Using SDE for SMA Imaging Simulations

Abstract

This memo is a practical guide to the Software Development Environment (SDE) developed by the NRAO. SDE can be used to simulate SMA observations and image reconstruction with mosaics. Because SDE is continuously being updated by NRAO, I first describe how to use FTP over Internet to copy the latest version of SDE to CX1 and how to install the new programs. Next I provide samples of SDE runs to show how a mosaicing image simulation is performed and how to read the resulting images in AIPS. Some helpful hints on using SDE are given at the end of this memo.

Introduction

The software development environment (SDE) was written by Tim Cornwell, Mark Holdaway and others at the National Radio Astronomy Observatory. SDE has been used for the simulations performed by Cornwell, Braun and Holdaway for the NRAO Millimeter Array. It has many features and is a platform for NRAO algorithm development for both the MMA and the VLBA. NRAO plans to use SDE to test new imaging techniques before they are implemented in AIPS. The primary advantage of SDE over AIPS is that it is easy to test imaging algorithms without a great deal of programming overhead. I have left a three-ring binder in the SMA office which describes SDE in more detail and presents a programmer’s guide.
The SDE account

SDE is presently kept in my account (DWOOD) on CFA CX1. I will give the password to her and Colin. SDE is located in the directory

/cxl/disk2/dwood

The simulations I have performed are kept in

/cxl/disk2/dwood/sma

If you run SDE from an account other than DWOOD, you should first type

% source /cxl/disk2/dwood/sdeini

to set-up path names, etc. This C-shell is executed in the .login of DWOOD.

Using FTP to Install Updates

SDE is constantly being updated by NRAO, so from time to time one should get the latest version. In addition, the current version that I have been using has some bugs (see below), which may be fixed with future updates. The following steps should allow you to use the network to copy the latest version of SDE over to our CONVEXes.

1) Copy the new version to CX1 over Internet

% cd /cxl/disk2/dwood
% ftp yucca

~~~~~~

FTP> Username: sde
FTP> Password: notaips

~~~~~~

FTP> cd /yucca/sde/tarfiles
FTP> type binary
FTP> get sdetar.d.Z

(sdetar.d.Z should be the latest version.

