

Further Investigation Required!

Late Night 6M NA to Far East Es (SSSP) Paths

By Bob Mobile, K1SIX (17 June 2024 Under Construction)

Introduction

This document addresses a possibly long overlooked long haul 50 MHz Summer Es path potential between eastern North America and the Far East that I believe requires further investigation. Links to supporting material are underlined and in bold blue. Try [this link](#) for starters. This is my website. ***This story has a surprise twist!***

Statistical Significance

[Here](#) is a link to my personal summer diurnal distribution for mid-latitude mostly 3x hop 6 meter paths to my east. Note the ***double hump*** and ***pay close attention to the sample size***. Size matters. Simply stated: the larger the size of the number of samples, the higher the confidence that the outcome of a specific number of trial or test samples will provide a specific percentage of a match between a model and that minimum number of test samples required to prove the model. Please refer to [Estimate of Proportions](#) for more detailed information. I consider myself to be very fortunate to be within 3-4 hop Es range of such a densely populated area with high interest level in operating on six meters.

Several have requested that I supply a confidence % for the diurnal plots that I supply. I won't do so and if someone asks me how good my Transatlantic data is the response will simply be: "It's pretty good!" However, a 20 point hourly comparison, with 4 hours of "outliers" discarded, against an annually updated model is recorded and published as a "fit score %" shown as Chart 1 in [this document](#) for each summer Es season. ***Note the trial or test sample sizes*** that are also plotted. Bigger is better! This is my preferred method to convey confidence. Watch things improve as the number of trials increases.

Late Night 6M NA to Far East Es (SSSP) Paths

Thanks to the efforts of Han, JE1BMJ and the very dedicated team of avid six meter dxers throughout the Far East, many North Americans have been able to make their first six meter contacts into that area. [CLICK HERE TO SEE HAN'S ARTICLE ON SSSP](#). For some of us, these represent extremely long distances. My personal best so far is BH4SCF at 7,204 mi. (11,594 km). I have also worked the Republic of Korea via six meter non-F2 propagation. [These](#) are my non-F2 propagation mode six meter results as of 2023 in terms of detected non-F2 days and not actual QSOs. My first JA 6M QSOs were all on CW. It can be seen that six meter openings to JA are quite rare here and often after local sunset.

Early Morning Unusual Conditions Being Reported

I usually rise early, Keurig my cup of coffee and head for the shack. I then turn on the radios and check into the [pskreporter site](#) to see what others around me may be realizing for conditions. Choose the call of a station known to be active and successful on the six meter band and select **FT8** from the pull down menu for modes and **12 hours**. For me, Lefty (K1TOL) and Tim (WW1L) are my best indicators. My next step is to click on (**show logbook**) then click on the **Distance** header twice to sort in descending order. This will sort the greatest distances to be listed first.

On the morning of June 5th, 2024 I rose and followed the above procedure using Tim's call and noticed a JA in his logbook. Then, on the following morning of June 6th it happened again! This time, JN1JFC was in Tim's log. Both JA stations were logged around 0600-0800 UTC as I recall.

Researching the Path Using the Es_Predict MS Excel Utility

Needless to say, the above events triggered a need for further investigation as the times of these events were somewhat unusual. [CLICK THIS LINK](#) to view my personal results for the times I have experienced non-F2 six meter propagation to the Far East during Northern Hemisphere summer. **Note the peak time for maximum probability is 2200-2259 UTC. Also note that I always indicate the test sample size to convey statistical significance.**

The next step is to view the results from the MS Excel Es_Predict Utility, hereafter referred to as the Utility, for the path between WW1L (FN54om) and JN1JFC (QM06ad). This macro driven utility is available for free download on my website. [CLICK HERE TO VIEW THE RESULT](#). I chose a date of 7 July to maximize the probability values. **Note the classic double hump and an exact match for maximum probability at 2200-2259 UTC.**

The prediction was run using a model (#3) that I created from the logs supplied by Bob, K6QXY. Thank you Bob! [CLICK HERE TO VIEW THE FOUNDATION FOR THIS MODEL](#) which includes sample size. This represents about 3 hops to Bob's west. If one were to overlay Bob's results with my 3 hop results to my east and use the path mid-point local solar time for the X-axis, [THIS WOULD BE THE RESULT](#). This is how the Utility can use a distant model and apply it to different paths. However, to reduce error, it's always best to select the closest model available that applies to the path of interest.

