Quick Intro to Gemini IRAF

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Gemini Data Format

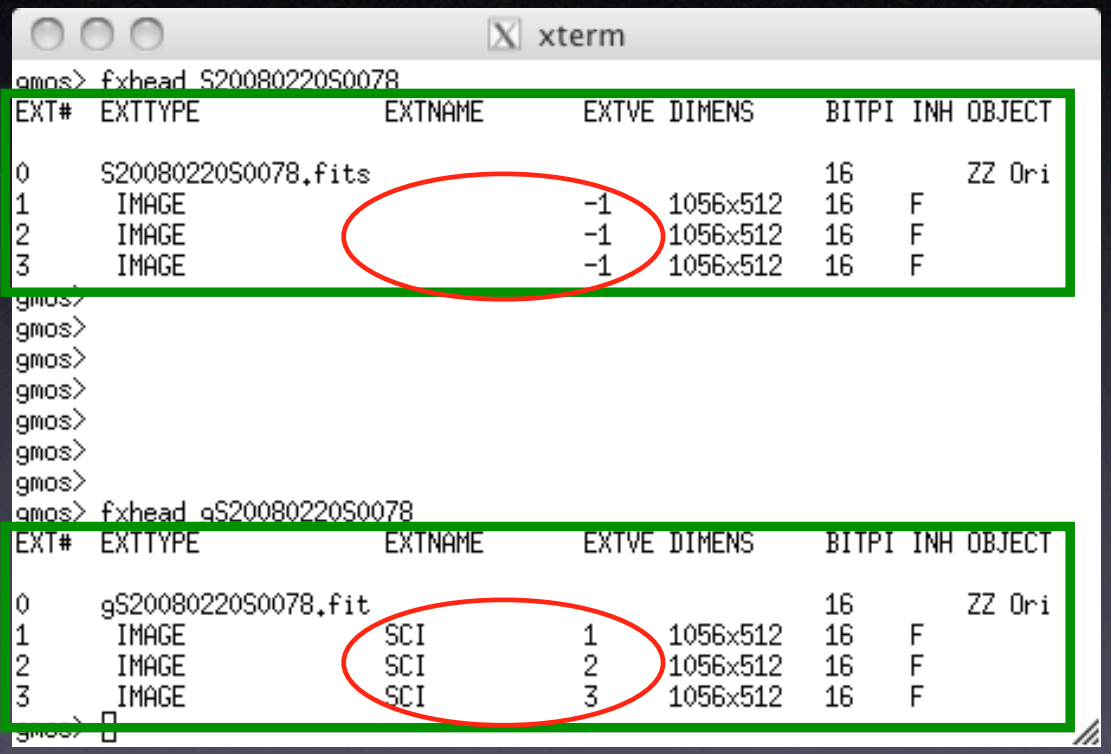
- Multi-extension FITS (MEF)
- Once "prepared", the extensions are named and versioned. (EXTNAME, EXTVER)
- SCI = Science; VAR = Variance; DQ = Data Quality; MDF = Mask Definition File
- Use fxhead (fitsutil package) to see what it looks like

