# The Grayzone CD-ROM: A Review

L. B. Cebik, W4RNL

After a little debugging to overcome a special limitation of some versions (and only some versions) of Notepad, Marcel De Canck, ON5AU, has perfected his suite of Windows utility programs that offer amateur radio operators a collection of handy study tools and special programs. As shown in **Fig. 1**, Marcel calls his suite of aids "Grayzone." Indeed, the gray zone (based on the gray line) sunrise and sunset wizards form the heart of the CD-ROM and run best directly from the disk. However, the CD-ROM also contain 4 especially useful programs that the user can transfer easily to his own hard drive for ready access at any time. So let's divide these notes into two parts, the first half devoted to the gray zone wizards and map files, and the second part devoted to the special utility programs.
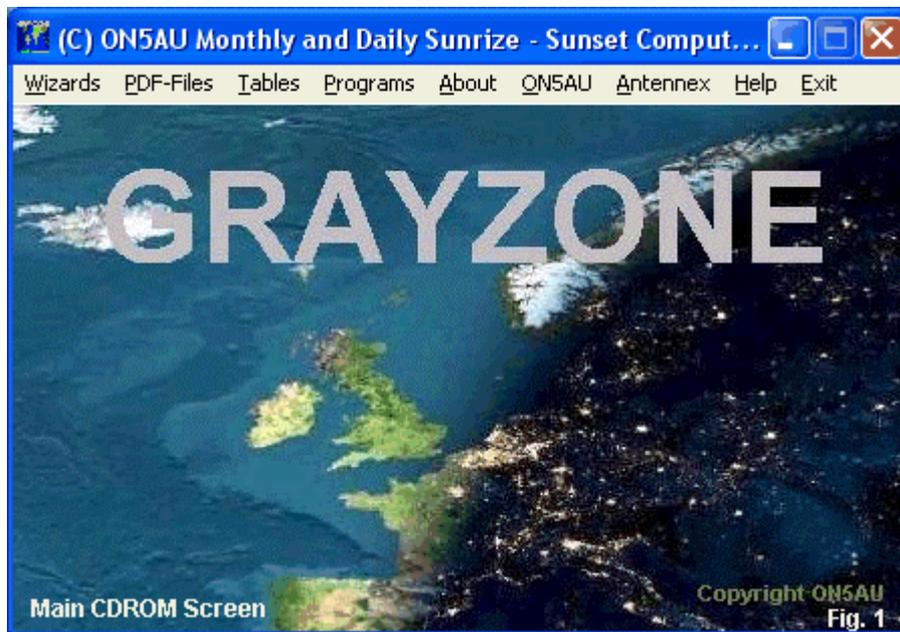

The Grayzone Wizards

The portion of the program that I use from the CD-ROM is devoted to an extensive set of animated wizards showing not only the movement of the gray zone in UTC, but also the movement of the auroral zones. From the CD-ROM, the user can select from a menu any of 3 days from any month (roughly every 10 days) and access the positions of the gray and auroral zones on a world map. **Fig. 2** shows a selected winter map for 1015 UTC as a sample.

(c) ON5AU   Auroral & Graytime Zones 10:15 UTC January 1
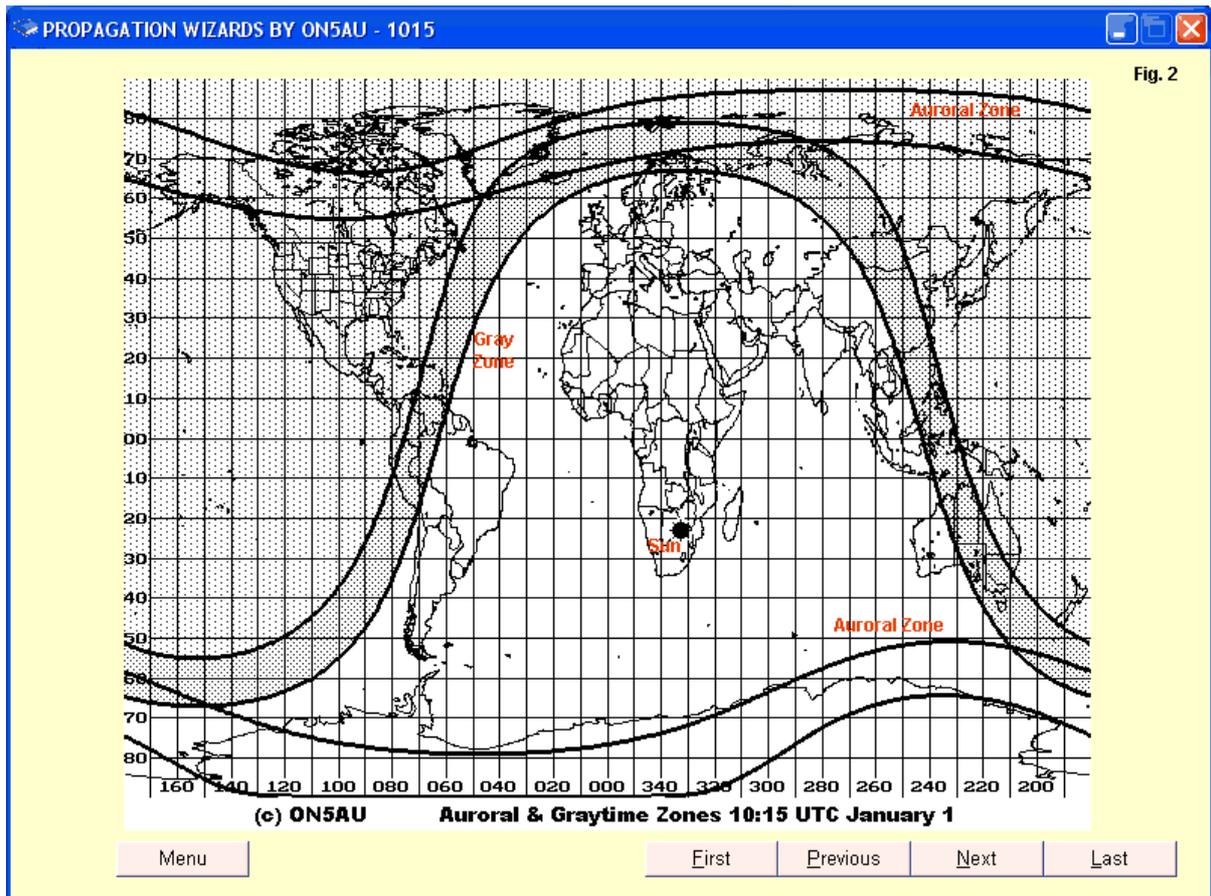
I have left the map at its full-screen size to make clear some of the available data for January 1. The sun position is evident just beginning to return from its most southern solstice limit. The day-night boundary is equally evident. The gray zone itself is a band the shading for which extends from sunset to 48 minutes or 12-degrees sun displacement after sunset. The user can easily mentally place a line on the other side of sunset to indicate about 48 minutes prior to sunset, as Marcel explains on page 4 of the extensive PDF on-line help manual. The profusely illustrated manual takes you through every possible user step with the CD-ROM.

