Welcone to

HCM\_MS.exe

the simple surrounding software for most versions of HCM DLLs.

# General:

This is “portable” software, meaning nothing has to be installed. Just copy the .exe to a directory of your choice and supplement it with some versions of HCM DLLs. At the first run you will have to initialise the information where TOPO/MORPHO/BORDER data can be found.

This software can be used in interactive or batch mode. When started from the commandline it will run in batch-mode and exactly one argument has to be supplied: the (path and) name of the input file. The results will be written to a subdirectory “HCM” to where the software is located.

The output will consist of two different files: HCM.txt and HCM\_X.txt. The first has the same format as allready known from the old Version (aka debug.txt), the HCM\_X as described in the last chapter. This HCM\_X (format) will also be accepted as input (for “re-calculation”).

# Using text files for input:

There are two ways to use files for input:

* give the file as argument on command line
* select the file from mainmenu using button “read file with input data”

both methods accept files with mixed data for

* point2point (C\_MODE >= 0) (see example 1)
* point2line (C\_MODE <0) (see example 2)

A file containing data for several calculations can be created by concatenating the needed data for each calculation without separator:

begin of file

first field calc #1

...

last field calc #1

first field calc #2

...

...

last field calc #n

end of file

as alternative “csv” can be used where all fields for one calculation are in one line, separated by a semicolon (;). No need to pad values with spaces, even ;; is allowed.

begin of file

field\_1-calc\_1;...;field\_n-calc\_1

....

field\_1-calcm;...;field\_n-calc\_m

end of file

**Example 1** for a data file containing all input for a borderline calculation.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Data | | | | | | | | | | | | | | | | Description /Format (not part of data!) |
|  | - | 9 |  |  |  |  |  |  |  |  |  |  |  |  |  | mode of calculation /N3 |
| 0 | 0 | 6 | E | 2 | 0 | 0 | 0 | 5 | 1 | N | 0 | 0 | 0 | 0 |  | Tx co-ordinates /C15 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Tx height above sea level /NC4 |
| 0 | 0 | 0 | N | D | 0 | 0 |  |  |  |  |  |  |  |  |  | Tx antenna type horizontal /C7 |
| 0 | 0 | 0 | N | D | 0 | 0 |  |  |  |  |  |  |  |  |  | Tx antenna type vertical /C7 |
|  |  | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  |  | azimuth /D5.1 |
|  |  | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  |  | elevation /D5.1 |
|  |  | 2 | 0 |  |  |  |  |  |  |  |  |  |  |  |  | Tx antenna height /N4 |
|  |  | 1 | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  | radiated power /D6.1 |
| E |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Tx type of antenna (E or I) /C1 |
| 0 | 0 | 9 | 5 | 4 | . | 4 | 0 | 0 | 0 | 0 | M |  |  |  |  | Tx frequency /D11.5 + C1 |
| 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | channel occupation / N1 |
| C |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | sea temperature (C or W) /C1 |
|  |  | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  |  | distance over sea /DC5.1 |
|  |  |  |  | 0 |  |  |  |  |  |  |  |  |  |  |  | radius of service area /N5 |
|  |  |  | 0 |  |  |  |  |  |  |  |  |  |  |  |  | distance to borderline (km) /N4 |
| D |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | land of Tx (IFL - code) /C3 |
| H | O | L |  |  |  |  |  |  |  |  |  |  |  |  |  | land to calculate to /C3 |
|  | 1 | 9 | . | 0 |  |  |  |  |  |  |  |  |  |  |  | perm. field str. (input) /DC5.1 |
| 1 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  | max. cbr (input) /C3 |
| 1 | 4 | K | 0 | F | 3 | E |  |  |  |  |  |  |  |  |  | Tx designation of emission /C9 |

