800

Accurate Gimbal.

a
b
c

factor

azel

GUMD
BDYF

Gim-J1
pitch, yaw mot (4)
pot (4)

sight
eye.

pivot
axis.

c axial

RLD-J1
roll mot (2)
pot (3)

tek
cine

tron
matic
rama
oid

clean shot.

opto

wing-

sight

sure

purist
purity.
Bedrock

level

convergence.

spartan
discreet
sensible.
dead on

right
simple.
tight
sharp.

clean
apt
right.

level
upright
upfront
clear

straight
natural

percept

hawkeye.
keen eye.

focus
boresight

method
delta

Mon 10 Jul '17

- [ ] tune inners ○
- [ ] tune outers ○
- [ ] console
- [ ] lens control
- [ ] connect roll
- [ ] better balance ○
- [ ] measure torque

noise
- [ ] accel lim
- [ ] sync with pwm (?)
- [ ] restart i2c
- [ ] bypass caps
- [ ] pololu slew limit
- [ ] APU
- [ ] pololu amps
- [ ] skip slip ring

120
2
10
32x30
3.00x0.5

- [ ] stem
- [ ] horizon
- [ ] video geo steering

mech (re-install)
- [ ] balance weight - lens comp
- [ ] mount gyro
- [ ] mount Arduino
- [ ] mount servos.
- [ ] DC-DC, power filter
- [ ] heat sink
- [ ] Red / Optimo

elec
- [ ] lens drive wiring
- [ ] 28 - 12 Arduino.
- [ ] noise vs lens.

test
- [ ] shaker
- [ ] truck
- [ ] flight

motor + pot 6×5
- FIZ
- ext
- filt, comp

tach 2×2
- zoom, comp

shutter 3
- slift reg. S1 S2 S3

sw
- [ ] 5axis math
- [ ] lens cal
- [ ] strip chart
- [ ] efficient reads (wire AIP)
- [ ] why stop on bode exit
- [ ] un-hang i2c
- [ ] console

~ 10 Jul '17

chiropodist

Qs FH

(905)

459

3003

320

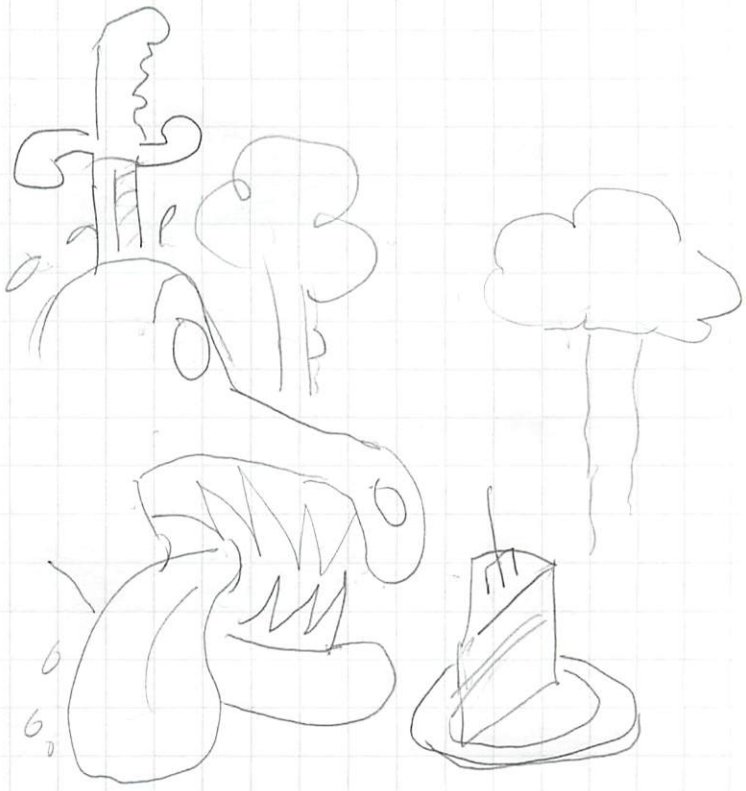
304

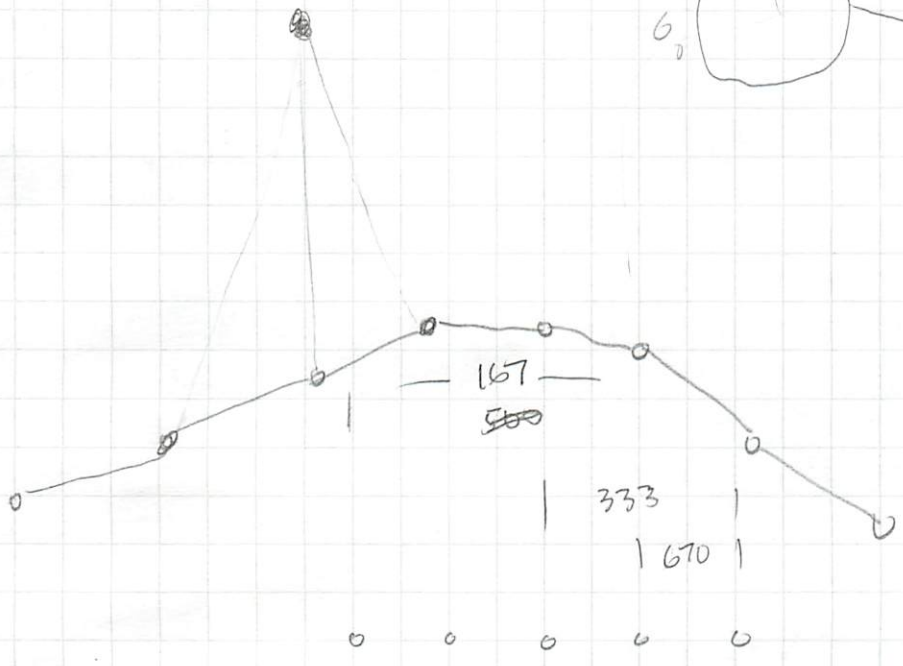
Fri Jul 21

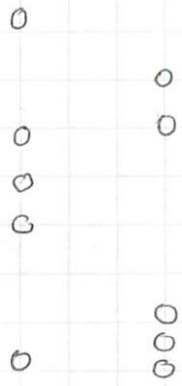
10:20

Sat 8 Jul '17

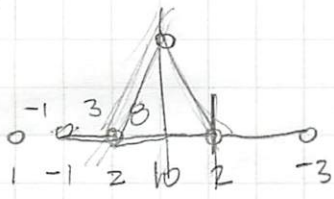
- [ ] bypass caps everywhere
- [ ] 2200 uF
- [x] measure stuff
- [x] 'raw' button



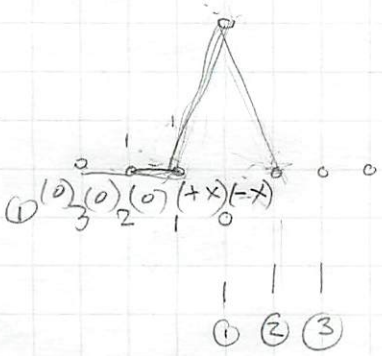


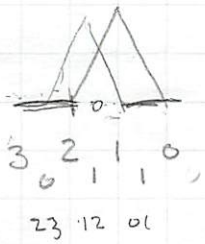


2000/3 670 Hz.