One interesting facet of the program is that it allows you to see not only the gray line region, but also to study its inter-relationship with the slowly shifting auroral zone. The relationship is far from static, as illustrated by a second map sample, drawn for the same UTC time, but on July 1. Compare the placement of the sun, the gray line zone, and the auroral zones with those on the map for January 1.

Fig. 3 — (c) ON5AU   Auroral & Graytime Zones 10:15 UTC July 1
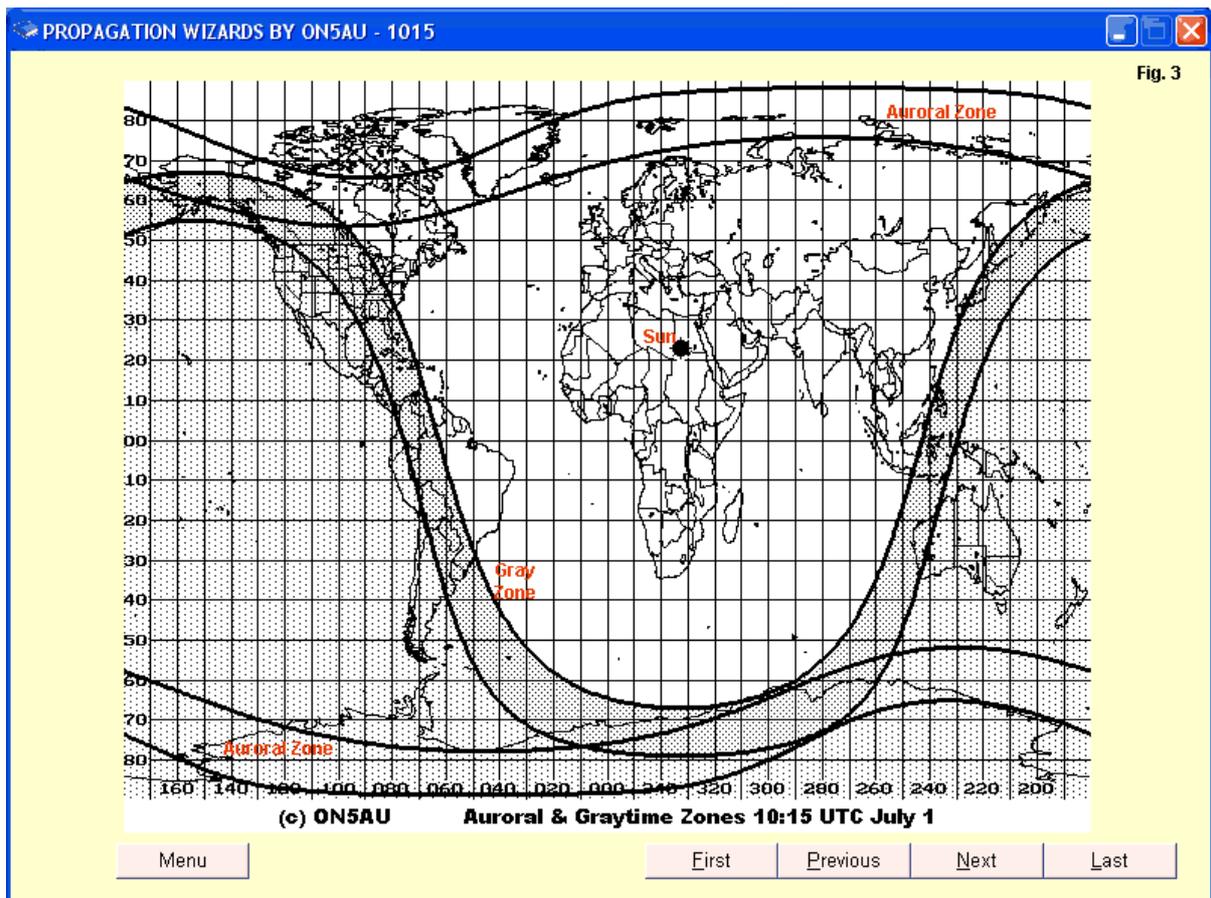
The sun is now close to but just returning from its summer solstice position. Since the gray zone region is far different from its shape on January 1, its intersections with the auroral zones also change.

