"HARPA: A versatile three-dimensional Hamiltonian ray-tracing program for acoustic waves in the atmosphere above irregular terrain", by R. Michael Jones, J. P. Riley, and T. M. Georges, NOAA special report, August 1986

Errata, August 18, 2009

1 Documentation Errata

page 31: The Transmitter latitude (W4) should have "km" circled. (20 April 2007)

pages 31 and 199: On the "form to specify input data", "stop frequency stepping" should be changed to "stop elevation angle stepping," and W30, W31, and W32 should be changed to W278, W279, and W280, respectively.

pages 33 and 221: The model check number in the "Form to specify input data for receiver-surface model RTERR" should be 2.0 instead of 3.0

page 49, Fig. 2.23: The implied decimal point for latitude of transmitter should be between card columns 16 and 17. The implied decimal point for longitude of transmitter should be between card columns 22 and 23. The implied decimal point for imaginary part of wave polarization at transmitter should be between card columns 75 and 76. (20 April 2007)

page 50, Fig. 2.24: The imaginary part of wave polarization should be in card columns 74-77, and the implied decimal point should be between card columns 75 and 76. (20 April 2007)

page 69: The last two lines should read:

*** Format type 1 implies format number A (see Table 5.3).
*** Format type 2 implies format number 1, 2, or 3 (see Table 5.3).

pages 94 through 98: The figure captions for Figures 6.1 through 6.5 should have the following added:

Circled block numbers correspond to program statement numbers.

page 98: In Figure 6.5, the lower branch on "Test mode." should read:

MODE $= 4$ and $y_{i,1} \neq 0$

page 101: The last sentence in Section 6.4 should refer to Table 7.17 instead of 7.9.

page 102: The second line of the first full paragraph should refer to equation (6.30) rather than (4.1).

page 136: The first note in the caption to Figure 7.10 should read:

* See Equation (6.83) to estimate the time of the nearest closest approach to the specified surface.

pages 177 through 196: The calculation of absorption in the sample printout and sample raysets is incorrect. The correct values are in the files dinp.sam and punch.sam (3 June 2004)

page 200: The sentence "Superimpose these raypath plots on the graph of the previous runset:" should read "Superimpose these raypath plots on the graph of the next runset:" (29 October 2003)

page 221: The model check number in the "Form to specify input data for receiver-surface model RTERR" should be 2.0 instead of 3.0 (3 June 2004)

page 222: The model check number in the "Form to specify input data for receiver-surface model RVERT" should be 3.0 instead of 2.0

2   Program Errata

page 251: Following line "UCON 30" in LOGICAL FUNCTION UCON, insert the line:
        IF(CONV.EQ.-1.0) CONV = 1.0/EARTHR   UCON305

page 251: Line "UCON 38" in LOGICAL FUNCTION UCON should be replaced by:
        CNVV(1,3) = -1.0   UCON380

page 329: (17 December 2002) The variable OWI in line ANWWL 70 in SUBROUTINE ANWWL should be OW.

page 332: (6 May 2003) The variable OW in line AWWWL 76 in SUBROUTINE AWWWL should be OWI.

page 344: (17 October 2003) Line WGAUSS18 in SUBROUTINE WGAUSS2 should be

        DATA RECOGU/8.0/   WGAUSS18

page 395: Line "RVERT 21" in SUBROUTINE RVERT should be replaced by:
        DATA RECORR/3.0/   RVERT21

3   Additional Errata from Appendix E of HARPO Report follows.

APPENDIX E. ERRATA FOR HARPA REPORT

HARPA: A versatile Three-Dimensional Hamiltonian Ray-Tracing Program for Acoustic Waves in the Atmosphere Above Irregular Terrain" by R. Michael Jones, J. P. Riley, and T. M. Georges

2 February 1987

Page xi: change line 12 to:
Table 7.23 Definitions of the parameters in common block /HDRC/....157

Page 21: Following "The profile:" circle the units "km" in the columns labeled z_i and δ_i.

Page 31 and 199: At mid-page, change "stop frequency stepping" to "stop elevation-angle stepping," and change W30, W31, and W32 to W278, W279, and W280, respectively.

Page 33 and 221: Change the Model Check Number from 3.0 to 2.0.

Page 50: Change "Phase path, km" to Phase time, sec" and "Group path, km" to "Pulse travel time, sec."

Page 59: In Table 4.1, change "NPABS" to "NPABSR".

Page 69: Change the last two lines to read:
*** Format type 1 implies format number A (see Table 5.3).
*** Format type 2 implies format number 1, 2, or 3 (see Table 5.3).

Page 79: Change description following W(21) to read "Set = 1 to stop elevation-angle increment when the ray goes out of bounds."

Page 94-98: Add the following to the captions for Figures 6.1 through 6.5: "Circled block numbers correspond to program statement numbers."

Page 98: Change the comment near the lower branch of the "Test Mode" block to read: "MODE = 4 and $Y_{i,1} \neq 0$".

Page 101: In the last sentence of Section 6.4 change the table mentioned from Table 7.9 to Table 7.17.

Page 102: In the second line of the first full paragraph change the equation mentioned from Eq. (4.1) to Eq. (6.30).

Page 126 and 128: Change the captions so that the parenthetical expressions following ANWNL and AWWNL begin "(Acoustic, No Winds..." and "(Acoustic, With Winds...").

Page 127: Change the name of PROGRAM NITIAL to PROGRAM RAYTRC in the second block down.

Page 136: Change the first note in the caption of Figure 7.10 to read: "*
See Equation (6.83) to estimate the time of nearest closest approach to
the specified surface."

Page 155: Add the variable names NDEVGRP and NDEVBIN to Table 7.19.

Page 158: Replace Table 7.23 by:

Table 7.23--Definitions of the parameters in common block /HDRC/

Position in common	Variable name	Definition
1	INITID	Character string for user name and phone number identifier for graphics output
2	DAT	Character string for the date of the computer run
3	TOD	Character string for the time of day of the computer run

Page 168: In line 9, replace PGRKPH with PGRPH.
In line 11, replace $\partial g/\partial \theta$ by $\partial g/\partial \phi$.

Page 222: Change the Model Check Number from 2.0 to 3.0.

Make the following changes in both the source-code listing (Appendix D) and
in the program itself:

Page 251: Following the line "UCON 30" in LOGICAL FUNCTION UCON, insert the
line: IF(CONV.EQ.-1.0) CONV = 1.0/EARTHR   UCON305

Page 251: Replace line "UCON 38" in LOGICAL FUNCTION UCON by:
CNVV(1,3) = -1.0   UCON380

Page 361: Replace line "TTANH554" in SUBROUTINE TTANH5 by:
ZIM1 = Z0   TTANH554

Page 395: Replace line "RVERT 21" in SUBROUTINE RVERT by:
DATA RECORR/3.0/   RVERT21

Add the following routine:

```
      FUNCTION ITOC(N)                                      ITOC0020
C     RETURN 7 CHARACTER STRING REPRESENTATION OF INTEGER N ITOC0030
C     IF NUMBER IS TOO LARGE OR SMALL USE FLOATING POINT FORMAT  ITOC0040
      CHARACTER ITOC*7                                      ITOC0050
      IF(N.LT.-9999.OR.N.GT.99999) GO TO 100               ITOC0060
      ITOC=' '                                             ITOC0070
      WRITE(ITOC,'(I7)',ERR=100) N                         ITOC0080
      RETURN                                               ITOC0090
100   WRITE(ITOC,'(2PG7.0)') FLOAT(N)                      ITOC0100
      END                                                  ITOC0110
```

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