8 JUL 17



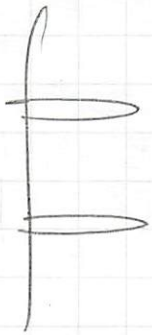


lowest

01 0. ✓

23 0. ✓

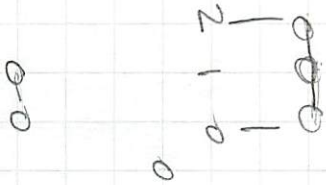
12 1



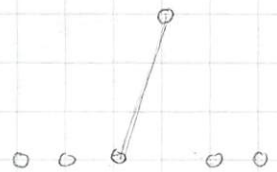
01

12

23



8 JUL '17



1- 3 2 1 0

2- 3 2 1 0

3- 3 2 1 0

				x		
01		12		23		
x					1	01 highest
x	x				0	23 lowest
		x	x		0	

thu 6 Jul '17

- [x] split Due's for noise
- [ ] final axis

- [x] cayal
- [x] MJK call
- [x] groceries
- [x] cut grass
- [x] laundry

Due = AT91 SAM 3x8E

split
- _MASTER
- _SLAVE

to finish the rod
- [ ] connect roll
- [ ] connect console
- [ ] fix i2c drop-outs
- [ ] good tuning
- [ ] rugged build
- [ ] choose amps
- [ ] more torque ?
- [ ] better balance
- [ ] lens control
- [ ] shaker test
- [ ] road test

16MHz
Ard Pro Mini

stdint.h int16_t

18 tx
19 rx

serial 1.

1000
20

Tues 4 Jul '17

- ☐ dip spikes
- ▨ cal inners
- ▨ connect tach yaw
- ▨ connect tach pitch

① wire

estimate 16
- ▨ inner angles
- ☐ uart to slave
- ▨ encoders ×2
- ▨ 3 inner angles
- ▨ tachs ×2
- ☐ console 422
- ☐ noise

saral
- ☐ db44 pins m
- ☐ db44 crimp
- ☐ square pins
- ☐ jumpers.
- ☐ 422 3v.
- ☐

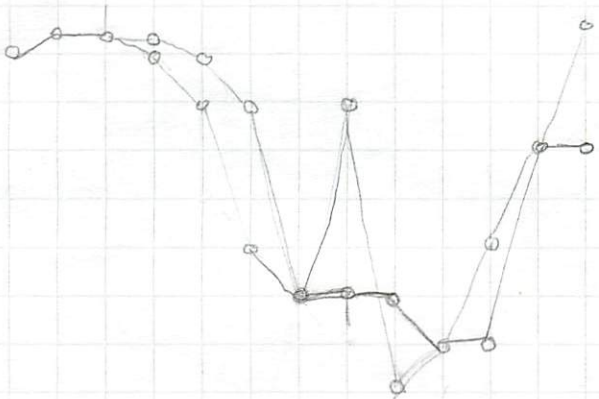
	gyro	enc	pot	tach	mi	mo
Y	▨	▨	▨	▨	▨	▨
P	▨	▨	▨	▨	▨	▨
R	☐		☐	☐	☐	

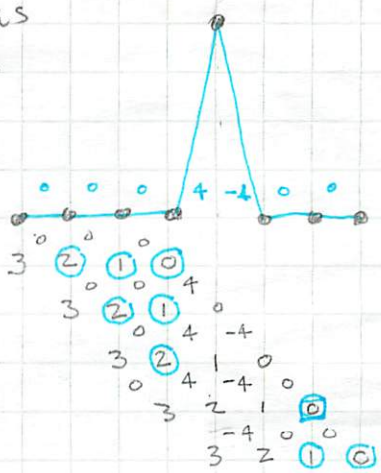
roll	pot	mot
yaw	pot	"
pitch	pot	"
dome	enc, tach	"
vsw	enc, tach	"

vsw tach p11-20
aref p11-25
vsw mot+ p11.9
vsw mot− p11.10

③ sensor
- ☐ zoom
- ☐ focus
- ☐ iris

②





6 Y
7 P
8 dome
9 vsw

19.56

4.05 4'0" 9/16 11'9" −16.16 −10

11-75 9-5 10.3

2-31 2'3" 11/16

r/o
20.3
116.4

yaw $2\tan^{-1}\frac{4.05}{11.75}\times 2$
pit $2\tan^{-1}\frac{2.31}{11.75}\times 2$

meas.
19.55
11.22

30.9
86.8
116.4
11.23
20.3

neo

Wed 5 Jul '17

encoder	33	in P13.9	A dom
	34	in P13.10	B
	35 / 50 C.13	in P13.8	I
	36	in P11.3	A vsw
	37	in P11.2	B
	38 / 51 C.12	in P11.1	I
	(39)	in	
	(40)	in	
	(41)	in	

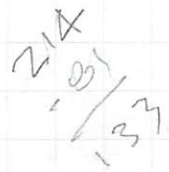
	PWM	DIR	DIR
motor -	6 y	22	23
	7 p	24	25
	8 dome	26	27
	9 vsw	28	29

12 scope out.
13 scope out.

tach	A8	P13.2
	A9	P11.20

90

P11.9 vsw
P11.10



1 header
5 pwm
1 dirs
1 tail
8 × 10 bits @ 3600 = 288000

_MASTER 500,000 baud.
_SLAVE 1000 000

16 D

mon 3 Jul '17

Joystick

org	POT+	3v3		
Grn	POT-	GND		
Blu	POT1	~~A2~~	A3	yaw
Wht	POT2	~~A3~~	A2	pit
Blk	S1	~~D2~~	D3	autonull
Brn	S2	~~D3~~	D2	standby

Angle

A6	P12.9
A7	P12.10

PID ~~pwm/D1/D2~~

Yaw	6, 12, 13	old
Pit	~~9, & 11~~	

tunings

pG	iG	f1	f2/f1	notch
55	1.0	32	30	—
100	2.0	32	30	270 2

pcb17. 80Khz

□ jitter with no joystick
new pan tunings
→ 25 .6 32 30

P12

9, 10	YAW, PIT POS	pots
22, 23	5V, DREF	encoders

P11

9, 10	YSW	+/-	mot
1, 2, 3	VSW	1, B, A	enc
15, 16	YAW	-/+	mot
17, 18	PIT	-/+	mot
23, ~~25~~, 26	-15, ~~DREF~~, +15		pots
20, 25	VSW	tach/aref	tach