Call Cornwell or Holdaway at NRAO to see if it is updated.)

~~~~~~
At this point the transfer should take place. If you have trouble completing the transfer, try again at an off time (evenings are best). It should take only 15 or 20 minutes. If it takes longer, there are too many network errors.

FTP> quit

2) Uncompress the tar file

The utility ‘uncompress’ is not available on CX1 or CX2. Ask Mark Birkenshaw to uncompress the file

/cx1/disk2/dwood/sdetar.d.Z

using his SUN. Put the output file sdetar.d in the /cx1/disk2/dwood directory.

3) Backup current configuration files

Before you ‘untar’ the tar file, you should first make copies of two files that have been specially configured for our system

% cd /cx1/disk2/dwood
% cp sdeini.csh sdeini.csh.save
% cd bin/unix
% cp comopt comopt.save

4) Run tar to install the new code

% cd /cx1/disk2/dwood
% tar -xf sdetar.d

5) Copy the saved files back

% cd /cx1/disk2/dwood
% cp sdeini.csh.save sdeini.csh
% cd bin/unix
% cp comopt.save comopt

6) Build

% cd /cx1/disk2/dwood
% build

Using SDE

The user interface to SDE is similar to the old DEC-10 programs. You invoke SDE modules by typing their name in the operating system rather than in a central command interpreter (as in AIPS). Each program has a set of inputs that are saved in a file named _____cur where _____ is the program name. You can write a unix script to execute several SDE tasks from a command file if you want to run things overnight or in the background.

Here is a current list of SDE task that is printed when you type sdetasks.

% sdetasks

The following tasks exist in SDE as of 5/29/90:

<table>
<thead>
<tr>
<th>Task</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>ant</td>
<td>I allow interactive array building</td>
</tr>
<tr>
<td>calsf</td>
<td>I calculate the antenna gain correlation</td>
</tr>
<tr>
<td>clean</td>
<td>I perform Clark or Hogbom CLEAN deconvolution</td>
</tr>
<tr>
<td>closure</td>
<td>I use closure phase information</td>
</tr>
<tr>
<td>cohtst</td>
<td>I perform a coherence test</td>
</tr>
<tr>
<td>corrupt</td>
<td>I corrupt data</td>
</tr>
<tr>
<td>cyclic</td>
<td>I</td>
</tr>
<tr>
<td>dump</td>
<td>I dump files</td>
</tr>
<tr>
<td>fft</td>
<td>I test FFTS</td>
</tr>
<tr>
<td>fftx</td>
<td>I time FFTs</td>
</tr>
<tr>
<td>fix</td>
<td>Special fixer</td>
</tr>
<tr>
<td>fly</td>
<td>I perform wide-field imaging</td>
</tr>
<tr>
<td>gsp</td>
<td>I perform GSP deconvolution</td>
</tr>
<tr>
<td>hdr</td>
<td>I manipulate headers</td>
</tr>
<tr>
<td>hgeom</td>
<td>I change the geometry</td>
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<tr>
<td>Img2sun</td>
<td>I display images on the Sun</td>
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<tr>
<td>imgclip</td>
<td>I clip images</td>
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<tr>
<td>imgcollap</td>
<td>I collapse cubes</td>
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<tr>
<td>imgcopy</td>
<td>I copy images</td>
</tr>
<tr>
<td>imgdesph</td>
<td>I project spheres</td>
</tr>
</tbody>
</table>
imgdump I dump Images
imglc I add images
imgmodel I insert a model into an image
imgpb I apply or correct primary beams
imgplot I contour an image
imgprnt I print images
imgres I find residuals
imgsph I expand images into spheres
imgstat I calculate statistics of images
imgsub I sub-section images
imgtv I put an image on the TV
imgxfr I make a transfer function
ldecs I do linear deconvolution and smoothing
lmosaic I perform linear mosaicing
lucy I perform Lucy deconvolution
magtape I handle magnetic tapes
makmos I assemble u,v data into mosaic data bases
makepb I make primary beams
mapper I make and clean images from visibility data
mosaic I perform maximum entropy mosaicing
moscat I concatenate mosaic data bases
moslist I list mosaic visibility data
mosobs I assist in scheduling mosaic observations
mosscal I self-calibrate mosaics
npamsim I make simulated mosaic array data, with errors
oism I make simulated OI array data
padim I pad images to a larger size
photon I add photon noise to images
rvres I plot normalized radially averaged residual vis
selfcal I self-calibrate
smooth I smooth images with an elliptical Gaussian
stalin I remove history cards
tblstat I calculate table statistics
template I am a template task
triple I solve for visibilities from triple product
trp I triple-produce
trplist I list triple product data
trptst I test TRP routines
uvcov I display uv coverage on the tv
uvmap I make images from visibility data
uvplt I plot uv data
vislist I list visibility data
vismodel I insert a model into a visibility data set
visres I find residuals
vlba I find mosaic data from VLBA mosaic data
vm I perform maximum entropy deconvolution
wiener I do Wiener filtering and smoothing
world Archetypal Hello, world program
Of course many of these routines are applicable to SMA simulations. I have used the routines
NPAMSIM and MOSAIC to simulate SMA observations and create mosaic images. At the back of
this memo I have included a sample run that illustrates how the a simulation was performed.

To date I have not tried to produce any plots directly with SDE, although this should be
possible. I have obtained a copy of the PGLOT library for our non-IEEE standard CONVExes,
so the the routines in SDE that generate graphics should work. This will take a little fiddling to
generate graphic output, but since NRAO has the same equipment we do there should be no major
snags.

I have not tried to generate any SDE images directly on the IIS in the image processing lab. It
is possible that this will work since NRAO uses IIS as well. SDE appears to be integrated with
SAOIMAGE so it may be possible to have SDE display image on an X-window system directly.
Currently I read the SDE FITS files into AIPS and use the IIS for display.

Antennae stations

The ANT file used by SDE is a list of the antennae stations. The format of this file is the same
at for the task UVSIM in AIPS. I have written some Excel spread sheets that calculate antennae
