TruHPoint 1.0

I.   Introduction. TruHPoint provides accurate pointing angles from earth stations to satellites. It is based on Intelsat Earth Station Standard (IESS) 412, which can be downloaded at http://www.intelsat.com/satellites/satellites_technicalresources.asp. The purpose is to provide pointing angles with 3 decimal point accuracy for calibration of antenna control units. It also provides the times of ascension or declension of the satellite over the equator. For initially finding and peaking up on the satellite, it is much better to use SATlt, which can also be found at www.hpcalc.org. SATlt provides pointing angles with 1 decimal point accuracy, and requires much less input data.

II. Installation.

Select the TruHPoint file to transfer from the appropriate folder. Use binary transfer for speed and accuracy. TruHPoint should take about 7 k of memory, but you should have at least 2-3 k more available to accommodate report storage.

TruHPoint requires a text editor/viewer for viewing reports. The libraries can be found at www.hpcalc.org. Please follow installation instructions included with the libraries.

        HP48 -- TED
        HP49 -- Lupa

III. Operation:

1.   Preliminaries.

        a.   Download the most recent 11 parameter ephemeris data from the satellite provider. A sample report is shown in Appendix A. Intelsat data can be obtained at the link indicated above. Other satellite suppliers normally have the data available on their web site.

        b.   To get the most out of TruHPoint, the calculator clock should be accurately set to Greenwich Mean Time.

2.   Basic operation.

        a.   The [VAR] soft key menu should be as follows:

Soft Key   Description

--------data input --------

        EPOC   Opens an INFORM dialog to enter epoch and report parameters. The epoch year, month, etc. are on the 11 parameter report. The last two items pertain to the report(s) to be generated. MBC is minutes between calculations. This should be between 10 and 90. A smaller

number means more calculations and a longer report. A larger number means faster execution but slightly less accuracy. DUR is the duration in days for the report.

PARM   Opens an INFORM dialog for entering the 11 ephemeris parameters.

ESTA   Opens an INFORM dialog for the earth station. The ID or name of the earth station, latitude (negative for south), east longitude, and elevation in km are required.

-------report generation -----

AZNW   AZimuth and elevation NoW. Provides a report of current pointing angles (you did set the calculator clock to GMT, didn't you?). Pressing [ON] after the report is in view will leave the azimuth on stack level 2 and elevation on stack level 1 for easy reference while calibrating the antenna controller. Note that this is the observed elevation angle that compensates for atmospheric refraction rather than the geometric elevation angle.

AZTB   AZimuth and elevation TaBle. (see Appendix B for a sample). This is the shorter of the two tabular reports. The report is a columnar list of azimuth and observed elevation angles by date and time. An "A" or "D" after a line indicates that the satellite has ascended (south to north) or descended (north to south) the equator since the last time calculated. These are the best times to peak up a manual or jog track system.

LGTB   LonG TaBle Same as AZTB but includes actual satellite position on each line.

EXIT   Erases the report from memory and leaves the TruHPoint program. If you want to keep the report for later viewing, just leave with UPDIR or HOME keys

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Important notes:

1.   These reports contain many calculations that will take several minutes. Please be patient. If you are in a hurry, try to cut out the header (see below), increase the minutes between calculations, or decrease the number of days for the reports.

2.   The header on any of the reports includes a calculated +170 hour satellite position. This should match the 170 hour prediction included in the 11 parameter report (Appendix A). This is a good check to make sure that the ephemeris were entered correctly.

a.   The [CST] soft key menu operates as follows:

Soft Key   Description
VIEW   VIEW the current report

PRDEV   (HP48 only) Selects IR or wire for PRinting DEVice.

PRINT   PRINT the current report

RSTF   ReSTores Flags to original condition. This is normally accomplished through program action. But, if you cancel a report in progress by pressing [ON], the original flags can be restored with this soft key.

HDR   HeaDeR toggle. Press to select whether or not the header is included in each report. You probably will want the header the first time to double check the input data and +170 hour satellite location calculation.