P13 dome

1, 2	AGND, tach
4, 6	mot -/+
8, 9, 10	enc I/A, B
11, 12	enc 5V, GND

Sun 2 Jul '17

- [x] balance weight
- [ ] encoder D35 pin issue
- [ ] tuning
- [ ] i2c
- [ ] new s/A vs noise
- [ ] 29 Jun list
- [x] setup 16 breadboard
- [x] solve i2c hang
- [ ] send 3.3V into ±15
- [ ] read the tachs
- [x] roll gyro
- [ ]

		motor	pos	rate
inner	Y	dir	pot	gyro x
	P	dir	pot	gyro y
	R	dir	pot	gyro z
outer	D	gear	encoder, tach	
	V	gear	encoder, tach	

signal — pins
jumpers

sat 1 Jul '17

- [x] example of read port reg
- [x] count logic
- [x] measure timing 3-5 µs. $\frac{5}{10^6}$ $\frac{10\times10^3}{}$ = 5% @ 10kHz
- [x] go to 10kHz
- [ ] polled i2c 500×10^{-6}
- [x] test in 16
- [ ] why pin 35 not working.
- [x] backup

pwm ~~x~~ portc
error count
jit ~~xxxxx~~ count + kdeg
drive drive
indexed by

360

0 - 20479

$512\times10\times4 = 20480$

$200° = \frac{200}{360}\times20480 = 11.4\,kHz$

$10kHz = 175°$

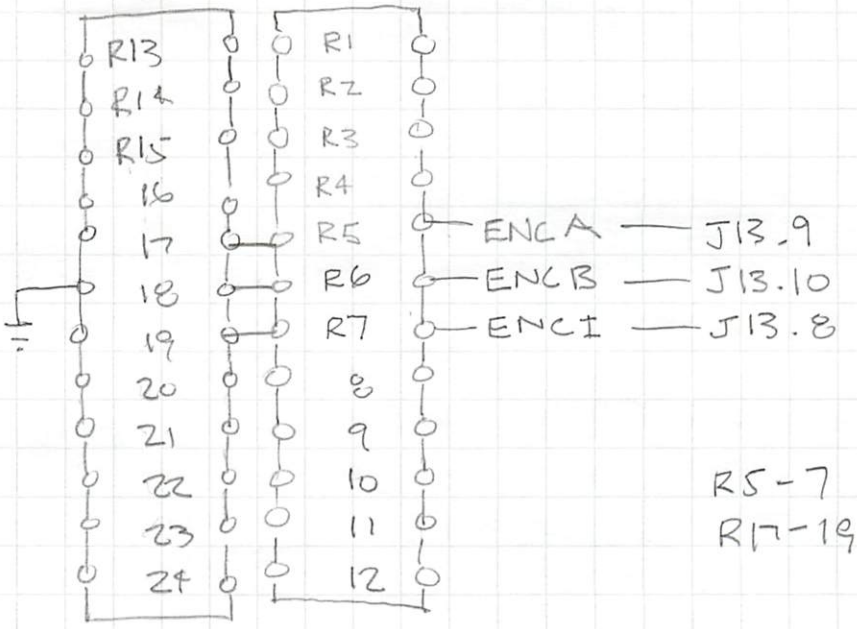
Encoders

fri 30 Jun '17

- logic
- what register
- interrupt
- resistors

16

	A	B	X	Port	bit	
dome	33	34	35	1	2	3 ← little demo
vs w	36	37	38	4	5	6
spare	39	40	41	7	8	9



R5-7 10K
R17-19 10K

30 Jun '17

Subject: Proposed milestones
From: Mike Vellekoop <mvellekoop@cogeco.ca>
Date: 27/06/2017 5:28 PM
To: Grant Bieman <grant@methodicalmonkey.com>, David Fordham <david@methodicalmonkey.com>

After a brief chat with Dave, it seems like time for a Taco event. On the agenda:

xometry online, aim +2 S3 Ben

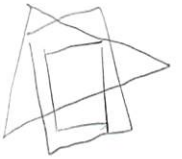
Proposed milestones

- 16D flight test in 4-5 weeks, including level horizon solution
- MonkeyGim proto/first unit built in 8-10 weeks. Console can be later.

The trickiest part of the MonkeyGim involves the payload.

- Catch-22 about funding the camera - maybe Uwe can help
- What payloads exactly to design for
- How to size the inner drives
- Many details about camera mount, lens mount, operator convenience, balance...

System issues ongoing



Pat cineflex, based here Truck Mount.

- Vertical reference
- Stabilization performance
- Encoder counting
- Gyro selection
- Power/signal noise/ripple/thermal

Business structure and funding

- Uwe in/out in
- Can we bootstrap the first unit: friendly customer orders on spec, pays half up front, CFE camera
- Can we self fund the first unit: use a dummy camera till we get an order
- Or do we need investment
- Look into incubator and government resources
- Funding for SolidWorks

$15K

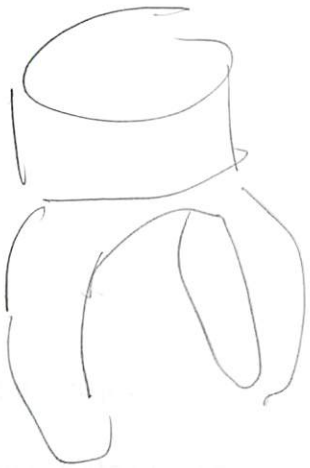
solid works Tibi?

3cam 3lens

T-7 Nathan

$11K.
$2K lab.
$3K flight.

truck.



Black Magic

Cine rentable
- red
  - epic
  - weapon
- alexa mini

F12
extender
back focus

Eng
- Panasonic 4K
  - Eng style.
  - single block
  - $20 - 30k

Sony F55
- GSS has it
- more like Cine.
- Ikegami - split

"Face in the hoodman"

feel for switches.

dvi → hdmi
what about latency.

Eng
Fuji 42x HD only maybe. not 4K

Cine
Canon 30-300
Optimo 25-250

Large Cine
Fujinon

30 Jun '17

Subject: Project status
From: Mike Vellekoop <mike@methodicalmonkey.com>
Date: 25/06/2017 12:17 AM
To: David Fordham <david@methodicalmonkey.com>, Grant Bieman <grant@methodicalmonkey.com>

Here's a list of systems items. To date I have taken certain high risk items down to M or L by bench testing. We're quite good on the concept-complete now.