station positions in the X,Y,Z coordinate system that UVSIM and SDE use. The spread sheets can
be found on the Mac file server in the folder SMA Array SE/SMA/SDE. SDE also has an option
for reading the stations in simply x,y coordinates on the ground. I have not tried this. You will
find the in the SDE area on CX1 some of these antennae files. They have extensions .DAT. The
two I have used the most are MK12.DAT (inner two stations of Y array on Mauna Kea) and
MKCRY6.DAT (a 6 station on Mauna Kea).

Tips and Hints

- Use the predefined prefix SMA/ in front of a file name (e.g. *mos = SMA/MK12#4.mos)
to direct SDE to look in the directory /cx1/disk2/dwood

- Use the prefix D1/ in front of image names to direct output to a large scratch area accessible
to AIPS (e.g. *VM = D1/MK12#4.FTS). Use .FTS as the extension to image files to
cause SDE to generate a FITS image for AIPS. With no extension SDE generates a binary
file that only it can read by SDE, but which is smaller and faster to read than FITS format.
You can easily read SDE FITS images into AIPS using IMLOD:

AIPS 2: IMLOD: Task to store an image from a FITS or IBM-CV tape
AIPS 2: Adverbs Values Comments
AIPS 2: -----------------------------------------------
AIPS 2: INTAPE 1 Input tape drive # (0 => 1)
AIPS 2: OUTNAME 'MKCRY6#8VM ' Image name (name)
AIPS 2: OUTCLASS ' ' Image name (class)
AIPS 2: OUTSEQ 0 Image name (seq. #)
AIPS 2: 0 => highest unique number
AIPS 2: -1 => FITS tape value
AIPS 2: OUTDISK 1 Disk drive # (0 => any)
AIPS 2: NCOUNT 1 Number of files to load.
AIPS 2: DOTABLE 0 True (1.0) means load tables
AIPS 2: NFILES 0 # of files to advance on tape
AIPS 2: NMAPS 0 # IBM maps to advance on tape
AIPS 2: INFILE 'D1:MKCRY6#8VM.FTS
>go
IMLOD2: Task IMLOD (release of 15JAN90) begins
IMLOD2: Reading from disk file: D1:MKCRY6#8VM.FTS
IMLOD2: ZTOPPD: using translated file name =
IMLOD2: ZTOPPD: /cxl/disk1/SDE/MKCRY6#8VM.FTS
AIPS 2: Resumes
IMLOD2: Create IMLOD .TEMP . 1 (MA) on disk 1 cno 39
IMLOD2: End of file read as expected
IMLOD2: RENAME MKCRY6#8VM .ICLN . 1 (MA) ON DISK 1 CNO 39
IMLOD2: Telescope=MMA Receiver=?
IMLOD2: Observer=? User #= 1207
IMLOD2: Observ. date=BAD DATE Map date=24-JUL-1990
IMLOD2: Minimum= 1.22097242E-03 Maximum= 2.69469023E-03 JY/PIXEL
IMLOD2: -----------------------------------------------
IMLOD2: Type Pixels Coord value at Pixel Coord incr Rotat
IMLOD2: RA---SIN 128 00 00 00.000 64.00 -1.000 0.00
IMLOD2: DEC---SIN 128 30 00 00.000 64.00 1.000 0.00
IMLOD2: FREQ 1 3.4499999E+11 1.00 3.4500000E+10 0.00
IMLOD2: -----------------------------------------------
IMLOD2: Map type=NORMAL Number of iterations= 15
IMLOD2: Conv size= 0.00000 X 0.00000 Position angle= 0.00
IMLOD2: Observed RA 00 00 02.761 DEC 30 00 35.87
IMLOD2: There are 1 extension files of type HI
IMLOD2: Appears to have ended successfully
IMLOD2: Account: Cpu= 2.61 Real= 10.0 IOcount= 47

After you run a program you can copy (cp) the .cur file into a file of your own choosing if you want to save the exact inputs that were used. You can then copy this file back to the .cur file to run the program with those inputs.
Bugs

1) AIRY and AIRYB work in NPAMSIM, but when I try to run MOSAIC it bombs with a floating point error when databases generated with AIRY or AIRYB are input.

2) I could not get MOSAIC to generate a CVM map. Perhaps these is some parameter that should be set to get this to work.

3) Large image mosaics bomb in MOSAIC with the message:
   "No memory available in routine DAIMAKAR, Requested item: M/FC37/XFR/ARRAY/DATA"
   This happens to me when I try to create images with IMSIZE = 256,256,1

4) Automatic stopping of the image restoration in MOSAIC does not work (or at least I never go it to stop automatically for me).

5) I have been using Mos = ____ .mos in NPAMSIM and getting good results. Mark Holdaway tells me (see attached E-mail) that I should use .SDE for the extension on visibility. This is undocumented and since I had no previous runs to study when I began my work I chose .mos as the extension. Probably NPAMSIM should be run with .SDE for the visibility file extensions in the future.
**UVSIM input calculator**

**OBSERVATORY:**

| LAT: | 19.82667° | .3460 (radians) |
| ALT: | 4066 m |

**D. Wood**

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<th>North (m)</th>
<th>Alt (m)</th>
<th>Dist (m)</th>
<th>Azimuth (radians)</th>
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**OUTRIGGERS**

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**CRY-6 ARRAY**

with same max. baseline as MK12

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</table>
Spread sheet for calculating a basic 6 element O array. See Cornwell MMA Memo #38

D. Wood

Scale = 27.9 diameter of circle in meters

If \( Y \) arm = 16.1 then use scale = 27.89 meters in order for the O array to have the same maximum baseline as \( Y \) array

<table>
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Y array pos calculator

D. Wood

Nstations= 6 per arm
MaxLen= 300 m  Max Baseline: 519.6
scale= 12.25 1 mm = scale ft 0.2678204
gfactor= 2.06
a= 8.086957

AZ_ARML= 21.1 0.37
AZ_ARM2= 141.1 2.46
AZ_ARM3= 261.1 4.56

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Page 1
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MK12.DAT

Inner 2 stations of MT Y
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MK CRYG.DAT

Crystalline 6 °MK
| 35.0000 | 1.000000 | 1.000000 | 9.72000 | 7.500000 |
| -6.81000 | -1.79000 | 4.91000 | 7.500000 |
| -3.44000 | -10.39000 | -3.59000 | 7.500000 |
| 2.51000 | -11.17000 | -9.39000 | 7.500000 |
| 6.58000 | 6.76000 | -8.12000 | 7.500000 |
| 5.69000 | 6.76000 | -8.12000 | 7.500000 |
| 0.51000 | 11.97000 | -0.74000 | 7.500000 |
| -9.05000 | 8.16000 | 7.21000 | 7.500000 |
| -12.59000 | -1.35000 | 17.99000 | 7.500000 |
| -11.46000 | -9.20000 | 16.37000 | 7.500000 |
| -8.78000 | -15.79000 | 12.55000 | 7.500000 |
| -4.92000 | -20.26000 | 7.02000 | 7.500000 |
| -0.390000 | -21.99000 | 0.550000 | 7.500000 |
| 4.190000 | -20.75000 | -5.99000 | 7.500000 |
