

D Appendix D

MIDAS programmes The following MIDAS programmes were written to aid the reduction of the spectral images obtained from the New Technology Telescope (NTT) at La Silla, Chile. The procedure is fully described in Section 2.1.1.3.

1. bias_ext.prg
2. bias_ins.prg
3. bias_insL.prg
4. bias_insR.prg
5. flat_prep.prg
6. flat3.prg

bias_ext.prg

```
def/local catal/i/1/1 0
def/local n/i/1/1 1
def/local extractL/c/1/8 "extractL"
def/local extractR/c/1/8 "extractR"
def/local biass_ins/c/1/9 "biass_ins"
def/par p1 ? C "Catalogue name with input bias frames :"
set/midas output=yes
n = 136
cat_loop:
store/frame in_a {p1}.cat 1 finito
n = {n}+1
comp/ima {biass_ins}{n} = {in_a}
extract/ima {extractL}{n} = {biass_ins}{n}[@1,@1:@1030,@2060]
extract/ima {extractR}{n} = {biass_ins}{n}[@1031,@1:@2060,@2060]
goto cat_loop
finito:
crea/icat {biass_ins} {Biass_ins}*.bdf
set/midas output=yes
write/out "frames to insert scaled sides into are labelled {biass_ins}, the extracted haves to use for
manual scaling are labelled extractL and extractR"
write/out "Thank you for using this Midas programme"
write/out "Created by Mandy Bailey, 25 September 2012"
```

bias_ins.prg

```
def/local catal/i/1/1 0
def/local n/i/1/1 1
def/local biass_ins/c/1/9 "biass_ins"
def/par p1 ? C "Catalogue name with original bias frames :"
set/midas output=yes
n = 0
cat_loop:
  store/frame in_a {p1}.cat 1 finito
  n = {n}+1
  comp/ima {biass_ins}{n} = {in_a}
goto cat_loop
finito:
crea/icat {biass_ins} {biass_ins}*.bdf
set/midas output=yes
write/out "copy of original data frame in {biass_ins}.cat"
write/out "Thank you for using this Midas programme"
write/out "Created by Mandy Bailey, 8 October 2012"
```

kwrite bias_insL.prg

```
def/local catal/i/1/1 0
def/local n/i/1/1 1
def/local dummya/c/1/6 "dummya"
def/local biass_ins/c/1/9 "biass_ins"
def/par p1 ? C "Catalogue name with input LHS frames :"
```

def/par p2 ? C "Catalogue name with frames to input scaled halves into :"

```
set/midas output=yes
n = 136
cat_loop:
  store/frame in_a {p1}.cat 1 finito
  n = {n}+1
  comp/ima {dummya}{n} = {in_a}
  insert/ima {dummya}{n} {biass_ins}{n} @1,@1
goto cat_loop
finito:
set/midas output=yes
write/out "inserts scaled LHS"
write/out "Thank you for using this Midas programme"
write/out "Created by Mandy Bailey, 25 September 2012"
```

bias_insR.prg

```
def/local catal/i/1/1 0
def/local n/i/1/1 1
def/local dummyb/c/1/6 "dummyb"
def/local biass_ins/c/1/9 "biass_ins"
def/local final/c/1/5 "final"
def/par p1 ? C "Catalogue name with input RHS frames :"
```

def/par p2 ? C "Catalogue name with frames to input scaled halves into :"

```
set/midas output=yes
n = 136
cat_loop:
store/frame in_b {p1}.cat 1 finito
n = {n}+1
comp/ima {dummyb}{n} = {in_b}
insert/ima {dummyb}{n} {biass_ins}{n} @1031,@1
goto cat_loop
finito:
crea/icat {final} {biass_ins}*.bdf
set/midas output=yes
write/out "scaled bias frame in {final}.cat"
write/out "Thank you for using this Midas programme"
write/out "Created by Mandy Bailey, 25 September 2012"
```