	Concept Complete	Bench Tested	Project Risk
Stabilization quality	Y	Y	M
Gyro type	Y	Y	M
Horizon solution	Y		M
Servo amp type	Y	Y	L
Motor type - inner YP	Y	Y	L
Motor type - inner R	Y		L
Motor type - outer YP	Y		L
CPU type - gimbal	Y	Y	L
CPU type - lens	Y		L
CPU type - console	Y		L
Joystick type	Y		L
Video Overlay			L
No-slipring Operation	Y		L
Geo Solution			
PWM ripple current			L
Power filter, i2c fails			L
Analog, PWM and Digital IO	Y	Y	L
Encoder IO	Y		L
SW steering and stabilization	Y	Y	L
SW outer drive with encoder and tach	Y		L
SW lens control	Y		L
SW 5-axis math	Y		L
SW console	Y		L
SW i2c reduce CPU usage			L
Processor IO expansion if needed			L
Vibe test	Y		L
SW Utility interface	Y	Y	L
SW operating system	Y	Y	L

30
15
33 -
2
3
$83

hellbot gen6 ... bitch

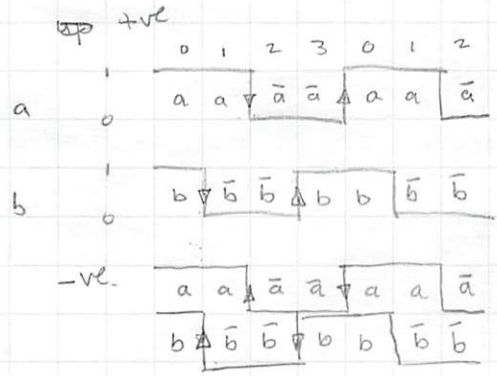
fri 30 Jun '17

- [x] encoder
- [ ] tuning
- [ ] i2c
- [ ] new s/a

16db

- [ ] encoder
- [ ] tuning
- [ ] i2c
- [ ] noise, ripple
- [ ] console
- [ ] lens
- [ ] tach loop
- [ ] math
- [ ] balance

c++ logical not ~
and &
or |
xor ^



+1 = (a.dn)·(b̄) || (a.up)·b ||
(b.dn)(a) || (b.up)·ā

-1 = (a.up)(b̄) || (a.dn)(b) ||
b.up (a) || (b.dn) ā

+1 ā b̄ || a·b || b̄a || bā
-1 a b̄ || ā b || ba || b̄ā

(a.up)·(b.)
(b.up)·(ā)

a	b	
0	0	+
0	1	-
1	0	
1	1	

if a^aold sign = a^b
if b^bold sign = ā^b̄

```
if ((reg^rego)·AMASK)
    inc=(((reg)^(reg<<1))·AMASK)?(1):(-1)
else if·((          ])·BMASK)
    inc=(                    )?( ):( );
```

ab		
00	1	0
01	0	1
10	0	1
11	1	0

c e a E

e A E C

e	0100
A	0110
E	0111
c	1010

0264

0000
0010
0110
0100

thu 29 Jun '17

- [x] mpu 6050 @ Sayal
- [x] jumpers @ sayal
- [ ] wire @ sayal
- [ ] dremel
- [ ] servo amps - new vs noise
- [ ] lens drives
- [ ] test vRef vs pot/encoder
- [ ] tune inners: step, bode, open, shake, sine
- [ ] new gyro vs I2C vs weecam
- [ ] SERCOM i2c
- [ ] PID accel term kd
- [ ] params mgmt
- [ ] backup
- [x] extension cable imu
- [ ] weecam: cal angles
- [ ] : mount imu
- [ ] : scale velocity
- [ ] visual nav.

- [x] license plate (sharpie)
- [ ] 6 mom things (see 25th)
- [ ] mike S
- [ ] coat, AHPx - steve.

2. MinIMU-9 v5
400kHz LSM6DS33 imu
400kHz LIS3MDL ~~compass~~
I2C

1b. OseOp ACCEL 02 ADXL345 acc

1a. oSepp "Gyroscope Sensor Module" MPU3050 gyro

3. osepp "Acc + Gyro Breakout" MPU6050 imu

installed on
Pi 2 / Arduino
'Processing'
adxl345 python (logger)
off_button.py

Pi 1 minIMU
python vis

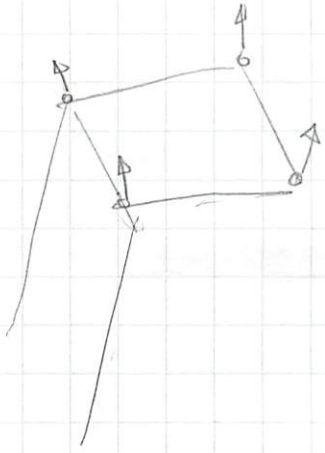
i2c 'fast' 400kHz
40 kHz/byte
40 kHz interrupt?

1e, 6b.

2-4

29 Jun '17

camera flies
lens distorts.
fixed major geometry: buildings
landscape.
roads



tue 27 Jun '17

- [x] pololu
- [ ] turn on weecam
- [ ] itunes / photos
- [x] answer mjv
- [x] try imu
- [x] try GPS

- [x] link2
- [x] link1
- [x] how to connect
- [x] attach connectors

- [ ] 6 mom things
- [x] cut grass

6 ~~3~~ 3 3
9 D S O
~~6 D S 3 3~~

LSM6DS33 imu ST-com
LIS3MDL compass ST-com

Pi
1 3V3
3 data
5 clock
6 gnd

mon 26 Jun '17

- [x] GRB wiring Q

- [x] groceries
- [ ] cardigan mom
- [ ] telepresence mom
- [x] call mom
- [x] deposit cheque mom
- [ ] scotia mom
- [ ] audio book mom
- [x] pat deck schedule
- [x] Troupe
- [x] pay Cogeco bill
- [x] get RBC report
- [x] nap
- [x] cut grass

25 Jun '17

- [x] Pololu order shaker
- [x] imu
- [ ] alternate amps

16 d

- [x] count encoder
- [x] wire gyro
- [ ] balance

wee cam

- [ ] hot tuning - auto?
  - bode
  - shake
  - compensator
  - step

nav

- [ ] 2x GPS
- [ ]

24 Jun '17

- [ ] buy vert ref ...
- [ ] or go open source

So far	solid concept	sensibility test
[ ] stabilization	[x]	[x]
[ ] gyro	[x]	[x]
[ ] horizon	[x]	[ ]
[ ] servo amp	[x]	[x]
[ ] lells drives	[x]	[ ]
[ ] open-source cpu	[x]	[x]
[ ] video routing	[ ]	
[ ] console e.	[ ]	
[ ] encoder	[ ]	[ ]
[ ] motors inner		
[ ] motors outer		

even lower	lowend	standard	upgrade
		30 μRad	
	none-	level horizon	Geo
		~~isolator~~	isolator
	none. hc	console	
		150°/sec	
		1.8 turns	slip ring

Today

23 Jun '17

- [x] backup
- [x] discuss level horizon
- [ ] 16 'small' cable test

Weecam

- [ ] bode step
- [ ] i2c code improvement
- [ ] i2c un-hang
- [ ] i2c kill servo on fail
- [ ] power noise
- [ ] outer drive
- [x] position r/o.