| 8.210000 | -16.71000 | -11.73000 | 7.500000 |
| 11.12000 | -10.41000 | -15.88000 | 7.500000 |
| 12.52000 | -2.700000 | -17.88000 | 7.500000 |
| 12.24000 | 5.370000 | -17.48000 | 7.500000 |
| 10.30000 | 12.71000 | -14.71000 | 7.500000 |
| 6.970000 | 18.34000 | -9.95000 | 7.500000 |
| 2.700000 | 21.49000 | -3.86000 | 7.500000 |
| -1.940000 | 21.74000 | 2.760000 | 7.500000 |
| -6.310000 | 19.05000 | 9.01000 | 7.500000 |
| -12.02000 | 6.670000 | 17.17000 | 7.500000 |
| -19.21000 | -5.900000 | 27.43000 | 7.500000 |
| -16.17000 | -19.01000 | 23.09000 | 7.500000 |
| -10.33000 | -28.3285 | 14.8353 | 7.500000 |
| -2.710000 | -33.67000 | 3.88000 | 7.500000 |
| 5.380000 | -32.68000 | -7.68000 | 7.500000 |
| 12.54000 | -26.05000 | -17.90000 | 7.500000 |
| 17.53000 | -14.90000 | -25.03000 | 7.500000 |
| 19.49000 | -1.190000 | -27.83000 | 7.500000 |
| 18.06000 | 12.74000 | -25.82000 | 7.500000 |
| 13.55000 | 24.46000 | -19.35000 | 7.500000 |
| 6.670000 | 31.95000 | -9.53000 | 7.500000 |
| -1.360000 | 33.92000 | 1.94000 | 7.500000 |
| -9.160000 | 30.02000 | 13.08000 | 7.500000 |
| -18.92000 | 8.230000 | 27.02000 | 7.500000 |

D ambiguation of MMA

MMA_D.DAT
SDE run example
An Example of an SDE run to simulate an SMA Observation
After Loggin in....

cd /cx1/disk2/dwood/sma
% npamsim
npamsim I: I make simulated mosaic array data
npamsim I: Compiled: Tue Jul 10 15:35:05 EDT 1990
npamsim I: *inp
npamsim I: Name of ASCII file specifying array: Antfile = MK12.DAT
npamsim I: Name of ASCII file giving model comps. : Model = testd.mod
npamsim I: Size of model image: Imsize = 256, 256, 1
npamsim I: Cellsize in model image: Cellsize = 1.000000, 1.000000, 0.000000
npamsim I: Name of output or input model image: Map =
npamsim I: Hour angle limits [hours]: HAlimits = -5.0000000000000000, 5.0000000000000000
npamsim I: Declination of source in Model [deg.]: Dec = 0.0000000000000000
npamsim I: Frequency of radiation [Hz]: Freq = 344.999985152.000
npamsim I: Minimum elevation for unflagged data [deg.]: ELmin = 0.0000000000000000

npamsim I: Primary beam application? : PB = T
npamsim I: Integration time [seconds]: INTtime = 180.000000000000000
npamsim I: Add noise to visibility data? : ADDN = F
npamsim I: rms phase noise per telescope per integration time: PHERMS = 0.000000
npamsim I: rms fractional complex gain deviation: GRMS = 5.0000000000000000

npamsim I: fractional gain drift for TOTAL POWER: GDRIFT = 0.0000000000000000
npamsim I: rms noise per correlator per integration time: NRMS = 0.000000
npamsim I: global pointing error, AZ, EL [arcsec]: GLPN = 0., 0.
npamsim I: original (random) pnt err, AZ, EL [arcsec]: ORPN = 0., 0.
npamsim I: drift in pointing over obs, AZ, EL [arcsec]: DRPN = 0., 0.
npamsim I: random pointing error, AZ, EL [arcsec]: RANPN = 0., 0.
npamsim I: Name of telescope for header and PB: Telescope = MMA
npamsim I: Telescope diameter for type AIRY or AIRYB [meters]: Teldiam = 7.5000

00
npamsim I: Do we use uniform grid on SIN PROJECTION? : Sinproj = F
npamsim I: Use DFT for no pointing error case? [T/F] : DFT = F
npamsim I: Generate autocorrelations? : AutoC = T

npamsim I: Weighting for autocorrelations : AutoW = 0.4000000
npamsim I: Number of extra pointings in each direction : NED = 4
npamsim I: Name of output mosaic database : Mosaic = MK12#10.SDE
npamsim I: Name of output Visibility database (first pointing only)

Vis =
npamsim I: *ims1 = 128, 128
npamsim I: *mod = teste.mod
npamsim I: *Int = 600
npamsim I: *Ned = 3
npamsim I: *Mosaic = SMA/MK12#10.SDE
npamsim I: Name of ASCII file giving model comps. : Model = teste.mc
npamsim I: Size of model image: Imsize = 128, 128, 1
npamsim I: Cellsize in model image: Cellsize = 1.000000, 1.000000, 0.000000
npamsim I: Name of output or input model image: Map =
npamsim I: Hour angle limits [hours]: HAlimits = -5.0000000000000000, 5.0000000000000000
npamsim I: Declination of source in Model [deg.]: Dec = 0.0000000000000000
npamsim I: Frequency of radiation [Hz]: Freq = 344.999985152.000
npamsim I: Minimum elevation for unflagged data [deg.]: ELmin = 20.000000000000000
npamsim I: Primary beam application? : PB = T
npamsim I: Integration time [seconds]: INTtime = 600.000000000000000
npamsim I: Add noise to visibility data? : ADDN = F
npamsim I: rms phase noise per telescope per integration time: PHERMS = 1.000000
npamsim I: rms fractional complex gain deviation: GRMS = 5.0000000000000000

02
npamsim I: fractional gain drift for TOTAL POWER: GDRIFT = 0.0000000000000000
npamsim I: rms noise per correlator per integration time: NRMS = 0.100000
npamsim I: global pointing error, AZ, EL [arcsec]: GLPN = 0., 0.
npamsim I: original (random) pnt err, AZ, EL [arcsec]: ORPN = 0., 0.
npamsim I: drift in pointing over obs, AZ, EL [arcsec]: DRPN = 0., 0.
npamsim I: random pointing error, AZ, EL [arcsec]: RANPN = 3.000000

npamsim I: Name of telescope for header and PB: Telescope = MMA
npamsim I: Telescope diameter for type AIRY or AIRYB [meters]: Teldiam = 7.5000

00
npamsim I: Do we use uniform grid on SIN PROJECTION? : Sinproj = F
SDE run example

npamsim I: Use DFT for no pointing error case? [T/F] : DFT = F
npamsim I: Generate autocorrelations? : AutoC = T
npamsim I: Weighting for autocorrelations : AutoW = 0.4000000
npamsim I: Number of extra pointings in each direction : NED = 3
npamsim I: Name of output mosaic database : Mosaic = SMA/MK12#10.SDE
npamsim I: Name of output Visibility database (first pointing only) : *

npamsim I: *go

npamsim I: POINTING ERROR MODEL (ARCSECONDS)

npamsim I: GLOBAL POINTING ERRORS : AZ 0.0 EL 0.0
npamsim I: INITIAL POINTING SPREAD : AZ 0.0 EL 0.0
npamsim I: DRIFT IN POINTING : AZ 0.0 EL 0.0
npamsim I: RANDOM POINTING ERRORS : AZ 3.0 EL 3.0

npamsim I: There were 6 shadowed points out of 21
npamsim I: Found 1 components
npamsim I: Read model
npamsim I: Pointings seperated by 11.9573811616 arcseconds
npamsim I: We will make 1 integration intervals
npamsim I: Integration number 1
npamsim I: Data go to Temp/PC411
npamsim I: There were 6 shadowed points out of 21