flat_prep.prg

```
def/local catal/i/1/1 0
def/local n/i/1/1 1
def/local nump/i/1/2 1,1
def/local dummy/c/1/5 "dummy"
def/local flatb/c/1/5 "flatb"
def/local flatbe/c/1/6 "flatbe"
def/local flatber/c/1/7 "flatber"
def/local flatberd/c/1/8 "flatberd"
def/local median/c/1/6 "median"
def/local med/c/1/3 "med"
def/local meda/c/1/4 "meda"
def/local extractL/c/1/8 "extractL"
def/local extractR/c/1/8 "extractR"
def/local biass_ins/c/1/9 "biass"
def/par p1 ? C "Catalogue name with input bias frames :"
set/midas output=yes
n = 0
cat_loop:
store/frame in_a {p1}.cat 1 finito
n = {n}+1
comp/ima {dummy}{n} = {in_a}
comp/ima {flatb}{n} = {dummy}{n}-biassfs210812.bdf
extract/ima {flatbe}{n} = {flatb}{n}[@17,@6:@1393,@2032]
rot/clock {flatbe}{n} {flatber}{n}
write/desc {flatber}{n} start 1,1
write/desc {flatber}{n} step 1,1
statistics/image {flatber}{n} + ? option=G outtab=flatmedian,image,median
copy/dk {flatber}{n} npix nump
grow/ima {med}{n} = flatmedian 1,1,{nump(1)} ? C
grow/ima {meda}{n} = {med}{n} 1,1,{nump(2)}
comp/ima {flatberd}{n} = {flatber}{n}/{meda}{n}
goto cat_loop
finito:
crea/icat flat flatberd*.bdf
set/midas output=yes
write/out "flats bias subtracted with statistics for the median of each frame in flatmedian, each flat
is divided by its median, catalogue flat.cat created"
write/out "Thank you for using this Midas programme"
write/out "Created by Mandy Bailey, 25 September 2012"
```

flat3.prg

```
def/local catal/i/1/1 0
def/local n/i/1/1 1
def/local m/i/1/1 1
def/local pixy/i/1/1 1
def/local igno/i/1/1 0
def/local nump/i/1/2 1,1
def/local medave/c/1/6 "medave"
def/local smooth/c/1/6 "smooth"
def/local dummie/c/1/6 "dummie"
def/local medav/c/1/5 "medav"
def/local smoot/c/1/5 "smoot"
def/local dummy/c/1/5 "dummy"
def/local catin/c/1/5 "catin"
def/par p1 ? C "Catalogue name with input flats :"
```

def/par p2 ? C "Name of output normalised flat :"

def/par p3 ? I "Smoothing parameter (integer) :"

pixy = 2*{p3}+1

set/midas output=no

n = 0

cat_loop:

store/frame in_a {p1}.cat 1 finito

n = {n}+1

comp/ima {dummy}{n} = {in_a}

write/desc {dummy}{n} start 1,1

write/desc {dummy}{n} step 1,1

stat/ima {dummy}{n} column ? ? xn?? outtab,image,median

copy/dk {dummy}{n} npix nump

grow/ima {medave}{n} = outtab 1,1,{nump(2)}

filter/median {medave}{n} {smooth}{n} {p3},1,0.

comp/ima {dummie}{n} = {dummy}{n}/{smooth}{n}

\$rm outtab.bdf

goto cat_loop

finito:

igno = m\$nint(0.4*{n})

crea/icat {catin} {dummie}*.bdf

ave/ima {p2} = {catin}.cat ? ? median,{igno},{igno}

crea/icat {catin} {medave}*.bdf

ave/ima {medav} = {catin}.cat ? ? mean

crea/icat {catin} {smooth}*.bdf

ave/ima {smoot} = {catin}.cat ? ? mean

```
do m = 1 {n}
  $rm {dummy}{m}.bdf
  $rm {medave}{m}.bdf
  $rm {smooth}{m}.bdf
  $rm {dummie}{m}.bdf
enddo
$rm {catin}.cat
$rm dirfile.ascii
$rm middummXyZ.tbl
set/midas output=yes
write/out "Averaged median-averaged rows in {medav}.bdf"
write/out "And averaged smoothed version in {smoot}.bdf"
write/out "Thank you for using this Midas programme"
write/out "Created by Jacco van Loon, 1 June 2011"
```