- [ ] gyro shopping
- [ ] INS shopping
- [ ] servo amp shopping

16d

- [ ] encoder
- [x] pololu
- [x] heds 5540 - ~~I006~~ I016 = 512 cpr 8:1

$200°/s \times 4 \times \frac{512}{360°} \times 8 = 9102$ hz.

mti-20.

- [x] mom cash
- [x] pat deck
- [x] harry movie.
- [ ] mike S

Today

22 Jun '17

- [x] concept for i2c
- [x] why 1ms - ser usb read
- [x] fastest i2c: 2kHz
- [x] i2c glitch restart vs Pololu
- [ ] i2c glitch count ✓
- [x] discuss level horizon
- [x] discuss pololu glitch
- [ ] animate accelerometer
- [x] timer concept
- [x] commit
- [x] coffee break

weecam

- [x] pitch js invert, biased
- [x] no trim pots.
- [x] new gyro always.
- [x] no-wait for i2c.

Level Horizon

- [ ] d/s - clinos, crap.
- [ ] cineflex - nothing.
- [ ] GSS - good horizon

50 µR 16dB / cineflex
5 µR

```
loop() {
if (2kHz) {
    if i2cbytes == 6
        ~~pids~~. request 6 bytes
    ~~else~~ doPid                    1200
    else if i2cbytes = 1              3800
        request 6 bytes.
    else request 1 byte.
    }
  joystick etc.
}
host comms.
}
```

100, 0, 10× ~~100~~ 40

669×5
32×20

21 Jun '17

- [x] wire pi, accel, console
- [x] schem osepp proto 01
- [ ] proto leds
- [x] logger
  - [x] how much disk space 7.9G
  - [x] millisec timer
  - [x] " timestamp
  - [x] auto launch
  - [x] binary? no.
  - [x] python?
  - [x] off button
  - [x] label leads

Hw	BCM2835	
~~ser~~	a22082	rev.
ser	32a2217	

- [x] how to loop
- [x] how to format date into filename:

1434

19 Jun '17

- [x] backup
- [ ] SERCOM I2C
- [ ] accel logger
- [x] order amps.

- [x] logger - choose lang.

- [x] update / upgrade
- [x] VNC
- [x] filezilla
- [x] install Arduino
- [x] install Processing
- [x] install IceWease1

Packing

- [x] monitor / ps / cable.
- [x] mouse / kb / dongle
- [x] Pi / acc / FTDI / power
- [x] Batt pack
- [ ] USB cables.
- [x] iPhone!
- [x] glasses

- [ ] doc
- [x] address of facility.
- [ ] ch3rrYZ

192.168.0.130

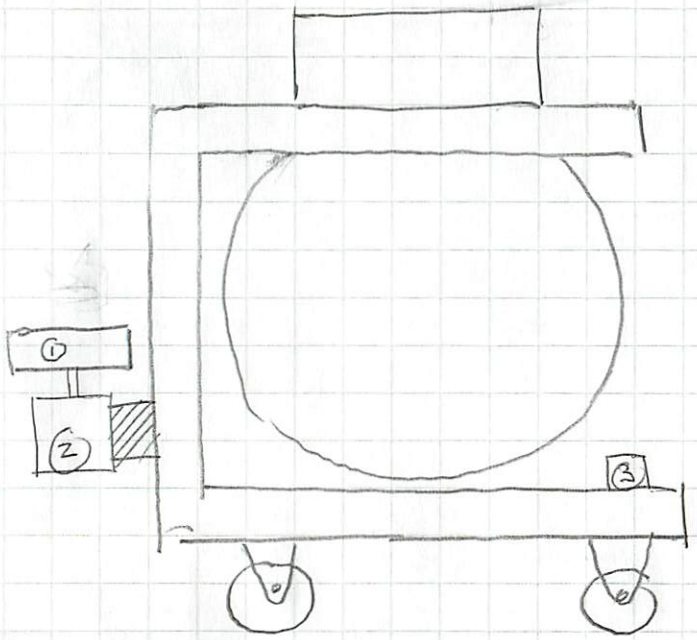
Sayal

- [x] USB debug cable.
- [x] connectors / cables?
- [ ] sticky / mech
- [x] test pins / socket style.

pololu
mike@mm.com
1slick33.

- [ ] raw data for visual nav.

- [x] try ser cable
- [ ] weecam new servo
- [ ] accel logger
- [ ] battery life & PM start



1. Lens comp, battery, Raspberry Pi
2. Big motor, speedcontrol, computer controlled
3. Accelerometer

18 Jun '17

17 Jun '17

- [x] pinouts → GRB
- [x] HS I2C gyro 400m
- [x] scaled xfer buffer
- [ ] digikey gyros.
- [ ] 3600 I2C gyro.
- [ ] PID lead
- [ ] autotune.
- [x] shaker table.
- [ ] why needs Bode?

- [ ] 422 console
- [ ] 422 HC
- [ ] nintendo
- [ ] encoder read
- [ ] vertical reference
- [ ] new utils
- [ ] params mgmt.
- [ ]

- [x] what gyro Invensense MPU3050
- [x] mount gyro
- [x] connect gyro
- [x] reassemble Due.
- [x] run gyro!

x - pit
y - rol
z - yaw.

17 Jun '17

b or HB.

$512 \times 10 \times 4 \ \frac{\text{pulse}}{\text{rev}} \times \frac{\text{rev}}{360 \text{ deg}} \times 200 \ \frac{\text{deg}}{\text{sec}}$

12 bits + cs.

3600 Hz.

400k
12k quad. 16mHz instructions

$\frac{16 \text{ mHz}}{400 \text{ kHz}} \quad \frac{16000}{400} = 40$ instr,

$\frac{16000}{100} = 160$ instr.

100 kHz

13 Jun '17

- [x] try I2C gyro
- [x] encoder I/F
- [ ] shop gyros
- [ ] try 400k I2C

- [x] write Andrew bday
- [x] Maurice & Angela

ATtiny85
AVRdude or Arduino IDE
has USI

find / -name Wire.h 2>/dev/null

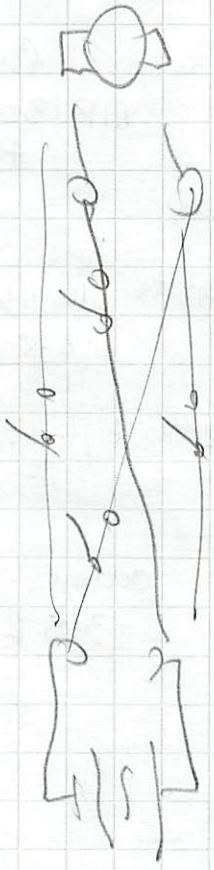
MPU3050
400 kHz I2C fast mode.