npamsim I: RA ERROR AVE, arcseconds = -1.16
npamsim I: DEC ERROR AVE, arcseconds = 0.33
npamsim I: RA ERROR SPREAD, arcseconds = 2.14
npamsim I: DEC ERROR SPREAD, arcseconds = 1.87

npamsim I: Creating pointing ( -3, -3)
npamsim I: Transforming model, DFT
npamsim I: IMGDFTPE found 1 integration intervals
npamsim I: IMGDFTPE found 6 ANTENNAS
npamsim I: Data go to Temp/PC511
npamsim I: There were 6 shadowed points out of 21
npamsim I: RA ERROR AVE, arcseconds = 1.14
npamsim I: DEC ERROR AVE, arcseconds = -0.123
npamsim I: RA ERROR SPREAD, arcseconds = 2.18
npamsim I: DEC ERROR SPREAD, arcseconds = 3.54

npamsim I: Creating pointing ( -2, -3)
npamsim I: Transforming model, DFT
npamsim I: IMGDFTPE found 1 integration intervals
npamsim I: IMGDFTPE found 6 ANTENNAS
npamsim I: Data go to Temp/PC711
npamsim I: There were 6 shadowed points out of 21
npamsim I: RA ERROR AVE, arcseconds = -1.48
npamsim I: DEC ERROR AVE, arcseconds = 1.35
npamsim I: RA ERROR SPREAD, arcseconds = 1.96
npamsim I: DEC ERROR SPREAD, arcseconds = 1.6

npamsim I: Creating pointing ( -1, -3)
npamsim I: Transforming model, DFT
npamsim I: IMGDFTPE found 1 integration intervals
npamsim I: IMGDFTPE found 6 ANTENNAS

npamsim I: Data go to Temp/PC811
npamsim I: There were 6 shadowed points out of 21
npamsim I: RA ERROR AVE, arcseconds = 0.0918
npamsim I: DEC ERROR AVE, arcseconds = -0.561
npamsim I: RA ERROR SPREAD, arcseconds = 2.23
npamsim I: DEC ERROR SPREAD, arcseconds = 1.76

npamsim I: Creating pointing ( 0, -3)
npamsim I: Transforming model, DFT
npamsim I: IMGDFTPE found 1 integration intervals
npamsim I: IMGDFTPE found 6 ANTENNAS
npamsim I: Data go to Temp/PC511
npamsim I: There were 6 shadowed points out of 21
npamsim I: RA ERROR AVE, arcseconds = -0.677
npamsim I: DEC ERROR AVE, arcseconds = 0.185
npamsim I: RA ERROR SPREAD, arcseconds = 5.3
npamsim I: DEC ERROR SPREAD, arcseconds = 3.17

npamsim I: Creating pointing ( 1, -3)
npamsim I: Transforming model, DFT
npamsim I: IMGDFTPE found 1 integration intervals
npamsim I: IMGDFTPE found 6 ANTENNAS
npamsim I: Data go to Temp/PC611
npamsim I: There were 6 shadowed points out of 21
npamsim I: RA ERROR AVE, arcseconds = 1.26
npamsim I: DEC ERROR AVE, arcseconds = -0.961
npamsim I: RA ERROR SPREAD, arcseconds = 2.55
npamsim I: DEC ERROR SPREAD, arcseconds = 2.41

npamsim I: Creating pointing ( 2, -3)
npamsim I: Transforming model, DFT
npamsim I: IMGDFTPE found 1 integration intervals
npamsim I: IMGDFTPE found 6 ANTENNAS
npamsim I: Data go to Temp/PC711
npamsim I: There were 6 shadowed points out of 21
npamsim I: RA ERROR AVE, arcseconds = 0.52
npamsim I: DEC ERROR AVE, arcseconds = 0.868
npamsim I: RA ERROR SPREAD, arcseconds = 3.17
npamsim I: DEC ERROR SPREAD, arcseconds = 1.93

npamsim I: Creating pointing ( 3, -3)
npamsim I: Transforming model, DFT
npamsim I: IMGDFTPE found 1 integration intervals
npamsim I: IMGDFTPE found 6 ANTENNAS
npamsim I: Data go to Temp/PC811
npamsim I: There were 6 shadowed points out of 21
npamsim I: RA ERROR AVE, arcseconds = -0.283
npamsim I: DEC ERROR AVE, arcseconds = -0.297
npamsim I: RA ERROR SPREAD, arcseconds = 2.28
npamsim I: DEC ERROR SPREAD, arcseconds = 1.88

npamsim I: Creating pointing ( -3, -2)
SDE run example

npasim I: Transforming model, DFT
npasim I: IMGDFTPE found 1 integration intervals
npasim I: IMGDFTPE found 6 ANTENNAS
npasim I: Data go to Temp/PC911
npasim I: RA ERROR AVE, arcseconds = -1.75
npasim I: DEC ERROR AVE, arcseconds = 1.53
npasim I: RA ERROR SPREAD, arcseconds = 3.89
npasim I: DEC ERROR SPREAD, arcseconds = 2.56
npasim I: .
npasim I: Creating pointing ( -2, -2)
npasim I: Transforming model, DFT
npasim I: IMGDFTPE found 1 integration intervals
npasim I: IMGDFTPE found 6 ANTENNAS
npasim I: Data go to Temp/PC1011
npasim I: RA ERROR AVE, arcseconds = -1.78
npasim I: DEC ERROR AVE, arcseconds = 0.214
npasim I: RA ERROR SPREAD, arcseconds = 2.22
npasim I: DEC ERROR SPREAD, arcseconds = 2.21
npasim I: .
npasim I: Creating pointing ( -1, -2)
npasim I: Transforming model, DFT
npasim I: IMGDFTPE found 1 integration intervals
npasim I: IMGDFTPE found 6 ANTENNAS
npasim I: Data go to Temp/PC1111
npasim I: RA ERROR AVE, arcseconds = -1.17
npasim I: DEC ERROR AVE, arcseconds = -0.476
npasim I: RA ERROR SPREAD, arcseconds = 1.52
npasim I: DEC ERROR SPREAD, arcseconds = 1.99
npasim I: .
npasim I: Creating pointing ( 0, -2)
npasim I: Transforming model, DFT
npasim I: IMGDFTPE found 1 integration intervals
npasim I: IMGDFTPE found 6 ANTENNAS
npasim I: Data go to Temp/PC1211
npasim I: RA ERROR AVE, arcseconds = -1.13
npasim I: DEC ERROR AVE, arcseconds = -0.427
npasim I: RA ERROR SPREAD, arcseconds = 4.61
npasim I: DEC ERROR SPREAD, arcseconds = 2.45
npasim I: .
npasim I: Creating pointing ( 1, -2)
npasim I: Transforming model, DFT
npasim I: IMGDFTPE found 1 integration intervals
npasim I: IMGDFTPE found 6 ANTENNAS
npasim I: Data go to Temp/PC1311
npasim I: RA ERROR AVE, arcseconds = -1.03
npasim I: DEC ERROR AVE, arcseconds = 1.71
npasim I: RA ERROR SPREAD, arcseconds = 1.66
npasim I: DEC ERROR SPREAD, arcseconds = 1.92
npasim I: .
npasim I: Creating pointing ( 2, -2)
npasim I: Transforming model, DFT
npasim I: IMGDFTPE found 1 integration intervals
SDE run example

npamslm I: RA ERROR AVE, arcseconds = -1.3
npamslm I: DEC ERROR AVE, arcseconds = -1.41
npamslm I: RA ERROR SPREAD, arcseconds = 3.26
npamslm I: DEC ERROR SPREAD, arcseconds = 4.89
npamslm I: 
npamslm I: Creating pointing ( 1, -1)
npamslm I: Transforming model, DFT
npamslm I: IMGDFTE found 1 integration intervals
npamslm I: IMGDFTE found 6 ANTENNAS
npamslm I: Data go to Temp/PC2011
npamslm I: RA ERROR AVE, arcseconds = -0.0111
npamslm I: DEC ERROR AVE, arcseconds = 0.158
npamslm I: RA ERROR SPREAD, arcseconds = 3.32
npamslm I: DEC ERROR SPREAD, arcseconds = 4.3
npamslm I: 
npamslm I: Creating pointing ( 2, -1)
npamslm I: Transforming model, DFT
npamslm I: IMGDFTE found 1 integration intervals
npamslm I: IMGDFTE found 6 ANTENNAS
npamslm I: Data go to Temp/PC2111
npamslm I: RA ERROR AVE, arcseconds = 2.18