Part of Alaska never sees a sunset on this day. You can use the program to prove this to yourself by doing something that I cannot show in the review. You may set the gray zone into motion by activating the animation feature. The zone will progress across the world map in 15-minute increments for the entire day--compressed of course, for easy viewing. A clock setting tracks the map motion, so you can jot down any interesting times and recall them as static maps. Every static map allows you to go to the preceding map or to the next map in the sequence. Therefore, you can set up a progression at your own speed and study the zones in detail.

If the on-screen maps are not sufficient, you may also call up the map collection from PDF files on the CD-ROM. Of course, you will need a PDF reader, but those now appear to be standard with current versions of Windows. **Fig. 4** shows the list of available map collections for January 1 in the PDF documentation. The "PDF Files" pull-down menu offers you maps for each month of the year on the 1st, the 11th, and the 21st. You simply double click on the desired month and day to arrive at the desired collection.

GRAYLINE AND AURORAL ZONES

JANUARY 1

| HOURS UTC	PAGE
00 :00 - 00 :15 - 00 :30 - 00 :45	3
01 :00 - 01 :15 - 01 :30 - 01 :45	4
02 :00 - 02 :15 - 02 :30 - 02 :45	5
03 :00 - 03 :15 - 03 :30 - 03 :45	6
04 :00 - 04 :15 - 04 :30 - 04 :45	7
05 :00 - 05 :15 - 05 :30 - 05 :45	8
06 :00 - 06 :15 - 06 :30 - 06 :45	9
07 :00 - 07 :15 - 07 :30 - 07 :45	10
08 :00 - 08 :15 - 08 :30 - 08 :45	11
09 :00 - 09 :15 - 09 :30 - 09 :45	12
10 :00 - 10 :15 - 10 :30 - 10 :45	13
11 :00 - 11 :15 - 11 :30 - 11 :45	14
12 :00 - 12 :15 - 12 :30 - 12 :45	15
13 :00 - 13 :15 - 13 :30 - 13 ;45	16
14 :00 - 14 :15 - 14 :30 - 14 :45	17
15 :00 - 15 :15 - 15 :30 - 15 :45	18
16 :00 - 16 :15 - 16 :30 - 16 :45	19
17 :00 - 17 :15 - 17 :30 - 17 :45	20
18 :00 - 18 :15 - 18 :30 - 18 :45	21
19 :00 - 19 :15 - 19 :30 - 19 :45	22
20 :00 - 20 :15 - 20 :30 - 20 :45	23
21 :00 - 21 :15 - 21 :30 - 21 :45	24
22 :00 - 22 :15 - 22 :30 - 22 :45	25
23 :00 - 23 :15 - 23 :30 - 23 :45	26

Fig. 4

Each PDF page contains 4 maps for the hour chosen. Beginning with the hour itself (nn:00), you will find a map for every 15-minute interval. **Fig. 5** shows the first hour's worth of maps on the indicated page.

GRAYLINE & AURORAL ZONES JANUARY 1

00:00 – 00:16 – 00:30 – 00:46 UTC

© 2002 ON5AU   3   Fig. 5
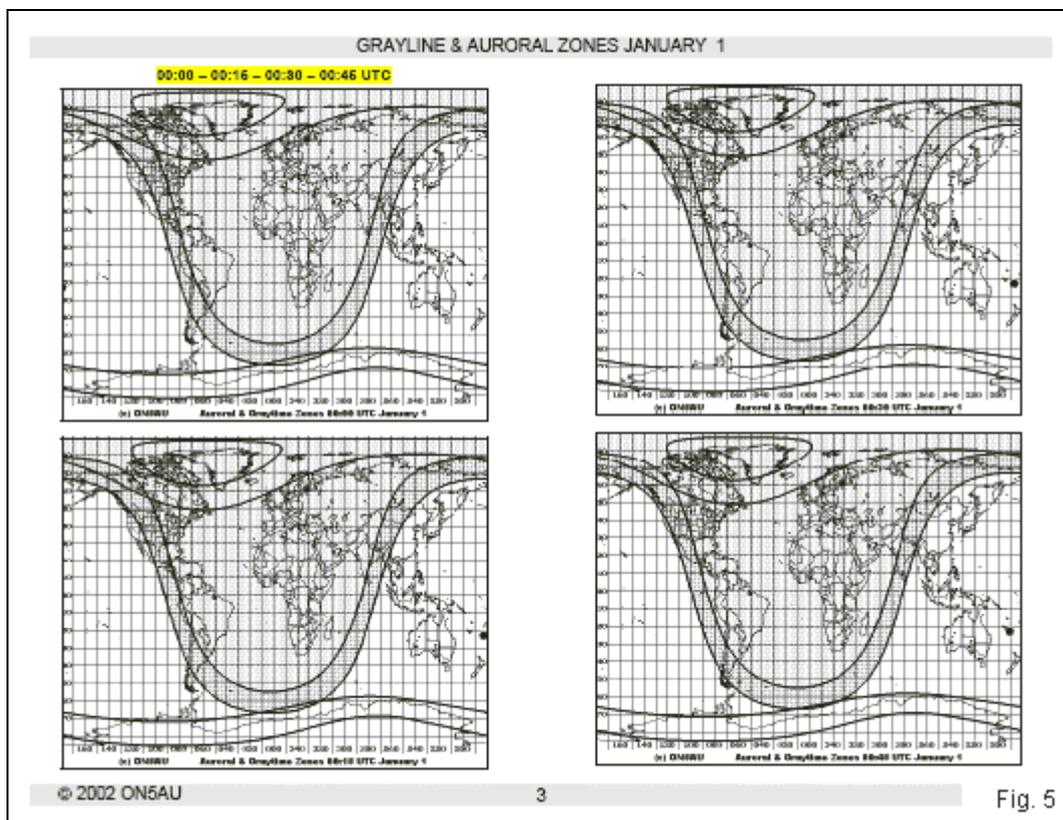
If you need more details, the maps have considerably more to offer, and the PDF format allows you to access it easily. Simply magnify the page by a desired amount. **Fig. 6** blows up one of the map page

by 400% and shows the state outlines within the US. We can satisfy ourselves that on the selected day, the sun will never rise on the towns at the northern edge of Alaska. (Although this information may be trivial in most instances, it serves as a sample of what we can glean from map study. You may set yourself more interesting or useful study goals.)