10 bytes 100 bits 10 µs/bit, 1 ms/read 1000 Hz.
2.5 µs/bit. 250 µs read.

3x2=6 bytes, 4000 Hz.

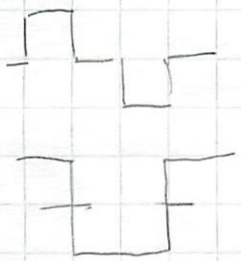
300 ms.
3.5 kHz

- [ ] horizon solutions
  - visual
  - external nav
  - how does GSS do it



12 Jun '17

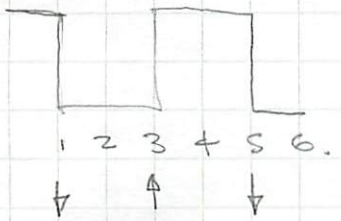
- [x] Paul call
- [x] Mom pTouch fail
  - 100 0-1 32×20
  - 200 0-1 2×10
- [x] jitter calc
- [ ] sine backdrive
- [ ] save file
- [x] float range on 16bit xfer buffer
- [ ] step response.



1024

3600/6.

integrated Error += N · dt × 92R
1024 samples of iE.
remove mean



deg
3600

Tues

- [x] power bar
- [x] coke
- [x] magnifier
- [x] servo amp
- [x] green tape
- [x] foam tape
- [x] snacks
- [x] vacuum ups
- [x] vacuum dns
- [x] laundry
- [x] wipes
- [x] fridge
- [ ] kit floor
- [x] driveway
- [x] deck
- [ ] car

A

11 Jun '17

- [x] shade thermostat
- [x] shower
- [x] A/C on
- [x] laundry
- [x] vacuum
- [x] tape up desk lamp
- [x] charge Kobo
- [x] 5km
- [x] make coffee
- [x] big picture:
- [x] get cool
- [x] get $400
- [x] revenge of the ironing room

wcc cam

- [x] drift pot code
- [x] connect motors
- [x] connect angles

big picture

qualitative steering

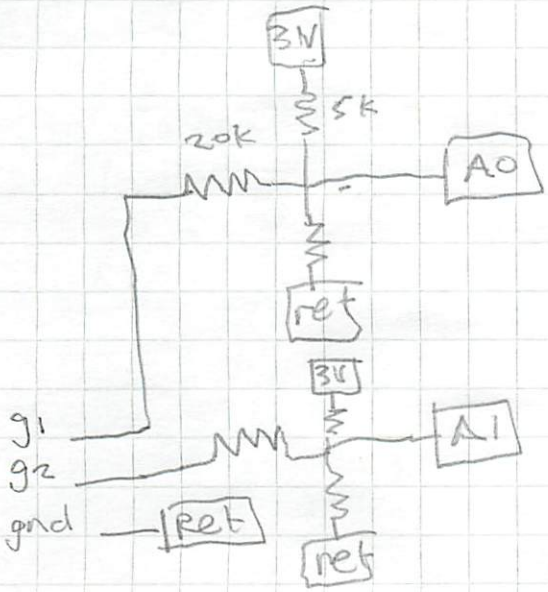
- [x] status → mm.com
- [x] console discussion

wii-cam

10 Jan '17

1 us = 1 MHz

16 MHz =



32 bits:

0x00

0x01

A B Z

Start Dup Ddown, Dleft, Dright

0,

∫∫∫

delay ms.

4+32×3 =

js

org	1	+3	+3
grn	2	0	ret
blu	3	js1	A2
wht	4	js2	A3
brn	5	s1	D2
blk	6	s2	D3

ret

Ret

trim

red	+3	+3
blk	ret	ret
grn	yaw	A4
yel	pit	A5

400 kHz (fast mode)

10 Jun 17

- [ ] ip address 192.168.0.170
- [ ] password ch3rry

	pwm	d1	d2
10	6	12	13
	9	8	11

y 1 gyro
p 0
y 3 js
p 2
y 4 angle.
p 5

2 autonull
3 standby.

2 Jun '17

big picture

- [ ] try steering - trim pots?
- [ ] yaw limit
- [ ] outer drive
- [x] verify ripple.
- [x] scale angles

- [ ] arduino due = good for gimbal.
- [ ] cheap amps = "
- [x] inv buys 5-axis desktop - NO
- [ ] electronic Bom
- [ ] anti drift: open cv?
- [ ] drift characterization

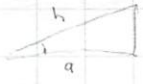
l	8'0	3/8
m	7'8	15/16
r	7'10"	1/2
m	7'9	5/16
l	8'0	1/4
	39 3/4.	

- [x] ripple: insert sense resistor.
  - [x] scope it
  - [x] cal it

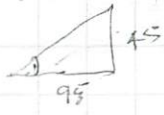
v41 - utils.

R -.15 +.61
-.17 -.67

Level .01
vert -.17 .50
0.51



42 1/4



pico 69310

J2+4
1-(2+4)-3
.15 mH

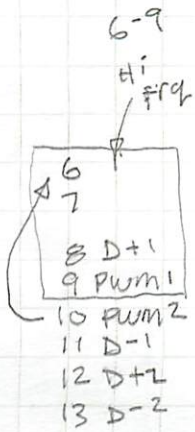
7 Jun '07

- [x] analogres = 12 (was 10)
- [x] display gains for pitch.
- [x] yaw pot : plot selector
- [x] kills ilim
- [x] always refresh pitch?
- [x] pitch <=> yaw swap
- [x] yaw feels very different
- [ ] try big frame.
- [x] doesn't draw pitch filters
- [x] add a feature
- [x] cut the grass!
- [x] integrate command check/parse.
- [x] fix plot Axis select
- [x] backup
- [x] checkin
- [x] enable buttons
- [x] why no workee
- [x] workee! commit & backup

features

- [x] standby button
- [x] plot selector
- [ ] js autonull separate.
- [ ] readouts
- [ ] strip chart.
- [ ] step response
- [ ] sine drive.
- [ ] bode plot.
- [ ] trim knob.

- [ ] outer axes
- [ ] lens cal
- [ ] trim knob.



- [ ] table for 16" gimbal
- [ ] clean up work room

4 Jun '17

- [x] frame for tunings
- [x] V.S. editor
- [x] solve missing frames
- [x] intellisense vs arduino
- [x] no PWM
- [x] params xfer up
- [x] nap.
- [x] SVN
- [x] filter up xfr
- [x] par dn xfr.
- [x] display filt par
- [x] display filt lines.
- [x] correct zero for redline
- [x] groceries
- [x] send filt par axis, filt.
- [x] send pid par axis
- [x] get standby
- [x] send standby
- [x] send tune axis.
- [x] backup.
- [x] merge g···.h
- [x] par msgs defined
- [x] how to send par.-
- [x] email monkeys: status
- [x] monkey win compile

- [x] 06 → SVN
- [ ]

f1
2^4
$5+2^2$
$5+2^2+3^4$
$5+10(14)$
$4+10(14)$
140

16 + 2 pid
10 + 10 filt
0/41

100 msec

$\frac{115200}{10} \times \frac{100}{1000} = 1152$ bytes.