To see an example of using a distant model in the Utility: I used my Diurnal Model for transatlantic paths (Model #2) and applied it to a path between JE1BMJ and AP2HA on the exact date (MM/DD) of June 8th. The result showed 3 hops with an overall probability of 20.3% for the date which is pulled from a Northern Hemisphere Composite Seasonal probability model. The predicted UTC times vs. the % probability (of that entire 20.3% probability) showed a classic double humped result with peaks at 0200-0259 UTC and 1100-1159 UTC as shown in [THIS PLOT](#). **Keep this result in mind as this date and time will resurface later. The plot is nothing more than a clone of my NA-Eu model (Model #2) shifted by the path midpoint local solar time and therein lies a potential problem for extremely long paths.**

WHAT REQUIRES FURTHER INVESTIGATION?

IF you believe in the classic double hump diurnal shape that we see over and over again and is supported in scientific literature AND if you have any confidence at all in what the Utility is telling us THEN the time period after the predicted null at 0230 UTC requires further investigation. To be more accurate: 0300-0800 UTC.

The Far East to Eastern North America path spans at least 13 time zones and unlike paths to Europe, creates the problem of mutual availability. 0600 UTC equates to 0200 LOCAL here in summer but in Tokyo it would be 1500 LOCAL. So the JA end of the path is wide awake while we are sleeping and potentially missing out on exciting propagation. Mutual availability is not the only problem.

So before going through the pain and suffering associated with getting up at 3:00 am every morning from May until August, let's try to comfortably try to prove that this path may potentially exist.

Later, I will provide a method that will allow researching the potential of such a path while one sleeps.

THEN SUDDENLY AND WITHOUT WARNING

On the morning of June 8, 2024 I arose as usual and went to the shack following my usual routine and began listening for Europe with the antenna northeast on 50.313 FT8 mode. After a short while, the following came across my screen (sorry for breaking etiquette):

240608_110945 50.313 Rx FT8 -19 2.9 1726 AP2HA JE1BMJ -24

I quickly opened the ALL.txt file, captured and saved the above under another filename.txt, turned the beam on Han, gave him a few calls, then proceeded to call about 6x CQ JA with no response. Wow! I said to myself. This is the first time anyone has seen that second hump diurnal peak to the Far East and I have it recorded. I looked at the decode again and then it hit me: I had been "had"!

BEYOND a REASONABLE DOUBT

OK OK So I missed it at first. That 2.9 second DT is an obvious part of evidence indicating EME. But let's take it a step further by providing four (4) additional evidentiary proofs making a total of five (5) supporting facts. Two of these will come from each individual: Both Azimuth and Elevation (antenna beamwidth) must "see" the moon at 11:09:45 on 8 June. My tool of choice for this endeavor was [GJTRACKER](#) by W7GJ available free on Lance's website. Thank you Lance!

For each individual, I provided a 5 minute printout every 1 minute with the time 1109 UTC centered and highlighted as minute #3.

JE1BMJ Han was calling AP2HA (MM63kp) on 3x Es. His bearing was assumed to be **294.5°** True

JUN 8,2024 35 ° 43' 45" N MOON POSITION RANGE: 231,044 MI

SATURDAY 140° 7 ' 30" E (PREPARED BY GJTRACKER) P +6 DAYS 15.52'SD

(JE1BMJ in QM05br)

APPROX 50 MHZ DB

UTC NOTES W AZIMUTH ELEV GHA DEC RT ASCN SKY °K DEGRADATION

==== =====

1107 298.4 7.5 319.0 27.3 6H 56M 6505 4.6

1108 298.5 7.4 319.3 27.3 6H 56M 6505 4.6

1109 Hrd 298.6 7.2 319.5 27.3 6H 56M 6505 4.6

1110 298.8 7.0 319.8 27.3 6H 56M 6505 4.6

1111 298.9 6.8 320.0 27.3 6H 56M 6505 4.6

K1SIX Bob was monitoring 50.313 with the antenna pointed at approximately **55°** True