npamslm I: DEC ERROR AVE, arcseconds = 0.035
npamslm I: RA ERROR SPREAD, arcseconds = 2.13
npamslm I: DEC ERROR SPREAD, arcseconds = 1.98
npamslm I: 
npamslm I: Creating pointing ( 3, -1)
npamslm I: Transforming model, DFT
npamslm I: IMGDFTE found 1 integration intervals
npamslm I: IMGDFTE found 6 ANTENNAS
npamslm I: Data go to Temp/PC2211
npamslm I: RA ERROR AVE, arcseconds = 1.4
npamslm I: DEC ERROR AVE, arcseconds = -1.39
npamslm I: RA ERROR SPREAD, arcseconds = 2.78
npamslm I: DEC ERROR SPREAD, arcseconds = 3.45
npamslm I: 
npamslm I: Creating pointing ( -3, 0)
npamslm I: Transforming model, DFT
npamslm I: IMGDFTE found 1 integration intervals
npamslm I: IMGDFTE found 6 ANTENNAS
npamslm I: Data go to Temp/PC2311
npamslm I: RA ERROR AVE, arcseconds = -0.886
npamslm I: DEC ERROR AVE, arcseconds = 0.903
npamslm I: RA ERROR SPREAD, arcseconds = 2.07
npamslm I: DEC ERROR SPREAD, arcseconds = 1.39
npamslm I: 
npamslm I: Creating pointing ( -2, 0)
npamslm I: Transforming model, DFT
npamslm I: IMGDFTE found 1 integration intervals
npamslm I: IMGDFTE found 6 ANTENNAS
npamslm I: Data go to Temp/PC2411
npamslm I: RA ERROR AVE, arcseconds = -0.167
npamslm I: DEC ERROR AVE, arcseconds = 0.582
npamslm I: RA ERROR SPREAD, arcseconds = 3.37
npamslm I: DEC ERROR SPREAD, arcseconds = 0.652
npamslm I: 
npamslm I: Creating pointing ( -1, 0)
npamslm I: Transforming model, DFT
npamslm I: IMGDFTE found 1 integration intervals
npamslm I: IMGDFTE found 6 ANTENNAS
npamslm I: Data go to Temp/PC2511
npamslm I: RA ERROR AVE, arcseconds = 0.343
npamslm I: DEC ERROR AVE, arcseconds = 0.97
npamslm I: RA ERROR SPREAD, arcseconds = 4.31
npamslm I: DEC ERROR SPREAD, arcseconds = 0.924
npamslm I: 
npamslm I: Creating pointing ( 0, 0)
npamslm I: Transforming model, DFT
npamslm I: IMGDFTE found 1 integration intervals
npamslm I: IMGDFTE found 6 ANTENNAS
npamslm I: Data go to Temp/PC2611
npamslm I: RA ERROR AVE, arcseconds = 0.486
npamslm I: DEC ERROR AVE, arcseconds = 0.887
npamslm I: RA ERROR SPREAD, arcseconds = 2.4
npamslm I: DEC ERROR SPREAD, arcseconds = 2.83
npamslm I: 
npamslm I: Creating pointing ( 1, 0)
npamslm I: Transforming model, DFT
npamslm I: IMGDFTE found 1 integration intervals
npamslm I: IMGDFTE found 6 ANTENNAS
npamslm I: Data go to Temp/PC2711
npamslm I: RA ERROR AVE, arcseconds = 0.254
npamslm I: DEC ERROR AVE, arcseconds = -0.913
npamslm I: RA ERROR SPREAD, arcseconds = 3.33
npamslm I: DEC ERROR SPREAD, arcseconds = 3.17
npamslm I: 
npamslm I: Creating pointing ( 2, 0)
npamslm I: Transforming model, DFT
npamslm I: IMGDFTE found 1 integration intervals
npamslm I: IMGDFTE found 6 ANTENNAS
npamslm I: Data go to Temp/PC2811
npamslm I: RA ERROR AVE, arcseconds = 0.805
npamslm I: DEC ERROR AVE, arcseconds = 1.47
npamslm I: RA ERROR SPREAD, arcseconds = 2.76
npamslm I: DEC ERROR SPREAD, arcseconds = 4.43
npamslm I: 
npamslm I: Creating pointing ( 3, 0)
npamslm I: Transforming model, DFT
npamslm I: IMGDFTE found 1 integration intervals
npamslm I: IMGDFTE found 6 ANTENNAS
npamslm I: Data go to Temp/PC2911
npamslm I: RA ERROR AVE, arcseconds = 1.2
npamslm I: DEC ERROR AVE, arcseconds = -0.0381
npamslm I: RA ERROR SPREAD, arcseconds = 2.8
npamslm I: DEC ERROR SPREAD, arcseconds = 3.02
SDE run example

npam: sim I: Creating pointing ( -3, 1)
npam: sim I: Transforming model, DFT
npam: sim I: IMGDFTPE found 1 integration intervals
npam: sim I: IMGDFTPE found 6 ANTIENNAS
npam: sim I: Data go to Temp/PC3011
npam: sim I: RA ERROR AVE, arcseconds = -1.11
npam: sim I: DEC ERROR AVE, arcseconds = -0.27
npam: sim I: RA ERROR SPREAD, arcseconds = 2.74
npam: sim I: DEC ERROR SPREAD, arcseconds = 3.13
npam: sim I: Creating pointing ( -2, 1)
npam: sim I: Transforming model, DFT
npam: sim I: IMGDFTPE found 1 integration intervals
npam: sim I: IMGDFTPE found 6 ANTIENNAS
npam: sim I: Data go to Temp/PC3011
npam: sim I: RA ERROR AVE, arcseconds = 1.03
npam: sim I: DEC ERROR AVE, arcseconds = 0.0415
npam: sim I: RA ERROR SPREAD, arcseconds = 3.37
npam: sim I: DEC ERROR SPREAD, arcseconds = 1.24

npam: sim I: Creating pointing ( -1, 1)
npam: sim I: Transforming model, DFT
npam: sim I: IMGDFTPE found 1 integration intervals
npam: sim I: IMGDFTPE found 6 ANTIENNAS
npam: sim I: Data go to Temp/PC3211
npam: sim I: RA ERROR AVE, arcseconds = -0.302
npam: sim I: DEC ERROR AVE, arcseconds = 0.743
npam: sim I: RA ERROR SPREAD, arcseconds = 2.62
npam: sim I: DEC ERROR SPREAD, arcseconds = 2.72
npam: sim I: Creating pointing ( 0, 1)
npam: sim I: Transforming model, DFT
npam: sim I: IMGDFTPE found 1 integration intervals
npam: sim I: IMGDFTPE found 6 ANTIENNAS
npam: sim I: Data go to Temp/PC3311
npam: sim I: RA ERROR AVE, arcseconds = 0.792
npam: sim I: DEC ERROR AVE, arcseconds = 2.84
npam: sim I: RA ERROR SPREAD, arcseconds = 4.41
npam: sim I: DEC ERROR SPREAD, arcseconds = 1.59

npam: sim I: Creating pointing ( 1, 1)
npam: sim I: Transforming model, DFT
npam: sim I: IMGDFTPE found 1 integration intervals
npam: sim I: IMGDFTPE found 6 ANTIENNAS
npam: sim I: Data go to Temp/PC3411
npam: sim I: RA ERROR AVE, arcseconds = 0.166
npam: sim I: DEC ERROR AVE, arcseconds = -0.88
npam: sim I: RA ERROR SPREAD, arcseconds = 1.05
npam: sim I: DEC ERROR SPREAD, arcseconds = 3.48

npam: sim I: Creating pointing ( 2, 1)
npam: sim I: Transforming model, DFT
npam: sim I: IMGDFTPE found 1 integration intervals
npam: sim I: IMGDFTPE found 6 ANTIENNAS
npam: sim I: Data go to Temp/PC3511
npam: sim I: RA ERROR AVE, arcseconds = 0.943
npam: sim I: DEC ERROR AVE, arcseconds = -1.25
npam: sim I: RA ERROR SPREAD, arcseconds = 1.45
npam: sim I: DEC ERROR SPREAD, arcseconds = 1.17
npam: sim I: Creating pointing ( 3, 1)
npam: sim I: Transforming model, DFT
npam: sim I: IMGDFTPE found 1 integration intervals
npam: sim I: IMGDFTPE found 6 ANTIENNAS
npam: sim I: Data go to Temp/PC3611
npam: sim I: RA ERROR AVE, arcseconds = 0.588
npam: sim I: DEC ERROR AVE, arcseconds = -4.61
npam: sim I: RA ERROR SPREAD, arcseconds = 2.57
npam: sim I: DEC ERROR SPREAD, arcseconds = 2.0