Magnification: 400%   Fig. 6
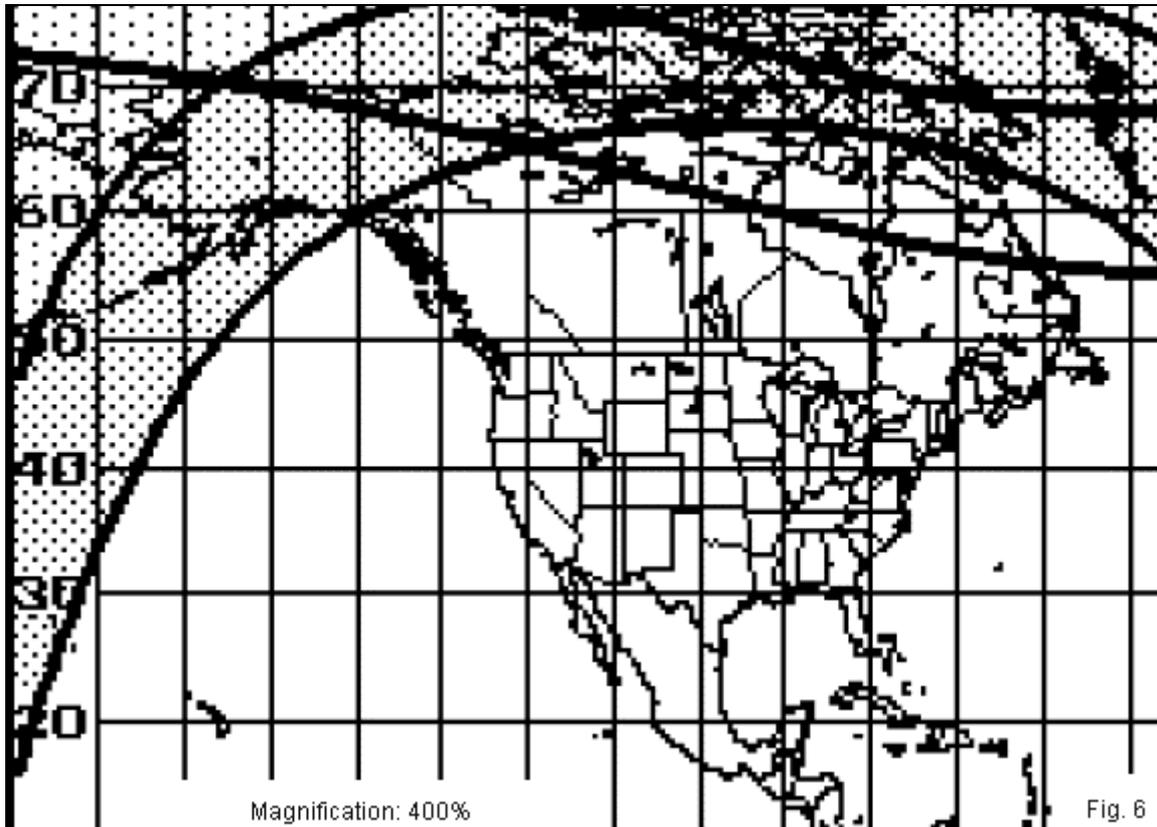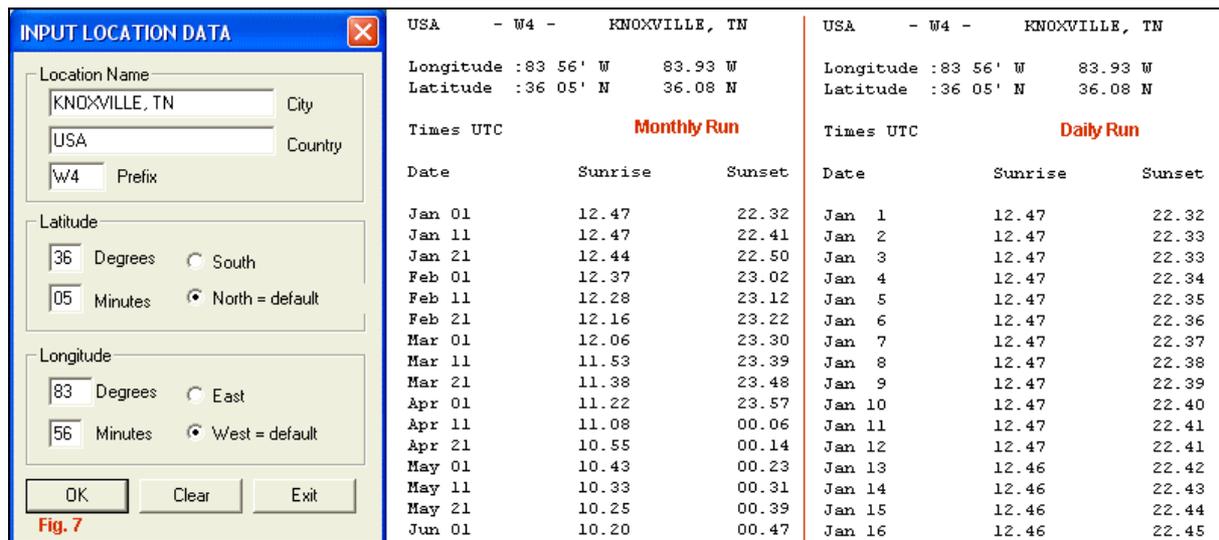
The CD-ROM also gives you access to the times of sunrise and sunset that appear as tables in Notepad. By using the "Tables" pull-down menu, you may proceed to a list of folders for various regions of the world, such as Africa or North America. Opening the selected folder will lead you to a long list of key locations within the region. Double-clicking on the location file will open a table of sunrise and sunset times for each day for which Marcel has included a map. We shall sample the tables as we turn to the other major part of the utility collection, the programs.