**Example 2** for a data file containing all input for a normal calculation.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Data | | | | | | | | | | | | | | | | Description /Format (not part of data!) |
|  |  | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  | mode of calculation /N3 |
| 0 | 0 | 6 | E | 0 | 0 | 0 | 0 | 5 | 0 | N | 0 | 0 | 0 | 0 |  | Tx co-ordinates /C15 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Tx height above sea level /NC4 |
| 0 | 0 | 0 | N | D | 0 | 0 |  |  |  |  |  |  |  |  |  | Tx antenna type horizontal /C7 |
| 0 | 0 | 0 | N | D | 0 | 0 |  |  |  |  |  |  |  |  |  | Tx antenna type vertical /C7 |
|  |  | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  |  | azimuth of Tx antenna /D5.1 |
|  |  | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  |  | elevation of Tx antenna /D5.1 |
|  |  | 1 | 0 |  |  |  |  |  |  |  |  |  |  |  |  | Tx antenna height /N4 |
|  |  | 1 | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  | radiated power /D6.1 |
| E |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Tx type of antenna (E or I) /C1 |
| 0 | 0 | 1 | 4 | 7 | . | 7 | 7 | 0 | 0 | 0 | M |  |  |  |  | Tx frequency /N11+ C1 |
| 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | channel occupation /N1 |
| C |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | sea temperature (C or W) /C1 |
|  |  | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  |  | distance over sea /DC5.1 |
|  |  |  |  | 0 |  |  |  |  |  |  |  |  |  |  |  | radius of Tx service area /N5 |
| 0 | 0 | 6 | E | 2 | 0 | 0 | 0 | 5 | 0 | N | 0 | 0 | 0 | 0 |  | Rx coordinates /C15 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Rx height above sea level /NC4 |
|  |  | 1 | 0 |  |  |  |  |  |  |  |  |  |  |  |  | Rx antenna height /N4 |
| L | U | X |  |  |  |  |  |  |  |  |  |  |  |  |  | country from /C3 |
| D |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | country to /C3 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | perm. Field str. (input) /DC5.1 |
| 0 | 0 | 1 | 4 | 7 | . | 7 | 7 | 0 | 0 | 0 | M |  |  |  |  | Rx frequency /N11+ C1 |
| 1 | 4 | K | 0 | F | 3 | E |  |  |  |  |  |  |  |  |  | Tx designation of emission /C9 |
| 1 | 4 | K | 0 | F | 3 | E |  |  |  |  |  |  |  |  |  | Rx designation of emission /C9 |
| 0 | 0 | 0 | N | D | 0 | 0 |  |  |  |  |  |  |  |  |  | Rx antenna type horizontal /C7 |
| 0 | 0 | 0 | N | D | 0 | 0 |  |  |  |  |  |  |  |  |  | Rx antenna type vertical /C7 |
|  |  | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  |  | azimuth of Tx antenna /D5.1 |
|  |  | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  |  | elevation of Rx antenna /D5.1 |
| E |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Rx type of antenna (E or I) /C1 |
| 0 | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  |  |  | gain of Rx antenna /D4.1 |
| 0 | 0 | . | 0 |  |  |  |  |  |  |  |  |  |  |  |  | depolarization loss /D4.1 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | corr. factor acc. freq. diff. /NC4 |
|  |  |  |  | 0 |  |  |  |  |  |  |  |  |  |  |  | radius of Rx service area /N5 |

**Format description:**

Nx = Number, x = number of digits, right justified.

Cx = Character (letters or numbers), x = maximum number of characters, left justified.

Dx.y = Decimal numbers, x = total length (including the decimal point), y = number of digits

after the decimal point.

NCx = Same as Nx, but it is possible to leave this field empty (blanks).

DCx.y = Same as Dx.y, but it is possible to leave this field empty (blanks).

padding of fields is mandatory

# Format of HCM\_X.TXT

General:

All input and output data values for one calculation in one long line of text (csv format, fields separated by “;”, max 624 characters). Some data items are blank depending on the input data and the calculation mode.

This file (format) will also be accepted as input (for “re-calculation”).

Data Items in one line:

# Description Variable name Input or Output

Calculation mode C\_mode Input

Tx co-ordinates Coo\_Tx Input

Site height of Tx station H\_Tx\_input Input

Horiz. antenna type of Tx Ant\_typ\_H\_Tx Input

Vert. antenna type of Tx Ant\_typ\_V\_Tx Input

Azimuth of Tx antenna Azi\_Tx\_input Input

Elevation of Tx antenna Ele\_Tx\_input Input

Tx antenna height H\_Tx\_ant Input

Maximum radiated power Max\_power Input

Type of Tx antenna ( E / I ) Type\_of\_Tx\_ant Input

Tx frequency TX\_frequ Input

Channel occupation Chan\_occup Input

Sea temperature Sea\_temperature Input

Input value of distance over sea D\_sea\_input Input

Radius of Tx service area Rad\_of\_Tx\_serv\_area Input

Rx co-ordinates Coo\_Rx Input

Site height of Rx station H\_Rx\_input Input

Rx antenna height H\_Rx\_ant Input

Distance to borderline D\_to\_border Input

Country of Tx Land\_from Input

Country of Rx Land\_to Input

Input value of permissible field strength Perm\_FS\_input Input

Rx frequency RX\_frequ Input

Designation of emission of Tx Desig\_of\_Tx\_emis Input

Designation of emission of Rx Desig\_of\_Rx\_emis Input

Horiz. antenna type of Rx Ant\_typ\_H\_Rx Input

Vert. antenna type of Rx Ant\_typ\_V\_Rx Input

Azimuth of Rx antenna Azi\_Rx\_input Input

Elevation of Rx antenna Ele\_Rx\_input Input

Type of Rx antenna ( E / I ) Type\_of\_Rx\_ant Input

Rx antenna gain Rx\_ant\_gain Input

Depolarization loss Depol\_loss Input

Correction factor acc. frequ. difference Cor\_fact\_frequ\_diff Input

# Description Variable name Input or Output

Radius of Rx service area Rad\_of\_Rx\_serv\_area Input

Input of maximum cross-border-range Max\_CBR\_D-input Input

Version number Version Output

Error value HCM\_error Output

Calculated Tx co-ordinates Coo\_Tx\_new Output

Calculated field strength Calculated\_FS Output

Distance Tx position – Rx position Distance Output

Direction Tx position  Rx position Dir\_Tx\_Rx Output

Permissible field strength Perm\_FS Output

Protection margin Prot\_margin Output

Calculated distance over sea D\_sea\_calculated Output

Calculated Rx co-ordinates Coo\_Rx\_new Output

ERP of reference transmitter ERP\_ref\_Tx Output

Cross-border-range CBR\_D Output

20 info values, ‘T’ RUE or ‘F’ ALSE Info Output

Site height of Tx from terrain database H\_Datab\_Tx Output

Site height of Rx from terrain database H\_Datab\_Rx Output

Transmitter terrain clearance angle Tx\_TCA Output

Correction acc. Tx terrain clearance angle Tx\_TCA\_corr Output

Receiver terrain clearance angle Rx\_TCA Output

Correction acc. Rx terrain clearance angle Rx\_TCA\_corr Output

Effective antenna height of Tx Heff\_Tx Output

Effective antenna height of Rx Heff\_Rx Output

Total effective antenna height Heff Output

Terrain irregularity Dh Output

Correction according terrain irregularity Dh\_corr Output

Land field strength Land\_FS Output

Sea field strength Sea\_FS Output

Correction acc. Tx antenna type (E / I ) Tx\_ant\_type\_corr Output

Correction acc. Tx antenna type (H and V) Tx\_ant\_corr Output

Direction Rx position  Tx position Dir\_Rx\_Tx Output

Vertical angle Tx  Rx V\_angle\_Tx\_Rx Output

Horizontal difference angle Tx  Rx H\_diff\_angle\_Tx\_Rx Output

Vertical difference angle Tx  Rx V\_diff\_angle\_Tx\_Rx Output

Vertical angle Rx  Tx V\_angle\_Rx\_Tx Output

Horizontal difference angle Rx  Tx H\_diff\_angle\_Rx\_Tx Output

Vertical difference angle Rx  Tx V\_diff\_angle\_Rx\_Tx Output

Correction acc. Rx antenna type (E / I ) Rx\_ant\_type\_corr Output

Correction acc. Rx antenna type (H and V) Rx\_ant\_corr Output

Frequency difference Delta\_frequency Output

Permissible field strength from table Perm\_FS\_from\_table Output

Correction factor acc. frequency difference Corr\_delta\_f Output

Channel spacing of Rx Channel\_sp\_Rx Output

Channel spacing of Tx Channel\_sp\_Tx Output

Radiated power in direction of Rx Power\_to\_Rx Output

Free space field strength Free\_Space\_FS Output

# n.b.:

This new generation of HCM\_MS.exe is internally using the HCM-DLL to give exactly the same results for .exe as for .dll (history shows there have been differences due to compiler settings) and minimize the maintenance overhead.

general:

compatible with Windows-XP/Vista/7/8.x/10 32/64 bit

only applicable for HCM Version 7

additional features:

°) DLL-Version selectable

°) "settings" mask

°) supports new C#DLLs

requirements:

min. .net runtime 2.0

TOPO/MORPHO\*/BORDER data

dforrt.dll for Versions <7.20

HCM DLLs as wanted

please put HCM DLLs (best named like on server) in same directory where HCM\_MS.exe resides.

if only one DLL is found, no dialog will be shown. HCMMS\_V7\_DLL.dll mandatory for batch mode

To do:

no popup-masks on error in batch mode.

remarks:

DLL version selection only possible on startup (vb.net problem)

only one running instance, except batch mode (vb.net problem)

\* if no MORPHO found, no automatic sea-path detection possible --> use input value