File: ISIS-PG-FMT101_QmatchForm_mat.pdf

Description of Qmatch Program Measurement Input and Output File Format(.mat).

Created as part of a project to put planetary geodesy control networks on the web. These control networks are from ISIS Planetary Geodesy Software (formerly RAND/USGS Planetary Geodesy (RUPG) Software).

Version: 2023.12.08

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Filename: [moon]_matchpoint_network.mat
(example: ariel_matchpoint_network.mat)

Description: ISIS qmatch matchpoint file format.

File format:

Group 1 - Header records (2 records) (Note 1):
Record 1:
Name Columns Format Description (units)
- 1-18 A18 Text: "Matchpoint total ="
nmea 19-24 I6 Number of measurements in file
Record 2:
Name Columns Format Description (units)
- 1-91 A91 Text:
"Point ID FSC LINE SAMP CLASS
DIAMETER Comment"
Sample (from file generated from the RAND Lunar Clementine solution, "dixy0.mat"):
=>Matchpoint total = 661<=
=>Point ID FSC LINE SAMP CLASS
DIAMETER Comment<=

Group 2 - Image pixel measurements ("nmea" records) (Note 2):
Name Columns Format Description (units)
Pointid 1-32 A32 Alphanumeric point identification
(unitless). Note 3.
Imageid 34-43 I10 Integer image identification. Usually
flight data sequence (FSC) or similar image number (unitless). Note 4.
Line 44-51F8.2 Line measurement on image (pixels).
Note 5.
Sample 52-59F8.2 Sample measurement on image (pixels).
Note 5.
Class 63 A1 Measurement class. Possible values are:
A - Previous measures, not used currently.
G - Measurement on a DIM (e.g. MOLA).
M - Manually measured.
T - Truth measure to which others are tied.
S - Automatic sub-pixel measurement.
U - Unmeasured (e.g. predicted/unverified).
Note 6.
Diameter 65-82 F18.4 Feature size (e.g. crater diameter)
(km). If blank or "-0.0000" no value is available. Note 7.

Comment 83- A User comment. Must be quoted or not
contain spaces (default is blank). Note 8.
Sample (first 5 measurements from file generated using the randtoqm
program, with input format #2, input=dixy0.mat):

```
1 3494830 762.2 521.2 M
-0.0000 "Picno=40037, F.L.= 1500.190, mm meas= 5.0189 1.5729,
File=dixy0.dat"
1 3494832 696.3 566.9 M
-0.0000 "Picno=40038, F.L.= 1500.190, mm meas= 4.0755 2.2100,
File=dixy0.dat"
1 4399616 407.1 491.6 M
-0.0000 "Picno=40543, F.L.= 1503.490, mm meas= 0.1075 1.2600,
File=dixy0.dat"
2 3494816 143.8 471.7 M
-0.0000 "Picno=40030, F.L.= 1500.190, mm meas= -3.5772 0.9308,
File=dixy0.dat"
2 3494818 149.0 390.8 M
-0.0000 "Picno=40031, F.L.= 1500.190, mm meas= -3.4951 -0.1810,
File=dixy0.dat"
```

Notes:

1. In some non-standard versions of files in this format, the header records may be missing, or the number of records may be missing or incorrect (or given as "XXXXXX").
2. The ISIS Qmatch program reads and writes the Group 2 records in free format, with blanks for field separation. However, the nominal format is given here, and this was in fact required by some of the early RAND and USGS utility programs which read this format, and is still used by some of the ISIS programs that have not yet been switched to using free format.
3. The ISIS Planetary Geodesy software currently allows for 7 character point identifications, in a right justified (A7) format. (Some early RAND and USGS utility programs require the use of 5 character point identifications for non-lunar data.)
4. ISIS 2.x currently requires that image identifications be integer*4 numbers. Future versions of ISIS (e.g. 3.x) will allow for alphanumeric identifications, probably up to at least 32 characters.
5. Line and sample coordinates are in the sense that coordinate (1,1) is defined as at the upper-left pixel of an image. Integer coordinates define the center of each pixel.
6. For each point, a reference (or "truth") image should preferably be identified and the CLASS designator set to "T". (The other measures on the point should have one of the other classes.) The reference image can be selected arbitrarily, or perhaps selected as the image with the clearest (or highest resolution) view of the point. The ISIS Qmatch program will not display images for a point until one of the images is designated the "truth" image.
7. Some early non-standard versions of file in this format had the resolution given in km/pixel, rather than feature size.
8. It is useful to put the actual filename of the image corresponding to the given imageid into the comment field, in order to document the physical connection between the measurements here and actual image files. Note that the user must also keep track of and document the use of multiple versions of images (and their corresponding measurement files if any) in the case where there may be a geometric change in the image.

Other notes:
A. In some non-standard versions of files in this format, lines beginning with "#" should be treated as comments.
B. The user must currently take care to keep measurement files separated as much as possible by mission (and/or camera), in cases where image numbers are not unique across missions. A future version (e.g. for ISIS 3.x) of this format will include a camera/mission identifier.
C. ".mat" (for matchpoint) is often used as the file name extension of files of this type. However, note that this is an unusual "reserved" special extension in Microsoft Windows for files of type "Microsoft Access Table Shortcut" and it might be preferable to simply use the ".dat" extension.

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References:

ISIS: See http://isis.astrogeology.usgs.gov/ for general information.
ISIS Planetary Geodesy: Under construction. But see:
https://web.archive.org/web/20210319084730/http://isis.astrogeology.usgs.gov/Isis2/isis-bin//viking_geodesy.cgi
https://web.archive.org/web/20210320211746/http://isis.astrogeology.usgs.gov/Isis2/isis-bin//cassini_geodesy.cgi
https://astrogeology.usgs.gov/maps/control-networks

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