The CD-ROM Programs

On the CD-ROM, there are four very useful programs. Each program consists of a zipped installation file that installs the programs on your hard drive in a directory of ON5AU software, with each program having its own subdirectory. Once you have installed the program, you can easily set up an icon on your main screen for easy access. Let's take a look at the programs one at a time.

Gray Line: This program produces tables of sunrise and sunset for any location that you enter by giving the latitude and longitude (in degrees and minutes). It does not have to be your own location, although the sample in **Fig. 7** uses my home QTH as a sample. The city and prefix simply serve as labels. The heart of the calculations lies in the latitude and longitude entries.

INPUT LOCATION DATA

Location Name
KNOXVILLE, TN   City
USA   Country
W4   Prefix

Latitude
36 Degrees   ○ South
05 Minutes   ● North = default

Longitude
83 Degrees   ○ East
56 Minutes   ● West = default

OK   Clear   Exit

Fig. 7

USA — W4 — KNOXVILLE, TN		
Longitude :83 56' W		83.93 W
Latitude :36 05' N		36.08 N
Times UTC		Monthly Run
Date	Sunrise	Sunset
Jan 01	12.47	22.32
Jan 11	12.47	22.41
Jan 21	12.44	22.50
Feb 01	12.37	23.02
Feb 11	12.28	23.12
Feb 21	12.16	23.22
Mar 01	12.06	23.30
Mar 11	11.53	23.39
Mar 21	11.38	23.48
Apr 01	11.22	23.57
Apr 11	11.08	00.06
Apr 21	10.55	00.14
May 01	10.43	00.23
May 11	10.33	00.31
May 21	10.25	00.39
Jun 01	10.20	00.47

USA — W4 — KNOXVILLE, TN		
Longitude :83 56' W		83.93 W
Latitude :36 05' N		36.08 N
Times UTC		Daily Run
Date	Sunrise	Sunset
Jan 1	12.47	22.32
Jan 2	12.47	22.33
Jan 3	12.47	22.33
Jan 4	12.47	22.34
Jan 5	12.47	22.35
Jan 6	12.47	22.36
Jan 7	12.47	22.37
Jan 8	12.47	22.38
Jan 9	12.47	22.39
Jan 10	12.47	22.40
Jan 11	12.47	22.41
Jan 12	12.47	22.41
Jan 13	12.46	22.42
Jan 14	12.46	22.43
Jan 15	12.46	22.44
Jan 16	12.46	22.45

The program has two major pull-down menus, a monthly run and a daily run. The input is the same in both cases, but the resulting tables have different lengths, as suggested by the partial tables shown in the figure. The monthly run gives sunrise and sunset times for the selected location on the 1st, 11th, and 21st of each month. The format of this table is identical to those offered in the CD-ROM collection. The difference lies in the method of selecting a location. In the program, you enter the latitude and longitude of the location. In the CD-ROM collection, you select from a very large collection of worldwide locations, and the latitude and longitude values are contained in your selection. The CD-ROM tables contain the latitude and longitude values, so you may copy the ones of interest for future reference. You can then plug them into the Gray Line program. As well you can modify the values to adjust them for communications targets at some distance from the listed location.

The daily run yields the sunrise and sunset times included in the monthly run, plus every other day of the year. The much longer list is useful in answering some questions that may require finer detail. For example (and again oddly, but just as a sample), you may have received the impression from watching your local weather forecaster that the earliest sunrise time may not occur on the same day as the latest sunset time. (For winter, change the positions of the words "earliest" and "latest.") The daily calculated sunrise and sunset times could convert your impression into a quantitative fact.