250 samples / frame.
2500 S/sec

71 ms

send $\frac{260 \times 2 \times 10}{115200} = 45$ ms $= 22.3$ Hz.

fill $\frac{260}{3600} = 72$ ms. $= 13.8$ Hz.

2048

oldest.

1 Jun '17

- [x] milestone cleanup
- [x] pick shield : most amps
- [x] 30 kHz

seed 15V, 2A

- [x] find BlacX
- [x] get Bode.
- [x] copy PV.→ F:

500k baud
3600 Hz.

$\frac{500{,}000}{10 \times 3600} = \frac{500}{36} = 13.88$

$\frac{115.200}{36} = 3.2.$

Joystick

Org	pot H
Grn	ret
Blu	pot w. 1.
Wht	" w 2
Blk	S1
Brn	S2

.1 msec = a/p read.

277.

2KHz: 500 usec.

5.2×20 usec = 104 usec.

32bit Due

zero 2018
101 2013

Due.

1 Jun '17

bode frame 1 kbyte samples:

filter code.

tunings: 4 filt × 2 chan × 4 bytes float = 4 bytes
4 PID "

mark	2
cmd	2
data	
sum	2

standby pot × 2
autonull

160 - 180

1.36 = 1
1 N-m = .738 ft lb.

10 lbs @ 7.5 in =
12 × 4 × .738

700 oz-in
58.6 ft-lb.
43 in-lb.

1 in-lb = .113 Nm
8.85 in-lb = 1 Nm.

$10 \times \frac{7.5 \text{ in}}{8.85} \times \frac{\text{Nm}}{\text{in-lb}} \times \frac{1}{4} = 2.1 \text{ Nm}$

(2)

2 Nm

100 deg/s =
16 rpm
72°/sec

21 May '17

- [x] check tax info $144
- [x] garage trim
- [ ] book club
- [ ] art synector
- [x] ~~call tax guys~~.
- [x] ICV present

August Wilson 28th May.

Fences - 'watch online'

The Piano Lesson

Joe Turner's Come & Gone

Seven Guitars

Testimonies

Jitney

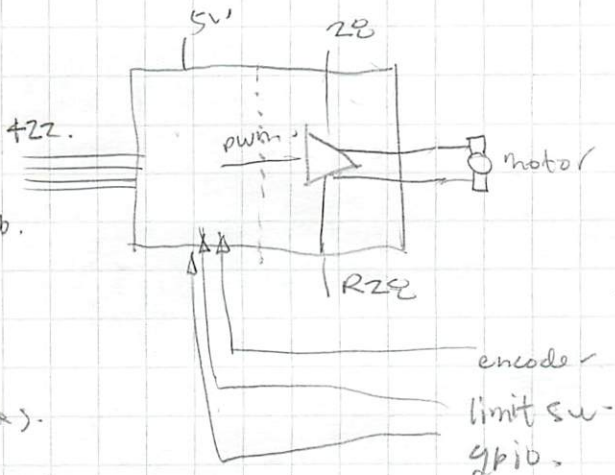
synector

Gimbal.

5 drives.

3 encoders.
3 tach

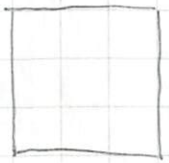
Lens.
3 drives
3 encoders
3 tach/encoder.

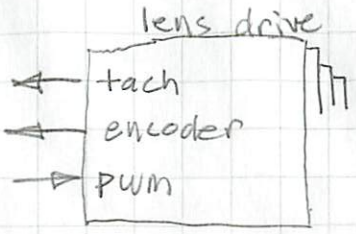


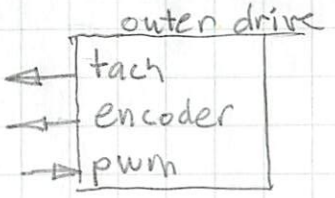
1 mb.
2 protocol
4 drive.
4 vel.
4 pos.
4 discrete.
4.
18. = .65 m.

6 axis.
3 lenses.
3 lens.

5 axes
1 spare
3 Lens
3 spare







outer gyro
inner gyro
cap sensor

Linux

disk df -h /root
resize window (etc) Alt-space
sudo apt-get install (name) update, upgrade

creuform

State.

Mon 22 May '17

$$x_k = Ax_{k-1} + Bu_k + w_k$$

$$\begin{bmatrix} 1 & 0 & 0 & \Delta T & 0 & 0 \\ 0 & 1 & 0 & 0 & \Delta T & 0 \\ 0 & 0 & 1 & 0 & 0 & \Delta T \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \\ \dot{x} \\ \dot{y} \\ \dot{z} \end{bmatrix} + \begin{bmatrix} \frac{1}{2}\Delta T^2 & 0 & 0 \\ 0 & \frac{1}{2}\Delta T^2 & 0 \\ 0 & 0 & \frac{1}{2}\Delta T^2 \\ \Delta T & 0 & 0 \\ 0 & \Delta T & 0 \\ 0 & 0 & \Delta T \end{bmatrix} \begin{bmatrix} a_x \\ a_y \\ a_z \end{bmatrix}$$

$[6\times 6][6\times 1] \rightarrow [6\times 1] \quad [6\times 3][3\times 1] \rightarrow [6\times 1]$

$$\begin{bmatrix} 0 & 0 & 0 \\ 1 & 1 & 1 \\ 2 & 2 & 2 \\ 3 & 3 & 3 \\ 4 & 4 & 4 \\ 5 & 5 & 5 \end{bmatrix} \quad \begin{matrix} 012 \\ 345 \end{matrix} \quad \begin{matrix} 012 \\ 345 \end{matrix} \quad \begin{matrix} 012 \\ 345 \end{matrix} \qquad \begin{bmatrix} 0 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \end{bmatrix}$$

192.168.0.170

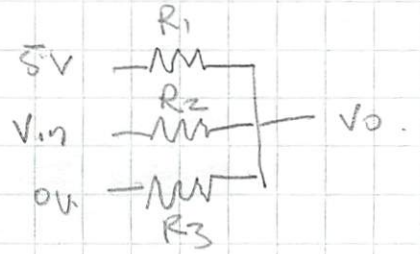
n pi
p. raspberry

sudo raspi-config.

I/F opt vnc yes
ssh yes.