npam: sim I: Creating pointing ( -3, 2)
npam: sim I: Transforming model, DFT
npam: sim I: IMGDFTPE found 1 integration intervals
npam: sim I: IMGDFTPE found 6 ANTIENNAS
npam: sim I: Data go to Temp/PC3711
npam: sim I: RA ERROR AVE, arcseconds = -1.13
npam: sim I: DEC ERROR AVE, arcseconds = 0.179
npam: sim I: RA ERROR SPREAD, arcseconds = 2.12
npam: sim I: DEC ERROR SPREAD, arcseconds = 3.58

npam: sim I: Creating pointing ( -2, 2)
npam: sim I: Transforming model, DFT
npam: sim I: IMGDFTPE found 1 integration intervals
npam: sim I: IMGDFTPE found 6 ANTIENNAS
npam: sim I: Data go to Temp/PC3811
npam: sim I: RA ERROR AVE, arcseconds = -0.739
npam: sim I: DEC ERROR AVE, arcseconds = 0.564
npam: sim I: RA ERROR SPREAD, arcseconds = 2.22
npam: sim I: DEC ERROR SPREAD, arcseconds = 1.76

npam: sim I: Creating pointing ( -1, 2)
npam: sim I: Transforming model, DFT
npam: sim I: IMGDFTPE found 1 integration intervals
npam: sim I: IMGDFTPE found 6 ANTIENNAS
npam: sim I: Data go to Temp/PC3911
npam: sim I: RA ERROR AVE, arcseconds = -0.0739
npam: sim I: DEC ERROR AVE, arcseconds = 0.564
npam: sim I: RA ERROR SPREAD, arcseconds = 2.22
npam: sim I: DEC ERROR SPREAD, arcseconds = 1.76

npam: sim I: Creating pointing ( 0, 2)
npam: sim I: Transforming model, DFT
npam: sim I: IMGDFTPE found 1 integration intervals
SDE run example

npamisim I: IMGDFTPE found 6 ANTENNAS
npamisim I: Data go to Temp/PC4011
npamisim I: RA ERROR AVE, arcseconds = 0.112
npamisim I: DEC ERROR AVE, arcseconds = -0.112
npamisim I: RA ERROR SPREAD, arcseconds = 4.87
npamisim I: DEC ERROR SPREAD, arcseconds = 2.41
npamisim I: Creating pointing ( 1, 2)
npamisim I: Transforming model, DFT
npamisim I: IMGDFTPE found 1 integration intervals
npamisim I: IMGDFTPE found 6 ANTENNAS
npamisim I: Data go to Temp/PC4111
npamisim I: RA ERROR AVE, arcseconds = -0.85
npamisim I: DEC ERROR AVE, arcseconds = 1.57
npamisim I: RA ERROR SPREAD, arcseconds = 3.04
npamisim I: DEC ERROR SPREAD, arcseconds = 4.07
npamisim I: Creating pointing ( -1, 3)
npamisim I: Transforming model, DFT
npamisim I: IMGDFTPE found 1 integration intervals
npamisim I: IMGDFTPE found 6 ANTENNAS
npamisim I: Data go to Temp/PC4611
npamisim I: There were 6 shadowed points out of 21
npamisim I: RA ERROR AVE, arcseconds = -0.619
npamisim I: DEC ERROR AVE, arcseconds = -0.309
npamisim I: RA ERROR SPREAD, arcseconds = 1.71
npamisim I: DEC ERROR SPREAD, arcseconds = 1.14
npamisim I: Creating pointing ( 0, 3)
npamisim I: Transforming model, DFT
npamisim I: IMGDFTPE found 1 integration intervals
npamisim I: IMGDFTPE found 6 ANTENNAS
npamisim I: Data go to Temp/PC4711
npamisim I: There were 11 shadowed points out of 21
npamisim I: RA ERROR AVE, arcseconds = -0.625
npamisim I: DEC ERROR AVE, arcseconds = -2.13
npamisim I: RA ERROR SPREAD, arcseconds = 2.29
npamisim I: DEC ERROR SPREAD, arcseconds = 2.23
npamisim I: Creating pointing ( 1, 3)
npamisim I: Transforming model, DFT
npamisim I: IMGDFTPE found 1 integration intervals
npamisim I: IMGDFTPE found 6 ANTENNAS
npamisim I: Data go to Temp/PC4811
npamisim I: There were 11 shadowed points out of 21
npamisim I: RA ERROR AVE, arcseconds = 0.886
npamisim I: DEC ERROR AVE, arcseconds = -0.522
npamisim I: RA ERROR SPREAD, arcseconds = 2.93
npamisim I: DEC ERROR SPREAD, arcseconds = 2.07
npamisim I: Creating pointing ( 2, 3)
npamisim I: Transforming model, DFT
npamisim I: IMGDFTPE found 1 integration intervals
npamisim I: IMGDFTPE found 6 ANTENNAS
npamisim I: Data go to Temp/PC4911
npamisim I: There were 15 shadowed points out of 21
npamisim I: RA ERROR AVE, arcseconds = -0.128
npamisim I: DEC ERROR AVE, arcseconds = 0.0934
npamisim I: RA ERROR SPREAD, arcseconds = 4.98
npamisim I: DEC ERROR SPREAD, arcseconds = 2.17
npamisim I: Creating pointing ( 3, 3)
npamisim I: Transforming model, DFT
npamisim I: IMGDFTPE found 1 integration intervals
npamisim I: IMGDFTPE found 6 ANTENNAS
npamisim I: Data go to Temp/PC4511
npamisim I: There were 15 shadowed points out of 21
npamisim I: RA ERROR AVE, arcseconds = -0.053
npamisim I: DEC ERROR AVE, arcseconds = 0.0257
npamisim I: RA ERROR SPREAD, arcseconds = 4.98
npamisim I: DEC ERROR SPREAD, arcseconds = 2.17
SDE run example

mpasn1: IMGDFTPE found 1 integration intervals
mpasn1: IMGDFTPE found 6 ANTENNAS
mpasn1: Writing new mosaic file as SDE file
mpasn1: Writing Vis to SDE format file SMA/MK12#10.SDE
mpasn1: User: 142.65 System: 5.23
mpasn1: Run on cfacxl

% mosaic
mosaic: I perform maximum entropy mosaicing
mosaic: Compiled : Tue Jul 10 15:35:05 EDT 1990
mosaic: Mos = SMA/MK12#10.SDmosaic I: *E
mosaic: *VM = D1/MK12#10VM.FTS
mosaic: *CVM = D1/MK12#10CVM.FTS
mosaic: *Res = D1/MK12#10RVM.FTS
mosaic: *Iml = 128,128
mosaic: *Imp
mosaic: Mosaic visibility file (must be specified if Vis is not) :
mosaic: A/MK12#10.SDE
mosaic: Default (can be left blank) : Default =
mosaic: VM (can already exist, can be left blank) : VM =
mosaic: Convolved VM plus residuals (can be left blank) : CVM =
mosaic: FTS
mosaic: Residual image (can be left blank) : Residual =
mosaic: Number of Iterations (<0 for automatic stopping) : Niter =
mosaic: Required total flux (<0 for a guess) : Tflux = 20.00000
mosaic: Required final fit in Jy/beam or Jy : Sigan = 4.9999995E-03
mosaic: Telescopes with specific sigma : Telnames =
mosaic: SIGMA for specific telescope : Sigtel = 1.0000001E-03,
mosaic: 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.000001E-03, 1.0000001E-03, 1.000001E-03, 1.0000001E-03,
mosaic: E-03,
mosaic: 1.00000001E-03, 1.000000001E-03, 1.0000001E-03, 1.000001E-03,
mosaic: 1.000001E-03, 1.0000001E-03, 1.000001E-03, 1.0000001E-03,
mosaic: E-03,
mosaic: 1.00000001E-03, 1.000001E-03
mosaic: Form to optimize, Entropy or emptiness [H|E] : Entropy = H
mosaic: Smoothing beam, BMAJ, BMIN, BPA, BZ : Beam = 1.000000,
mosaic: 1.00000001E-03, 1.000000001E-03, 1.0000001E-03, 1.000001E-03,
mosaic: 1.000001E-03, 1.0000001E-03, 1.000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
mosaic: 1.0000001E-03, 1.00000001E-03, 1.000000001E-03, 1.0000001E-03,
SDE run example