RECL   RECaLl.. Puts the last calculated Azimuth on level 2 and Elevation on level 1.

EXIT   Same as VAR menu

V.   Revision history:

Initial Release. 27 March 2002.

VI.   Disclaimer. Copyright 2002 by Mike Richards. The software is provided free of charge, "as is," without any guarantee of any type, written or implied. You may distribute or use it in freeware only. You may not use it in any commercial product.

VII.   References:

Intelsat Corporation. Intelsat Earth Station Standard (IESS) 412. 9 March 1990.

VIII.   Please send comments or bug reports to:

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ROUTINE
FROM: INTELSAT WASHINGTON DC

TO: ALL STATIONS OPERATING AT 332.50 DEG EAST

SUBJECT: ELEVEN PARAMETER EPHEMERIS FOR INTELSAT 605/332.50
         DEG E

EARTH STATIONS PLEASE ON-PASS TO YOUR ADMINISTRATION

WEEKLY 11-PARAMETER DATA 20020323

THE 11 PARAMETER EPHEMERIS AND EPOCH PREDICTING THE SPACECRAFT
MOTION ARE PROVIDED BELOW.

PLEASE ENTER THIS DATA INTO THE EPHEM.DAT FILE

YEAR  MONTH  DAY  HOUR  MINUTE  SECOND
2002  03     23   00    00      00

THE EPHEMERIS VALUES ARE:

LM0             LM1             LM2
DEG. E          DEG/DAY         DEG/DAY/DAY
332.5252        .0057           -.000749 (MINUS)


LONC            LONC1           LONS            LONS1
DEG. E          DEG/DAY         DEG. E          DEG/DAY
  .0022           .0013         -.0116 (MINUS)  .0005


LATC            LATC1           LATS            LATS1
DEG. N          DEG/DAY         DEG. N          DEG/DAY
  .0018           .0004          .0268          .0017

THE NOMINAL ORBITAL LOCATION FOR THIS SATELLITE IS 332.50 DEG. E


THE PREDICTED SATELLITE LONGITUDE AND LATITUDE AT 170 HOURS AFTER
EPOCH ARE 332.5322 DEG. E. AND   .0271 DEG. N.



BEST REGARDS
MANAGER IOC
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E/S ID: Lima
Lat(south):  12.0999°
Long(East): 283.0834°
 Elevation:     .125 km
   Interval: 60 min
   Duration: 4 days
Epo: 02/23/02  00:00:00
Ephemeris:
  LM0: 332.5060000
  LM1:   0.0063000
  LM2:  -0.0007710
 LONC:   0.0027000
LONC1:   0.0010000
 LONS:  -0.0152000
LONS1:   0.0008000
 LATC:   0.0088000
LATC1:  -0.0009000
 LATS:   0.0344000
LATS1:   0.0026000
Calculated +170 hours:
332.514(E) .0337(N)
TIME     AZIMUTH EL(obs)
DATE 02/23/02
00:00:00  79.828 32.160
01:00:00  79.816 32.162
02:00:00  79.805 32.163
03:00:00  79.797 32.165
04:00:00  79.791 32.166
05:00:00  79.789 32.167
06:00:00  79.789 32.168
07:00:00  79.794 32.169
08:00:00  79.801 32.169
09:00:00  79.811 32.169
10:00:00  79.822 32.169
11:00:00  79.835 32.168
12:00:00  79.849 32.166D
13:00:00  79.861 32.164
14:00:00  79.872 32.163
15:00:00  79.881 32.161
16:00:00  79.887 32.159
17:00:00  79.890 32.157
18:00:00  79.890 32.155
19:00:00  79.886 32.154
20:00:00  79.879 32.153
21:00:00  79.869 32.153
22:00:00  79.857 32.153
23:00:00  79.844 32.153
DATE 02/24/02
00:00:00  79.830 32.154A
01:00:00  79.818 32.155
02:00:00  79.806 32.156
03:00:00  79.797 32.158
04:00:00  79.791 32.159
05:00:00  79.788 32.160
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