

**T040045-00-K**

Records the parameters used in the preparation of the OSEM review document E040108.

Figures from Norna Robertson submitted to DCC by Justin Greenhalgh, March 24 2004.

From: Norna Robertson [mailto:norna@fastloki.stanford.edu]  
Sent: 22 March 2004 18:01  
To: Greenhalgh, RJS (Justin) ; k.strain@physics.gla.ac.uk  
Subject: parameters for OSEM design

Justin, Ken

In response to one of Justin's queries (below) I attach the parameter file which i made at the time i sent all the data requested by Ken. This does not include number of OSEMs assumed by Ken - and I agree that should be noted explicitly somewhere.

Cheers  
Norna

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MC parameters for figures sent to KAS (for Control Design Work) on 23 Feb 04.

Files in C:\My Documents\MATLAB\_for6\_1\MC\_2003\_sept25

Local control Gains for long box = 0.55 and vert box = 0.23, other boxes unchanged

Long sensor TF at 10 Hz = 3.7e-6, vert sensor TF at 10 Hz = 4.9e-4

pend =

```
m1_parameters: 'Calculated'
  material1: 'combination steel+alum'
    m1: 3.1300e+000
    I1x: 2.3800e-002
    I1y: 2.4000e-003
    I1z: 2.3800e-002
  m2_parameters: 'Noise P-type: Silica Mass without flats
and ears'
    material2: 'silica'
      ix: 7.5000e-002
      ir: 7.5000e-002
      m2: 2.9184e+000
      I2x: 8.2081e-003
      I2y: 5.4721e-003
      I2z: 5.4721e-003
    m3_parameters: 'Noise P-type: Silica Mass without flats
and ears'
      material3: 'silica'
        tx: 7.5000e-002
        tr: 7.5000e-002
        m3: 2.9184e+000
        I3x: 8.2081e-003
        I3y: 5.4721e-003
        I3z: 5.4721e-003
        I1: 2.9500e-001
        I2: 1.6700e-001
        I3: 2.2000e-001
        nw1: 2
        nw2: 4
        nw3: 4
        r1: 1.8000e-004
        r2: 1.0000e-004
    r3_parameters: 'Fused-Silica'
      r3: 7.5000e-005
      Y1: 2.2000e+011
      Y2: 2.2000e+011
    Y3_parameters: 'Fused-Silica Fibres'
      Y3: 7.0000e+010
      ufc1: 2.2900e+000
      ufc2: 3.2200e+000
      d0: 5.0000e-003
      d1: 2.0000e-003
      d2: 1.0000e-003
      d3: 1.0000e-003
      d4: 1.0000e-003
      su: 0
      si: 2.8500e-002
      sl: 5.0000e-003
      n0: 7.7300e-002
      n1: 1.0000e-001
      n2: 3.9000e-002
      n3: 7.6500e-002
      n4: 7.6500e-002
      n5: 7.6500e-002
      tl1: 2.9413e-001
      tl2: 1.6274e-001
      tl3: 2.2000e-001
      I_total: 7.6186e-001
      I_com: 6.8686e-001
    longpitch1: [6.7106e-001 9.3320e-001 1.5193e+000]
    longpitch2: [2.3596e+000 2.7936e+000 4.4012e+000]
      yaw: [1.0878e+000 1.9410e+000 3.5198e+000]
    transroll1: [6.7832e-001 1.5196e+000 2.1254e+000]
    transroll2: [2.7789e+000 3.7789e+000 2.8662e+001]
    vertical: [1.1967e+000 4.2200e+000 1.9889e+001]
```

RM parameters for figures sent to KAS (for Control Design Work) on 23 Feb 04.