Grid-Square Locator: The Grid-Square Locator program is a handy way to move back and forth between latitudes and longitudes on the one hand and grid square regions on the other. Therefore, the program has two modes of entry and two outputs. We may input a latitude and longitude values set (in degrees and minutes) and receive grid square information, or we may enter a 6-entry grid square designator and receive latitude and longitude information. **Fig. 8** shows both options at work for my QTH.
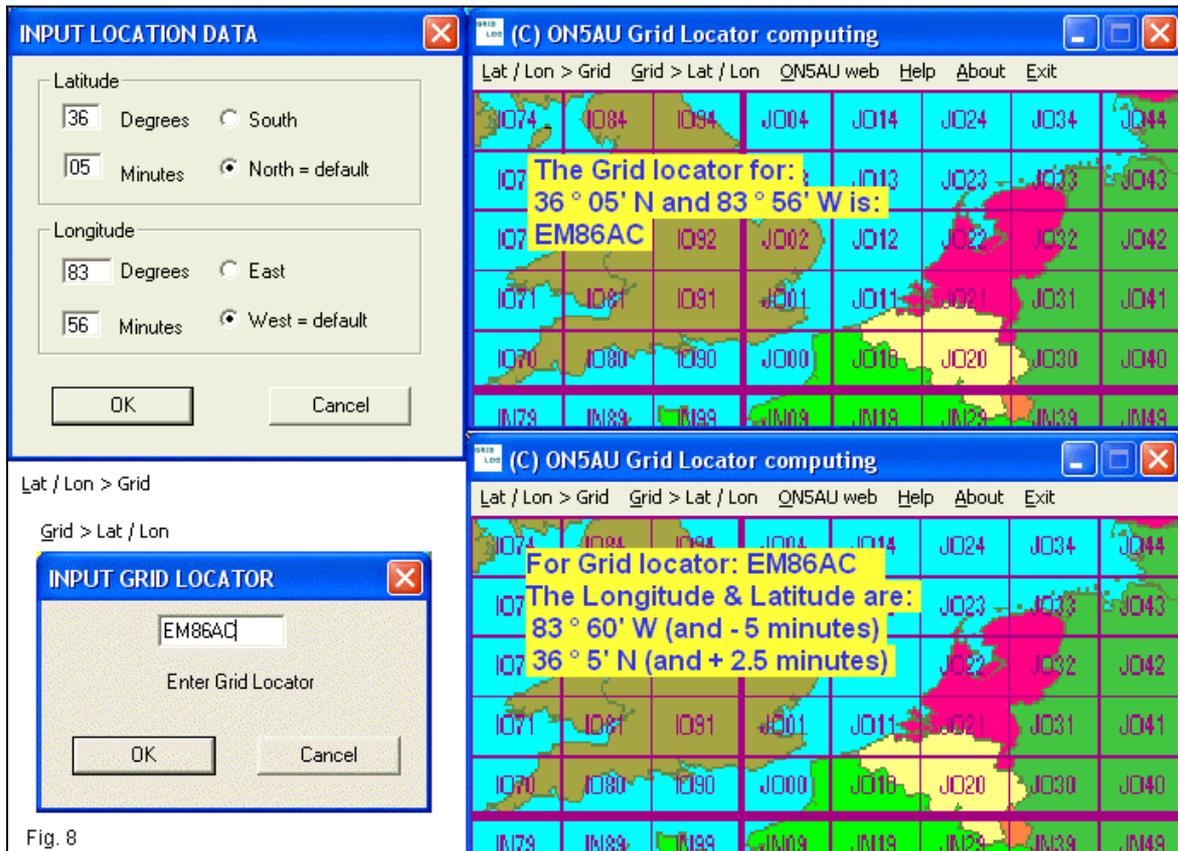
Fig. 8

Since a grid square is a region, entering a set of latitude and longitude values results in a definite grid square location. However, entering a grid square does not yield a single set of values, and the output report shows the range of possibilities. The listed latitude may be up to 2.5 minutes higher than the calculated value, while the longitude that applies to the grid square you enter may be up to 5 minutes lower. As you can see from my initial entry, I live very close to a border line--indeed, very close to a 4-corners situation when it comes to grid squares. When I take a morning walk, I easily end up traveling through 4 grid squares without going very far at all.

Hamclock: ON5AU offers an interesting variation on many other clocking utilities. He uses the computer time (in XP Pro, self-adjusting whenever one goes on-line) to give the user several options for the big digits shown in **Fig. 9**.
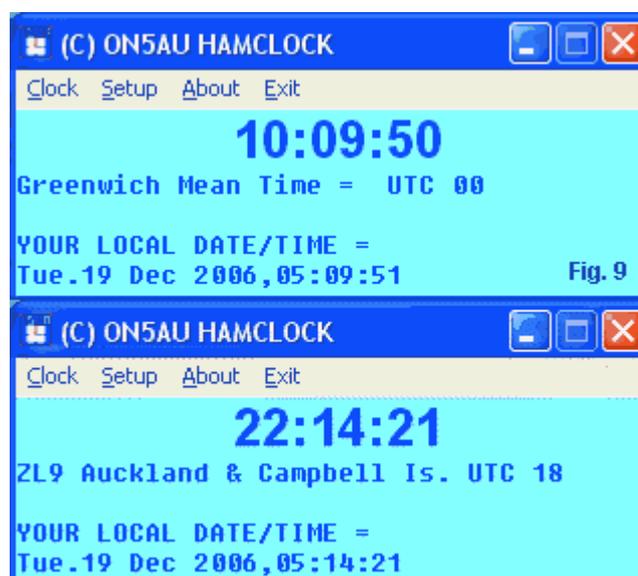

Fig. 9

After setting up the clock for your relationship to UTC, you may choose to run the big print in local time, although that always appears at the screen bottom. Alternatively, you can set the big print in UTC, which is usually where I keep my clock. However, those with DX interests can go to a long list of DXCC locations and select one of interest. As the bottom half of the figure shows, the big print now shows the local time at the other location. This feature is useful in determining the best time for attempting a communications link, given the information that you glean both from the gray line CD-ROM and from your knowledge of propagation for the date and time of interest.

You will have to recheck your set up twice a year if you are subject to daylight saving time adjustments.