```
mosaic I: Pointing 28 : selected 21 visibilities
mosaic I: Pointing 29 : selected 21 visibilities
mosaic I: Pointing 30 : selected 21 visibilities
mosaic I: Pointing 31 : selected 21 visibilities
mosaic I: Pointing 32 : selected 21 visibilities
mosaic I: Pointing 33 : selected 21 visibilities
mosaic I: Pointing 34 : selected 21 visibilities
mosaic I: Pointing 35 : selected 21 visibilities
mosaic I: Pointing 36 : selected 21 visibilities
mosaic I: Pointing 37 : selected 21 visibilities
mosaic I: Pointing 38 : selected 21 visibilities
mosaic I: Pointing 39 : selected 21 visibilities
mosaic I: Pointing 40 : selected 21 visibilities
mosaic I: Pointing 41 : selected 21 visibilities
mosaic I: Pointing 42 : selected 21 visibilities
mosaic I: Pointing 43 : selected 21 visibilities
mosaic I: Pointing 44 : selected 21 visibilities
mosaic I: Pointing 45 : selected 15 visibilities
mosaic I: Pointing 46 : selected 15 visibilities
mosaic I: Pointing 47 : selected 10 visibilities
mosaic I: Pointing 48 : selected 10 visibilities
mosaic I: Pointing 49 : selected 6 visibilities
mosaic I: Got data: User: 23.56 System: 1.01
mosaic I: Creating new VM image
mosaic I: Coordinates for VM:
  mosaic I: Axis Name Pixels Ref. Pix Ref. Value Increment:
    mosaic I: 1 RA---SIN 128 64.00 0.000E+00 -2.770E-04
    mosaic I: 2 DEC---SIN 128 64.00 3.000E+01 2.770E-04
    mosaic I: 3 FREQ 1 1.00 3.450E+11 3.450E+10
mosaic I: Coordinates for transform of VM:
  mosaic I: Axis Name Pixels Ref. Pix Ref. Value Increment:
    mosaic I: 1 UU---SIN 129 1.00 0.000E+00 -8.057E+02
    mosaic I: 2 VV---SIN 256 128.00 0.000E+00 8.057E+02
    mosaic I: 3 FREQ 1 1.00 3.450E+11 3.450E+10
    mosaic I: 4 RA---SIN 1 128.00 0.000E+00 -2.778E-04
    mosaic I: 5 DEC---SIN 1 128.00 3.000E+01 2.778E-04
mosaic I: Using flat default
mosaic I: Initial guess is a flat image
mosaic I: Initialized dirty images
mosaic I: Initial fit = 1001.432, Sum of weights = 3.063E+07
mosaic I: Iteration  Entropy  Flux  Fit
  mosaic I: 1 20.336 998.891 0.4
  mosaic I: 2 20.336 998.891 0.4
  mosaic I: 3 20.336 998.891 0.4
  mosaic I: 4 20.336 998.891 0.4
  mosaic I: 5 20.336 998.891 0.4
  mosaic I: 6 20.336 998.891 0.4
  mosaic I: 7 20.336 998.891 0.4
  mosaic I: 8 20.336 998.891 0.4
  mosaic I: 9 20.336 998.891 0.4
  mosaic I: 10 20.336 998.891 0.4
mosaic I: Opening FITS file DI/MK12#10VM.FITS for WRITE as VM
mosaic I: Writing 32-bit scaled-integer format
mosaic I: Writing 2-dimensional image VM
  mosaic I: 11 21.386 990.535 0.6
  mosaic I: 12 21.651 988.358 0.6
  mosaic I: 13 21.978 985.633 0.6
  mosaic I: 14 22.388 982.171 0.6
  mosaic I: 15 22.907 977.702 0.6
mosaic I: Opening FITS file DI/MK12#10VM.FITS for WRITE as VM
mosaic I: Writing 32-bit scaled-integer format
mosaic I: Writing 2-dimensional image VM
  mosaic I: Pointing: 1 Fit = 1.504E-01 sigma
  mosaic I: Pointing: 2 Fit = 4.980E-01 sigma
  mosaic I: Pointing: 3 Fit = 1.032E+00 sigma
  mosaic I: Pointing: 4 Fit = 9.683E-01 sigma
  mosaic I: Pointing: 5 Fit = 8.171E-01 sigma
  mosaic I: Pointing: 6 Fit = 2.240E-01 sigma
  mosaic I: Pointing: 7 Fit = 1.142E+01 sigma
  mosaic I: Pointing: 8 Fit = 3.097E-01 sigma
  mosaic I: Pointing: 9 Fit = 1.389E+00 sigma
  mosaic I: Pointing: 10 Fit = 3.335E+00 sigma
  mosaic I: Pointing: 11 Fit = 4.408E+00 sigma
  mosaic I: Pointing: 12 Fit = 3.620E+00 sigma
  mosaic I: Pointing: 13 Fit = 1.918E+00 sigma
  mosaic I: Pointing: 14 Fit = 5.198E-01 sigma
  mosaic I: Pointing: 15 Fit = 8.259E-01 sigma
  mosaic I: Pointing: 16 Fit = 3.330E+00 sigma
  mosaic I: Pointing: 17 Fit = 7.713E+00 sigma
  mosaic I: Pointing: 18 Fit = 1.038E+01 sigma
  mosaic I: Pointing: 19 Fit = 7.986E+00 sigma
  mosaic I: Pointing: 20 Fit = 3.943E+00 sigma
  mosaic I: Pointing: 21 Fit = 5.792E-01 sigma
  mosaic I: Pointing: 22 Fit = 1.361E+00 sigma
  mosaic I: Pointing: 23 Fit = 4.194E+00 sigma
  mosaic I: Pointing: 24 Fit = 1.062E+01 sigma
  mosaic I: Pointing: 25 Fit = 1.366E+01 sigma
  mosaic I: Pointing: 26 Fit = 1.026E+01 sigma
  mosaic I: Pointing: 27 Fit = 4.632E+00 sigma
  mosaic I: Pointing: 28 Fit = 9.868E-01 sigma
  mosaic I: Pointing: 29 Fit = 9.761E-01 sigma
  mosaic I: Pointing: 30 Fit = 3.323E+00 sigma
  mosaic I: Pointing: 31 Fit = 8.381E+00 sigma
```
SDE run example

mosaic I: Pointing:  32 Fit =  1.020E+01 sigma
mosaic I: Pointing:  33 Fit =  6.634E+00 sigma
mosaic I: Pointing:  34 Fit =  3.400E+00 sigma
mosaic I: Pointing:  35 Fit =  6.922E-01 sigma
mosaic I: Pointing:  36 Fit =  4.150E-01 sigma
mosaic I: Pointing:  37 Fit =  2.046E+00 sigma
mosaic I: Pointing:  38 Fit =  3.470E+00 sigma
mosaic I: Pointing:  39 Fit =  4.313E+00 sigma
mosaic I: Pointing:  40 Fit =  3.415E+00 sigma
mosaic I: Pointing:  41 Fit =  1.688E+00 sigma
mosaic I: Pointing:  42 Fit =  4.812E-01 sigma
mosaic I: Pointing:  43 Fit =  1.244E-01 sigma
mosaic I: Pointing:  44 Fit =  3.745E-01 sigma
mosaic I: Pointing:  45 Fit =  8.829E-01 sigma
mosaic I: Pointing:  46 Fit =  1.179E+00 sigma
mosaic I: Pointing:  47 Fit =  1.555E+00 sigma
mosaic I: Pointing:  48 Fit =  2.546E-01 sigma
mosaic I: Pointing:  49 Fit =  1.496E-01 sigma
mosaic I: Opening FITS file D1/MK12#10RV.M.FTS for WRITE as Residual
mosaic I: Writing 32-bit scaled-integer format
mosaic I: Writing 2-dimensional image Residual
mosaic I: User:  1110.72 System:  15.89
mosaic I: Run on cfacxl