Files in C:\My Documents\MATLAB\_for6\_1\ALIGORM\_may\_07\_2003\RM\_2003May07

Local control Gains for long box = 1.4 and vert box = 0.3, other boxes unchanged

Long sensor TF at 10 Hz = 6.1e-6, vert sensor TF at 10 Hz = 4.5e-4

pend =

```
m1_parameters: 'Calculated from SWorks Assem          n5: 1.3750e-001
2003Mar26'                                           tl1: 1.9285e-001
material1: 'combination steel+alum'                 tl2: 1.8933e-001
m1: 1.2070e+001                                       tl3: 2.5300e-001
l1x: 1.2630e-001                                       l_cofm: 6.4018e-001
l1y: 1.8570e-002                                       l_total: 7.7268e-001
l1z: 1.2740e-001                                       longpitch1: [4.9198e-001 7.0345e-001 1.5821e+000]
m2_parameters: 'Controls P-type: Calculated from    longpitch2: [2.0938e+000 2.8491e+000 4.0022e+000]
SWorks Assembly'                                       yaw: [1.0051e+000 2.2486e+000 3.3040e+000]
material2: 'alum + s/stl inserts + s/stl clamps'     transroll1: [7.0252e-001 1.5634e+000 2.0985e+000]
ix: 1.0000e-001                                       transroll2: [2.8656e+000 4.5826e+000 4.7242e+001]
iy: 2.5500e-001                                       vertical: [1.2647e+000 4.3504e+000 2.9926e+001]
iz: 9.2000e-002
m2: 1.2214e+001
l2x: 8.1620e-002
l2y: 2.0350e-002
l2z: 8.1430e-002
m3_parameters: 'Noise P-type: Silica Mass without flats
and ears'
material3: 'silica'
tx: 1.0000e-001
tr: 1.3250e-001
m3: 1.2145e+001
l3x: 1.0661e-001
l3y: 6.3426e-002
l3z: 6.3426e-002
l1: 2.0000e-001
l2: 2.0100e-001
l3: 2.5300e-001
nw1: 2
nw2: 4
nw3: 4
r1: 3.0000e-004
r2: 2.0000e-004
r3_parameters: 'Spring Steel Wires'
r3: 1.4000e-004
Y1: 2.2000e+011
Y2: 2.2000e+011
Y3_parameters: 'Spring Steel Wires'
Y3: 2.2000e+011
l1b: 2.5000e-001
a1b: 6.5000e-002
h1b: 2.3000e-003
ufc1: 2.6000e+000
st1: 7.7949e+008
intmode_1: 1.3854e+002
l2b: 1.2000e-001
a2b: 4.5000e-002
h2b: 1.1000e-003
ufc2: 3.2000e+000
st2: 7.8996e+008
intmode_2: 2.8759e+002
d0: 1.0000e-003
d1: 1.0000e-003
d2: 1.0000e-003
d3: 1.0000e-003
d4: 1.0000e-003
su: 0
si: 3.0000e-002
sl: 5.0000e-003
n0: 7.7000e-002
n1: 1.3000e-001
n2: 7.0000e-002
n3: 1.3750e-001
n4: 1.3750e-001
```

ETM parameters for figures sent to KAS (for Control Design Work) on 23 Feb 04.

