

28-August-2020

Sending MERMAID shallower

500 m: P016, P019

750 m: P013, P020

1000 m: P017, P021

1250 m: P018, P022

SENDING P-016 to 500m

cmd edited or server

28-August-2020

First test: Send P016 to 500m

- keeps told due the sum length requires adjusting acquisition time

Q: Before I do this, does P016 seem to be doing well?

Last .vit entry 2020-08-25T07:00:33

Pres: 99mbar (range 20mbar) → external pressure \leq 300mbar
Expected value

Print: 7,9022 Pa → initial vacuum $< 9,000$

These are the values to check for in TEST mode before deployment, if the laboratory values do not apply because MERMAID has been ~~already~~ draining

Last .gac file for P016: 22-July-2020

452.020-P-16.cmd

- 1 leg 0
- 2 buoy defaut
- 3 buoy bypass 20000 120000
- 4 stage del

5 stage 1500dbar (50dbar) 1000mn (1000mn)

6 stage 1500dbs (50dbar) 10800mn (11800mn)

7 stage store

8 mermaid UPLOAD-MAX: 150

NB, these specs explain how one float, P-16, was adjusted to 500m.

The addition (a1, a2) describes a script, cmdparkdepth.m, and its validation to actually adjust the others

28-Aug-2020

L1: record basic info only in LOG (exclude voltage & current)
it's currently tot 0 for all .cmd files
log

L2: use default algorithm etc. parameters

L3: initial immersion parameters
1) secondary opening (milliseconds) = 20s
2) primary opening (milliseconds) = 120s

L4: delete old movies recorded in flash memory

STAGE 1 LS: descent stage:
1) target depth = 1500m
2) depth tolerance = 50m
3) duration of stage = $1000 \text{ mn} \approx 17 \text{ hrs}$
4) total duration since immersion = $1000 \text{ mn} \approx 17 \text{ hrs}$

STAGE 2

L5: parking (acquisition) phase:
1) target depth = 1500m
2) depth tolerance = 50 m
3) duration @ depth = $10800 \text{ mn} \approx 7.5 \text{ days}$
4) total duration = $11800 \text{ mn} \approx 8.2 \text{ days}$

* total time since immersion

= 1000mn for descent + 10800mn @ depth = 11800m $\approx 8.2 \text{ days}$

ASCENT IS NOT A STAGE BUT DRIVE IS

DRIVE + ACQUISITION = STEP (3) OF OPERATING CYCLE

ASCENT = STEP (4)

• Adjustable w/ "bray" commands; here: default

L7: Keep stages in memory after ascent (we deleted this delete step L4)

L8: Max # of ^{bytes} \sim bytes allowed to transmit @ each surface = 150KB

26-Aug-2020

Currently P-016 stops aquifer after a fall of 11800mn
I went to key that time

I don't need to adjust ascent because that's depth, but
I should consider if it is adjusting my fall time
so that it comes @ the same rate.

buoy defant - ascent speed = 8 mbar/s

$$\text{as } 8 \text{ mbar/s} = 0.08 \text{ dbar/s}; \quad \frac{1500 \text{ dbar}}{0.08 \text{ dbar/s}} = 18,750 \text{ s}$$

OLD ASCENT
 $= 18,750 \text{ s}$
 $\approx 5.2 \text{ hrs.}$

$$\Rightarrow 8 \text{ mbar} \cdot \frac{1 \text{ dbar}}{1000 \text{ mbar}} \cdot \frac{10 \text{ dbar}}{1 \text{ dbar}} = 0.08 \text{ dbar/s}$$

Assume it takes 5 hrs to ascend (true by my Fig. 3) from 1600m
 $\therefore \approx 1.75 \text{ hrs from } 500 \text{ m} \approx 105 \text{ mn}$ to be added to stage 2

currently, P-016 begins ascent after 11,800 mn and ascent takes $\approx 312.5 \text{ mn}$

~~STAGE 2~~ \therefore from minimum to surface in $12,112 \text{ mn} \approx$ 8.4 days.

If F went a dive to the 8.4 days @ 500 m depth

$$= 12,112 \text{ mn} - 105 \text{ mn} \approx \boxed{12,000 \text{ mn when begins ascent}}$$

NEW BEGIN ASCENT

$$\rightarrow \text{out off } \approx 3.33 \text{ hrs of ascent.}$$

But F also went aquifer to start $\frac{1}{3}$ of time

~~STAGE 1 : stage 500dbar (50dbar) $\frac{350}{333}$ min (350 mn)~~

~~STAGE 2 : stage 500dbar (50dbar) 11650mn (12000mn)~~

OK
different

Editing on & MELMAD / server : water branch, 26-Aug-2020

commit : f48309065

28 Aug 2020

VEREPPY

60AL - P-016 surfaces at some frequency @ shallow depth.