Gemini Data Format

GMOS dataset

Raw dataset

Prepared dataset

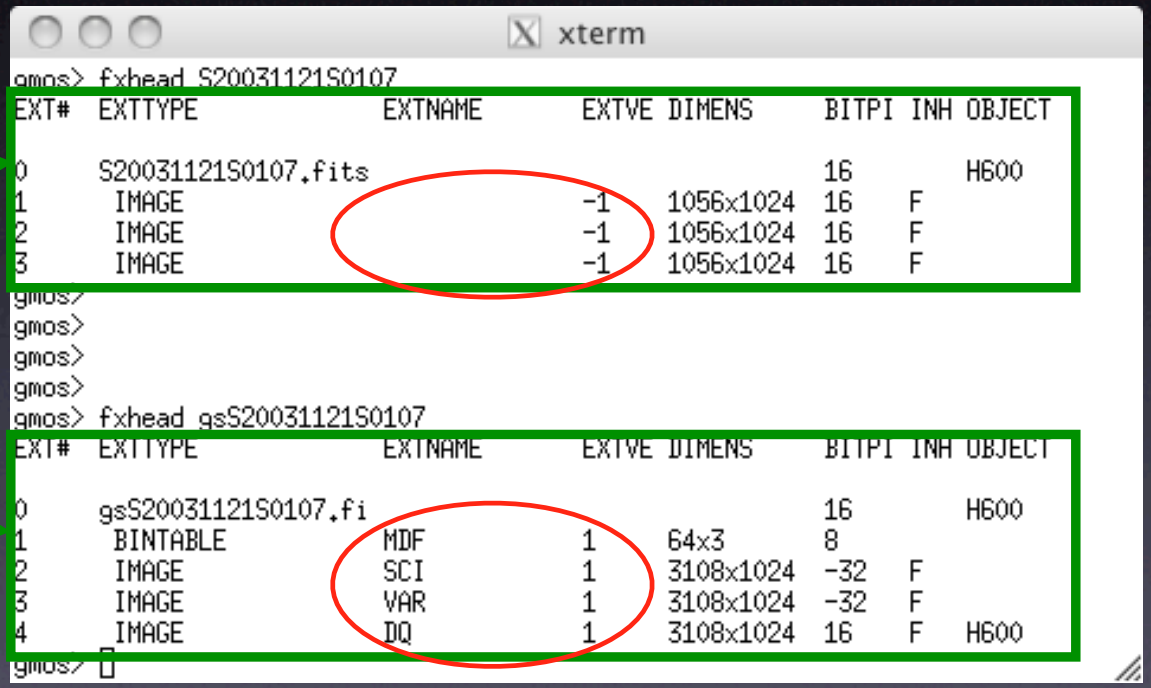


Gemini Data Format

GMOS longslit dataset

Raw dataset

Processed and mosaiced dataset with variance and DQ



GMOS MOS dataset

Raw dataset

Processed and cut MOS dataset with variance and DQ

Untitled

```
gmos> fxhead N20011221S140
EXT#  EXTTYPE              EXTNAME      EXTVE DIMENS     BITPI INH OBJECT

0     N20011221S140.fits                              16        Abell851
1      IMAGE                           -1   2080x4608  16    F
2      IMAGE                           -1   2080x4608  16    F
3      IMAGE                           -1   2080x4608  16    F
gmos>
gmos>
gmos>
gmos> fxhead gsN20011221S140
EXT#  EXTTYPE              EXTNAME      EXTVE DIMENS     BITPI INH OBJECT

0     gsN20011221S140.fit                             16        Abell851
1      BINTABLE            MDF          1    118x37     8
2      IMAGE               SCI          1    6218x101   -32   F   148
3      IMAGE               VAR          1    6218x101   -32   F   Abell851
4      IMAGE               DQ           1    6218x101   16    F   Abell851
5      IMAGE               SCI          2    6218x85    -32   F   138
6      IMAGE               VAR          2    6218x85    -32   F   Abell851
7      IMAGE               DQ           2    6218x85    16    F   Abell851
8      IMAGE               SCI          3    6218x41    -32   F   80
9      IMAGE               VAR          3    6218x41    -32   F   Abell851
10     IMAGE               DQ           3    6218x41    16    F   Abell851
...
...
95     IMAGE               SCI          32   6218x130   -32   F   3515
96     IMAGE               VAR          32   6218x130   -32   F   Abell851
97     IMAGE               DQ           32   6218x130   16    F   Abell851
98     IMAGE               SCI          33   6218x130   -32   F   3463
99     IMAGE               VAR          33   6218x130   -32   F   Abell851
100    IMAGE               DQ           33   6218x130   16    F   Abell851
101    IMAGE               SCI          34   6218x72    -32   F   3302
102    IMAGE               VAR          34   6218x72    -32   F   Abell851
103    IMAGE               DQ           34   6218x72    16    F   Abell851
gmos>
```

Gemini Data Format

- The gemini tasks handle and *expect* MEF files.
- To access PHU and extensions in IRAF:
  - imheader S20100719S0001[0]
  - imstat S20100719S0001[3]
  - display rgS20100719S0001[SCI,2]
- To see what is in the MDF:
  - tread gS20100719S0001[MDF]

Data Reduction Package – Objective

For all Gemini facility instruments, provide the tools necessary to remove instrument and atmospheric signatures from data.