May '17

$$V_o = \frac{\frac{V_1}{R_1} + \frac{V_2}{R_2} + \frac{V_3}{R_3}}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$$



$R_2 = 10K$

$$den = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$V_o = \frac{\frac{0}{R_3} + \frac{5}{R_1} + \frac{Vin}{10K}}{den}$$

$$5 = \left(\frac{5}{R_1} + \frac{12}{10K}\right) / den$$

$$0 = \frac{5}{R_1} + \frac{-12}{10K} / den$$

$$R_1 = 10K \times \frac{5}{12}$$

900 Hz.

100 uF

$10 \times 10^{3} \times 100 \times 10^{-6} = 1$ sec

.0001 uF

$10^{-6} \times 10 \times 10^{-4} \times 10 \times 10^{-3} <$

$10^{-6} \times 10^{-4} \times 10^{4} = 1\mu s.$

100 nF

$100 \times 10^{-9} \times 10^{4} = 10^{-3}$

13 May '17

- [ ] Jo art synector
- [x] Katya text
- [x] GSP Jarre.
- [x] mom cash
- [x] evaluate processors
- [x] scope

- [ ]

Con
joystick
gyro — SPI / 422
encoders — pulse
cap sensors. — ADC.
servo amp — PWM
gps.

logging.
navigation

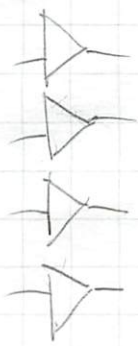
console.
joystick
buttons.
gui

5axis.

485
422 10 mBits/sec.
1 mbyte/sec.
277 bytes @ 3600 Hz.

USB. 2 480 mbits/sec

opto



ssg. encoder / pwm.

encoder RS422.
drive.

opto pwm → HBridge.

(iPhone day 1) 19 Apr '17

annual

$30/mo	35 × 12	400	present	
$35	40 × 12	480	min data.	600
$40	46 × 12	550	min iphone plan.	360
		$150		

$33.90. 400

nano sim.

27 mar '16

day

sleep	4 - 10	
chores	0 - 2	vacuum, tax, laundry, shopping, yard
meditate	1 - 1	'morning page'
plan	0 - 1	
walk	1	5km, 7min
project 1	8	
project 2	2	
project 3	2	
outing	0 - 16.	visit / tour
tv / surf / book	0 - 16	
holiday	0 - 24	

robot swarm
visual nav
sim 2

project types

product / product range
product enable - tool / skill
learning for its own sake - philosophical / geek / general

awareness
explore / research market / technology

pv labs. sim / util / nav
work of art / craft
~~craft~~

categories
tech
art
craft.
humanity

make yard bot
- open cv
- webcam

make a program
concept
tools / skills

make a cartoon
3d 2d aid
trace paper rint
clay char

make a tune
- learn theory
- install FZZ
- review old tunes
- make patch
- just do it

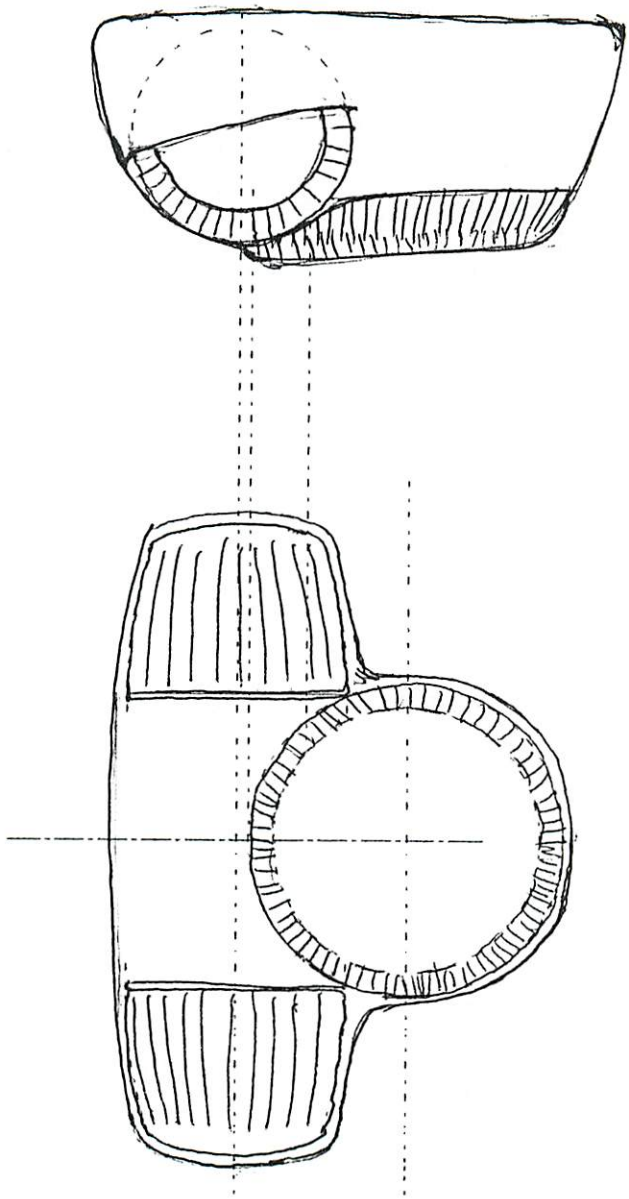
write a story
just write
take class

make a pic
draw it on paper
learn Gimp
learn Inkscape
make mikeSys

make a 3d thing
learn Blender
make mikeSys.
sculpt it with clay / paper, wire

make a tool
kinect / projector

21 Feb 99



Mar '16

the future! and i'm alive
wonders roll on
now i am 55
get off my lawn

and
the future! ~~and~~ i'm alive
~~to be~~ wonders roll on
~~that~~ now ~~that~~ i'm 55
~~so just~~ get off my lawn

1957
1961

the future! i'm alive
as the wonders roll on
now i am 55

2016
1961
55

its too late

3 the future!
3 i'm alive
6 as new wonders roll on
3 i just turned
3 55
6 ~~would you~~ get off my lawn
sorry
you kids

little zooks

2016! to be alive
as the future rolls on
i ~~just~~ turned 55
~~so~~ get off of my lawn

its 2016
we're living in the future
kids these days
get off my lawn

2016! to be alive
as the future rolls on
now i am 55
get off my lawn

the future time

now i am [55]
so get off my [lawn]

---- - -|-
2016! i'm alive
as the future rolls on
i just turned 55
so get off my lawn

the future is [on]
what a time to be [alive]

its 2016
the bright future rolls on
i wish that teen
would get off my lawn

2016! to be alive
as the future ~~comes~~ rolls on
now i have turned 55
so get off of my lawn

Judy Merchant LHIN

905
795
0040
7467

Sara
3241
FM 1ST Floor.
nurse.
fall yesterday.

~~Westbury~~ Wenleigh | short stay (1 of them has) CCAC.

2 months. (can't estimate).