OLD: begin ascent after ~~100~~ 11800 min
ascent takes 312 mins

$$\Rightarrow \text{total dive duration} = 12112 \text{ mins} \approx 8.4 \text{ days}$$

NEW: begin ascent after 12000 min
ascent takes 105 min

$$\Rightarrow \text{total dive duration} = 12104 \approx 8.4 \text{ days} \checkmark$$

nr

$$\text{Diff descent time} = 10000 \text{ min} - 350 \text{ min} = 650 \text{ min}$$

$$\text{Diff ascent time} = \# 312 \text{ min} - 105 \text{ min} \approx 200 \text{ min}$$

Total difference in descent/ascent TO BE ADDED TO ACQUISITION
- 850 min

$$\therefore \boxed{\text{step 2, time acquiring data} = 10800 \text{ min} + 850 \text{ min} = 11650} \checkmark$$

old ↑ ↑
difference

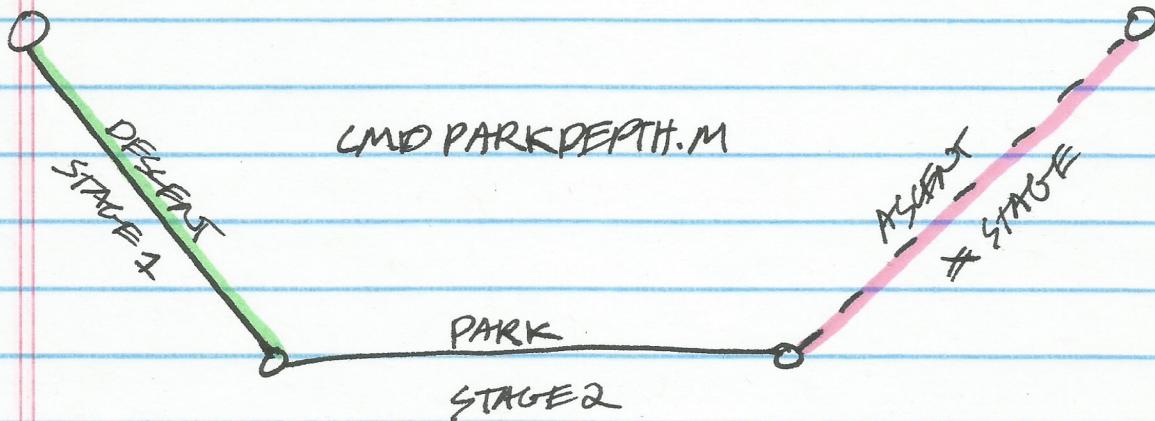
= extra time spent
parked instead of
descending or ascending

I verified the change was successfully made in the script to

452.020-P-16.cmd commit fd28fa to SUPERMAD/Super
(master branch)

DESCENT: DEFAULT = 3 mbar/s \rightarrow I assume 2.5 mbar/s, as cmd
 & "buoy near" programmed by Seabird used 1000m, 1500d!

ASCENT: DEFAULT = 8 mbar/s



Total time = descent time + park time + ascent time

$$\text{descent time} = (\text{descent speed})^{-1} \cdot \text{park depth}$$

$$= \text{descent slowness} \cdot \text{park depth}$$

$$\text{ascent time} = (\text{ascent speed})^{-1} \cdot \text{park depth}$$

$$= \text{ascent slowness} \cdot \text{park depth}$$

$$\text{park time} = \text{total time} - (\text{descent time} + \text{ascent time})$$

- [1] stage park_depth (depth_tot) descent_time (descent time)
- [2] stage park_depth (depth_tot) park_time (descent + park time)

DEFAULT

Default descent: $3 \text{ mbar/s} \approx 0.03 \text{ m/s} \approx 32.73 \text{ s/m}$ ~~use 2.5~~
 ~~$0.03 \text{ m/s} \cdot 100 \text{ m}$ using 2.5 mbar, the corrective descent = 40 s/m~~
 $40 \text{ s/m} \cdot 100 \text{ m} \cdot 1 \text{ hr} / 3600 \text{ s} = [1.11 \text{ hr to go 100m}] = [90 \text{ m/hr}]$

& should be green

Ascent: $8 \text{ mbar} \approx 0.08 \text{ m/s} \approx 12.5 \text{ s/m}$

$12.5 \text{ s/m} \cdot 100 \text{ m} \cdot 1 \text{ hr} / 3600 \text{ s} = 0.35 \text{ hr to go 100m}$ = 288 m/hr ^{a1/a2}

- charges made to ~~remote~~^{remote} server: 22-Sep-2020
- charges logged in TOWER MAP server: 4830cae

validate: CMD PARK DEPTH. m

500m 340mn (340mn) ← P-16, P-19
12070mn (12410mn)

750m 500mn (500mn) ← P-13, P-20
11850mn (12350mn)

... skipping 1000m ... ← P-17, P-21

1250m 840mn (840mn) ← P-18, P-22
11410mn (12250mn)

First check: stage 1 duration + stage 2 duration = end stage 2 ✓
(that is, strictly enforced in cmd park depth.m)

500m - 750m: 250m deeper @ descent of 90m/hr
⇒ stage 1 duration should be 166.66 longer
actual, 160 ✓ (500mn - 340mn)

250m deeper @ ascent of 288m/hr
⇒ stage 2 should end 52mn sooner/earlier
actual, 60 ✓ (12350mn - 12410mn)

500 - 1250m: 750m deeper @ descent of 90m/hr
⇒ stage 1 should be 500mn longer
actual, 500 ✓ (840mn - 340mn)

750m deeper @ ascent of 288m/hr
⇒ stage 2 should end 156.25mn sooner/earlier
actual, 160 (12250mn - 12410mn)