Path Azimuth and Distance: The final utility program in the suite is a great circle calculator, a program that we once saw only in BASIC and later in DOS. Marcel has updated the program, not only to provide bearings, but as well to calculate a considerable collection of other useful information. The program main screen shown in **Fig. 10** for my location is not the default screen that appears on the program that you load from the CD-ROM into your hard drive. However, Marcel has told me that he will provide a comparable screen to anyone who has purchased the CD-ROM and contacts him directly. The customized screen has enough definition to let me estimate short-path bearings to a number of locations.
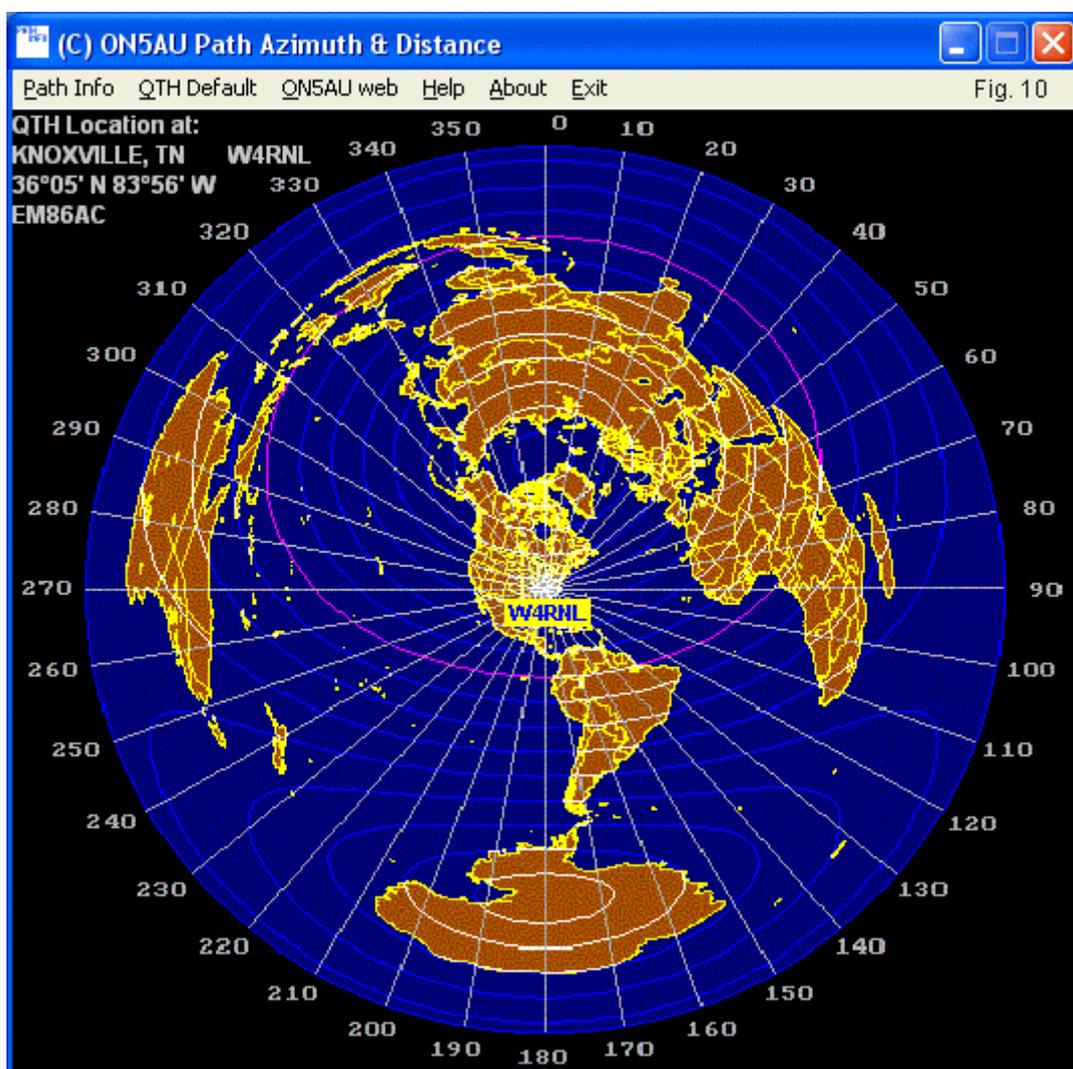
The information in the upper left corner comes from a data file that is the first step in using the program. You set your location latitude and longitude into a default QTH screen. The program remembers this information--until you change it, of course. For normal operation, you may have to change the default QTH information only if you change your station location.
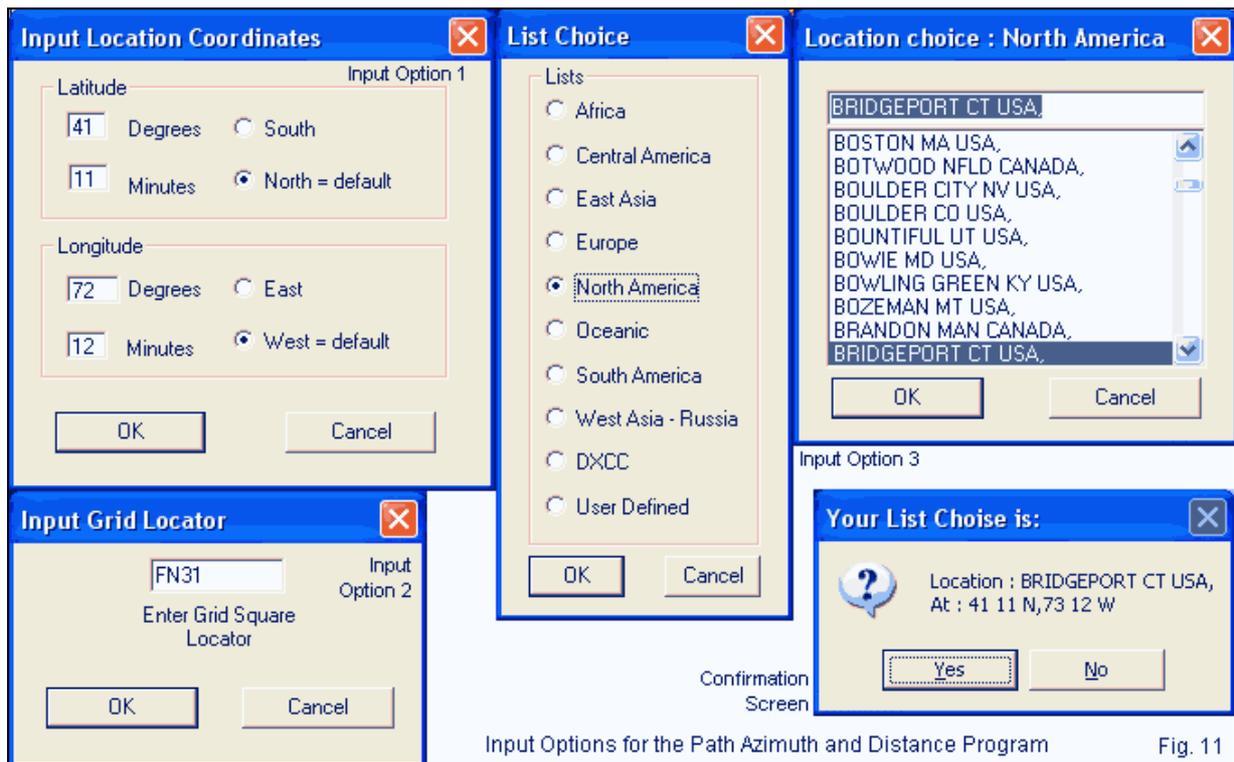
Fig. 11 — Input Options for the Path Azimuth and Distance Program