Gemini IRAF package

- The package currently supports the following instruments:
  - GMOS [imaging, longslit, MOS, IFU] (gmos package)
  - NIRI [imaging, longslit] (niri and gnirs package)
  - GNIRS [longslit, XD, IFU] (gnirs package)
  - NIFS [IFU] (nifs and gnirs package)
  - Michelle [imaging, longslit] (midir and gnirs package)
  - T-ReCS [imaging, longslit] (midir and gnirs package)

Gemini IRAF package

- All raw frame must be "prepared", even if you are going to use your own software afterwards.

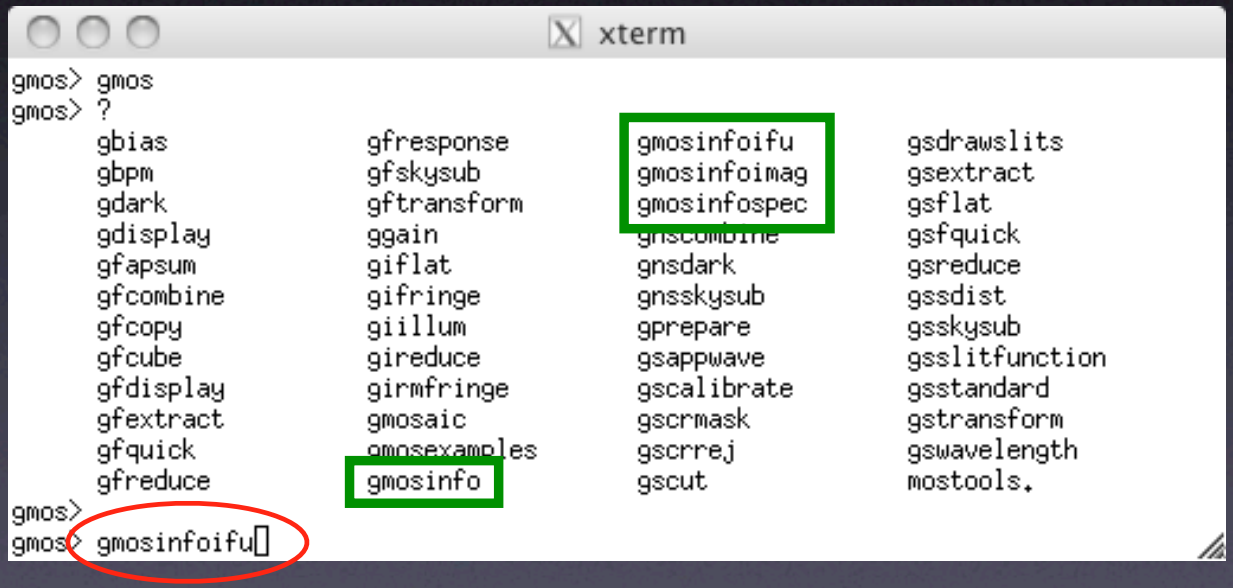
Eg. gprepare will add the correct values for GAIN and RDNOISE.

Eg. saturation level and non-linearity level will be added.

Eg. The MDF will be added.