Files in C:\My Documents\MATLAB\_for6\_1\QUAD\_2003NOV14

Local control Gains for long box = 1.3 and vert box = 0.3, other boxes unchanged

Long sensor TF at 10 Hz =  $2.1e-7$  , vert sensor TF at 10 Hz =  $1.23e-4$

pend =

```
g: 9.8100
nx: 0.1300
ny: 0.5000
nz: 0.0840
denn: 4000
mn: 21.8400
lnx: 0.4678
lny: 0.0436
lnz: 0.4858
ux: 0.1300
uy: 0.5000
uz: 0.0840
den1: 4000
m1: 21.8400
l1x: 0.4678
l1y: 0.0436
l1z: 0.4858
ix: 0.1300
ir: 0.1570
den2: 3980
m2: 40.0660
l2x: 0.4938
l2y: 0.3033
l2z: 0.3033
tx: 0.1300
tr: 0.1570
den3: 3980
m3: 40.0660
l3x: 0.4938
l3y: 0.3033
l3z: 0.3033
ln: 0.4450
l1: 0.3040
l2: 0.3420
l3: 0.6000
nwn: 2
nw1: 4
nw2: 4
nw3: 4
rn: 5.4000e-004
r1: 3.5000e-004
r2: 3.1000e-004
r3: 2.0000e-004
Yn: 2.2000e+011
Y1: 2.2000e+011
Y2: 2.2000e+011
Y3: 7.0000e+010
lnb: 0.4800
anb: 0.0961
hnb: 0.0045
ufcn: 2.3628
stn: 8.9866e+008
intmode_n: 73.5303
l1b: 0.4200
a1b: 0.0583
h1b: 0.0049
ufc1: 2.5555
st1: 8.9994e+008
intmode_1: 104.5764
l2b: 0.3400
a2b: 0.0500
h2b: 0.0045
ufc2: 2.1106
st2: 7.9192e+008

intmode_2: 146.5517
dm: 0.0010
dn: 0.0010
d0: 0.0010
d1: 0.0010
d2: 0.0010
d3: 0.0010
d4: 0.0010
twistlength: 0
d3tr: 0.0010
d4tr: 0.0010
sn: 0
su: 0.0030
si: 0.0030
sl: 0.0150
nn0: 0.2500
nn1: 0.0900
n0: 0.2000
n1: 0.0700
n2: 0.1200
n3: 0.1635
n4: 0.1580
n5: 0.1580
tln: 0.4162
tl1: 0.2768
tl2: 0.3412
tl3: 0.6020
l_suspoint_to_centreofptic: 1.6363
l_suspoint_to_bottomofptic: 1.7933
bd: 0
longpitch1: [0.3831 0.4409 0.9865 1.4275]
longpitch2: [1.8423 1.9907 3.4189 3.6310]
yaw: [0.6659 1.3961 2.4232 3.0681]
transroll1: [0.4466 0.8407 1.0019 2.0248]
transroll2: [2.7817 3.5577 3.9560 12.4446]
vertical: [0.6854 2.7292 4.3988 8.7577]
```

Beamplitter parameters for figures sent to KAS (for Control Design Work) on 23 Feb 04.

Files in C:\My Documents\MATLAB\_for6\_1\newtripleBSdamp

Local control Gains for long box = 0.8 times 0.8 triangle and vert box = 0.17 times 1.2 triangle, other boxes as lab book 6, p111

Long sensor TF at 10 Hz =  $9.4e-7$  , vert sensor TF at 10 Hz =  $2.3e-3$  for 10.9 Hz highest freq and  $1.4e-3$  for 8.9 Hz

```
pend =
transroll1: [4.2921e-001 9.9015e-001 1.6211e+000]
transroll2: [2.3102e+000 3.9260e+000 1.2697e+001]
vertical: [1.2435e+000 4.1439e+000 8.9355e+000]
m1: 1.2600e+001
material1: 'steel'
l1x: 1.5225e-001
l1y: 2.7405e-002
l1z: 1.3240e-001
m2: 1.2711e+001
material2: 'silica'
ix: 6.0000e-002
ir: 1.7500e-001
l2x: 1.9464e-001
l2y: 1.0114e-001
l2z: 1.0114e-001
m3: 1.2711e+001
tx: 6.0000e-002
tr: 1.7500e-001
l3x: 1.9464e-001
l3y: 1.0114e-001
l3z: 1.0114e-001
l1: 5.5000e-001
l2: 5.5000e-001
l3: 6.0000e-001
nw1: 2
nw2: 4
nw3: 4
r1: 3.0000e-004
r2: 2.0000e-004
r3: 1.1300e-004 * or 1.4e-4
Y1: 2.2000e+011
Y2: 2.2000e+011
Y3: 7.0000e+010
l1b: 2.5000e-001
a1b: 6.2500e-002
h1b: 2.4000e-003
ufc1: 2.5910e+000
st1: 7.7709e+008
intmode_1: 1.4457e+002
l2b: 1.4000e-001
a2b: 2.5778e-002
h2b: 1.6000e-003
ufc2: 3.0432e+000
st2: 7.9365e+008
intmode_2: 3.0733e+002
d0: 1.0000e-003
d1: 1.0000e-003
d2: 1.0000e-003
d3: 1.0000e-003
d4: 1.0000e-003
su: 0
si: 1.5000e-002
sl: 5.0000e-003
n0: 7.7000e-002
n1: 1.3000e-001
n2: 6.0000e-002
n3: 1.8150e-001
n4: 1.7650e-001
n5: 1.7650e-001
tl1: 5.4744e-001
tl2: 5.3641e-001
tl3: 6.0000e-001
l_cofm: 1.6889e+000
l_total: 1.8639e+000
longpitch1: [2.8957e-001 4.2970e-001 5.7976e-001]
longpitch2: [9.9220e-001 1.2901e+000 1.6999e+000]
yaw: [5.4357e-001 1.4484e+000 2.1119e+000]
```