To obtain great circle bearing, you need to enter the location of the other end of the great arc. As shown in **Fig. 11**, you have 3 ways to enter the information. If you know the latitude and longitude, you may enter these values on an input screen. Alternatively, if you know the grid square of the other station, you may enter this data, although you will only use a 4-entry location (that is, as EM86 rather than EM86ac). Finally, you may enter the other station's position from a very large list of locations. As the figure shows, it takes a two-step process to enter a position. You select from a regional list (that also has a DXCC list), and then you scroll down to the nearest place to your target. For the example, I selected the city in Connecticut next door to my hometown. (You may speculate on whether the town is Fairfield, Shelton, Stratford, or Trumbull.) All three entry systems will yield the same output information.

Where Marcel's program differs from many others in the past is in the wealth of information that he calculates for the path between you and the other location. **Fig. 12** shows the sample of the path from Knoxville, TN, USA to Bridgeport, CT, USA.
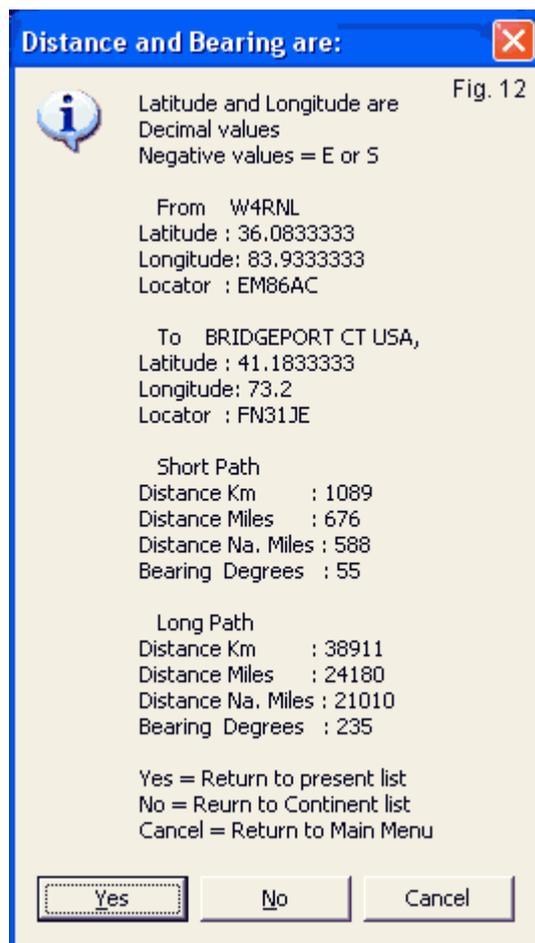
Distance and Bearing are:

Fig. 12

Latitude and Longitude are
Decimal values
Negative values = E or S

From   W4RNL
Latitude : 36.0833333
Longitude: 83.9333333
Locator : EM86AC

To   BRIDGEPORT CT USA,
Latitude : 41.1833333
Longitude: 73.2
Locator : FN31JE

Short Path
Distance Km   : 1089
Distance Miles   : 676
Distance Na. Miles : 588
Bearing Degrees   : 55

Long Path
Distance Km   : 38911
Distance Miles   : 24180
Distance Na. Miles : 21010
Bearing Degrees   : 235

Yes = Return to present list
No = Reurn to Continent list
Cancel = Return to Main Menu

[Yes]   [No]   [Cancel]

If you entered the location from a list, the output data gives the location, the latitude and longitude, and the grid square. (Multiply the decimal portion of the latitude and longitude by 60 to convert into degrees and minutes.) In addition, there are bearings for both short-path and long-path arcs. Finally, the distance values appear in kilometers, miles, and nautical miles to cover worldwide conventions, including those used at sea. Of course, the bearing information is useful in aiming my beam. The distance information is useful--especially in conjunction with propagation predictions--in estimating my chances of making contact with the home-town hams on a given day and band. Although I may not have much use for the long-path information for TN-to-CT, the data is highly useful in a myriad of other instances.

The information screen for entries selected from a list is especially useful. Clicking on "Yes" takes you back to the scroll list that you used for the current entry. Clicking on "No" takes you back to the world regions list to select a location on another continent. Clicking on "Cancel" returns you to the program's main screen. Marcel has built an unusual amount of user friendliness into the program.

Conclusion

ON5AU's CD-ROM and programs are not themselves a propagation program. For that work, you need a program like Proplab or ACE-HF. Instead, the CD-ROM is a collection of utility programs that can assist you in various ways relative to your DX interests. The Grayzone maps--still or animated--can help you refine your understanding of the shifting values in the course of a year and their relationship to auroral zones. The wizards alone are worth the price of the CD-ROM.

However, the stand-along programs that allow easy calculation of sunrise and sunset, or grid squares, or time around the world, or great circle information would also be worth the disk price. They are each handy, accurate, and unobtrusive--and, most important, very useful. You are likely to find yourself using all of them from time to time, whatever your communications interests. **-30-**
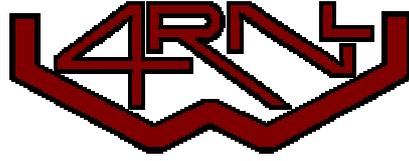
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