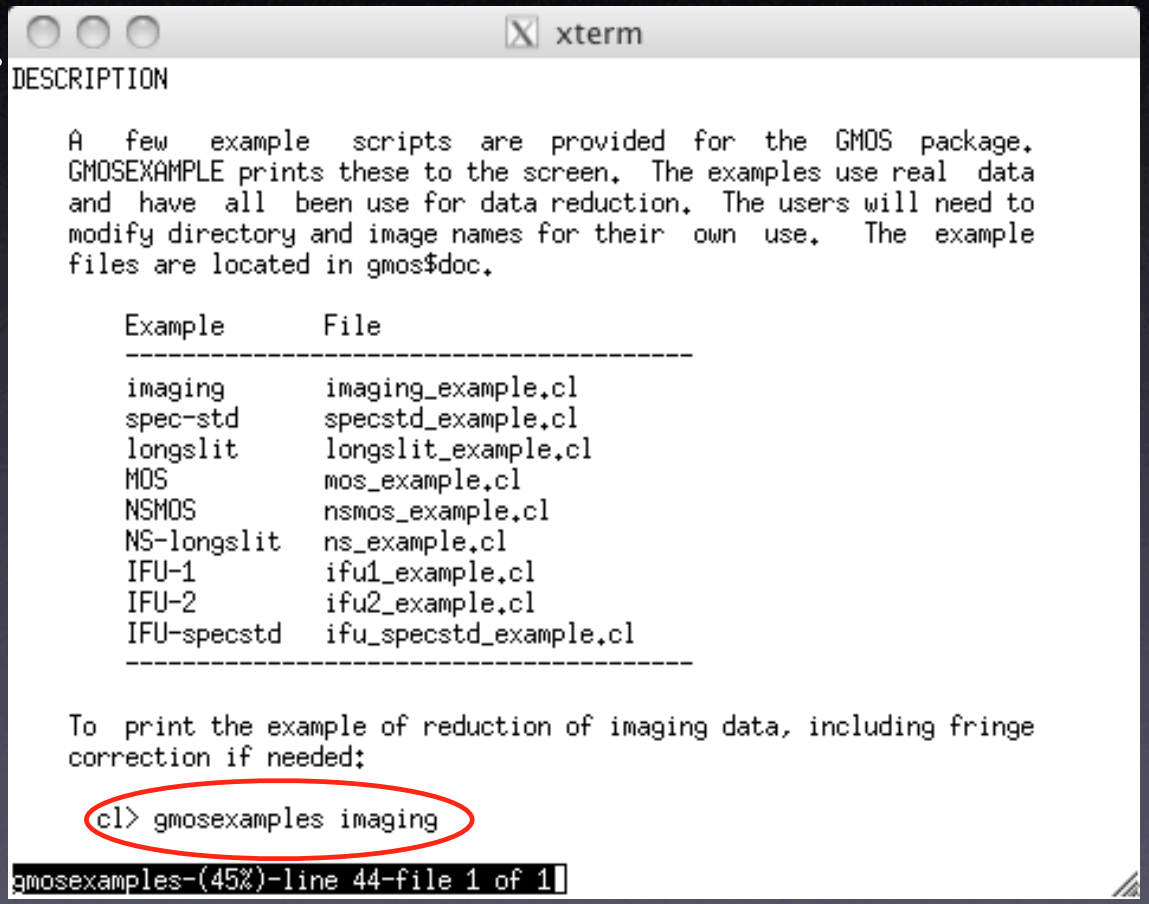
Gemini IRAF package

- Want an overview of how to reduce? Start with the "info" script.



Gemini IRAF package

- Want an example reduction script? Try the "examples" script.



Gemini IRAF package

- Want to know about a specific task? Read the help page.

```
phelp wmef
```

Untitled

```
WMEF (Oct2001)              gemini.gemtools              WMEF (Oct2001)

NAME
    wmef -- convert individual FITS or PLIO (.pl) files to a MEF file

USAGE
    wmef input output

PARAMETERS

    input
        A comma separated list of input files ...
    ...
    ...

DESCRIPTION
    WMEF is a task that creates a Multi-Extension  Fits  (MEF)  (output)
    from individual files, input.
    ...
    ...

EXAMPLES
    1.  Create a MEF file with three NIRI files containing the data, the
    variance and the data quality information:

        cl> wmef data.fits,var.fits,dq.pl niridata
    ...

BUGS

SEE ALSO
    fxdummy, fxinsert, fxheader
```

Gemini IRAF package

- Gemini package tasks you should be aware of
  - gemarith and gemexpr
    - Arithmetic on MEF files (akin to imarith and imexpr)
  - gemcombine
    - Average, sum, median combine MEF files (akin to imcombine)
  - wmef
    - From single FITS files, build a MEF file
  - gemlist
    - Cute little tool to make list of gemini datasets using the standard naming convention: N20100719S0001
- Bottom line, check the gemtools package.

Heads-up – Python's coming

- As of v1.10, the package is PyRAF compatible.
- New development work is done in Python.
- We are working on a new, more automated, data reduction system called the Recipe System.
- At the center of the Recipe System is AstroData. This will be of interest to astronomers coding in Python.