JUN 8,2024 43 ° 8 ' 45" N MOON POSITION RANGE: 231,044 MI

SATURDAY 71 ° 57' 30" W (PREPARED BY GJTRACKER) P +6 DAYS 15.52'SD

JD: 2460469.5

(K1SIX in FN43ad)

APPROX 50 MHZ DB

UTC NOTES W AZIMUTH ELEV GHA DEC RT ASCN SKY °K DEGRADATION

==== =====

1107 55.3 3.6 319.0 27.3 6H 56M 6505 4.6

1108 55.5 3.7 319.3 27.3 6H 56M 6505 4.6

1109 Hrd 55.6 3.8 319.5 27.3 6H 56M 6505 4.6

1110 55.8 4.0 319.8 27.3 6H 56M 6505 4.6

1111 55.9 4.1 320.0 27.3 6H 56M 6505 4.6

With five (5) matching evidentiary proofs, I believe it is safe to conclude that decode of Han's FT8 signal that morning was via EME. This was a personal first for me and I can only assume that two well equipped stations could complete a six meter FT8 EME QSO if this hasn't already been accomplished!

USING the Utility for EXTREMELY LONG HAUL PATHS

The best way I can think of to begin this section is to simply state the obvious: **ONE SIZE DOES NOT FIT ALL** and if I could think of a single word to best describe the Utility in its present form, it would be: **Obsolete**. However, I believe it still has value and the learning process and technology changes that have occurred since the initial release in 2002 have created a list of upgrades in my mind that could make such a utility extremely valuable, on a global basis, in the future.

So, consider this as a version of [Shark Tank](#). I am looking for talented investors as this is well beyond my personal capability. The investment is time. I'm looking to build a team with similar interests. A team of experts in the fields of programming, plasma physics, propagation and understanding how people may interact with software- all with people skills. A perfect example of a team effort is the WSJT-X application itself. The return on investment in such an endeavor is anticipated to be \$0. However, the reward could benefit the 6m dx community and that could impact you. Please read on as I describe the shortcomings of the present Utility along with potential solutions.

THE APPLICATION

Using MS Excel for just about anything is "a natural" for me. I am formally trained on this product (and others) by classroom attendance at courses offered directly by Microsoft. This means that I can quickly and efficiently develop a Macro driven application. Over time, I have developed Macro driven Excel "apps" for business, finance and engineering which is my background. Often, these "apps" would "massage" the data and export a CSV file to another application for further processing. So maybe I could be called an Excel "guru" but...

MS Excel is not the platform to distribute a product to a wide audience if that product could potentially realize widespread use. A compiled high level programming language, distributed as a .exe file is clearly the solution. In addition, in these modern times, such an "app" should be compatible with a minimum of the most commonly used smartphone operating systems (Apple iOS and Android). I support and envision "freeware" and Open Source to promote further personal investigations of propagation on "The Magic Band" that will, hopefully, see the results passed on to others over time.

Oops! Did someone say Open Source? Are we talking about **control** over [Intellectual Property Rights](#) here? Please understand that Open Source implies that your source code is available to anyone to use and that they will be able to develop "spinoff" applications from it. One example is the WSJT-Z program. So a developer with good intentions must consider risk and protect themselves.

The Solution: We may need a **free lawyer** as a consultant on "the team". This just keeps getting better! At this point, I predict that most readers of this document will start [dropping off like flies](#).

THE DIURNAL MODELS and DATA COLLECTION

In this section I will elaborate on how the first models were developed along with their goals and the intended audience *at that time*. That was then and this is now. Things have changed! I will also offer suggestions related to modern model development and improvements. I will also address the potential failures associated with extremely long-haul paths and include links to useful reference material. This is designed to be a “busy” section!

Placeholder addressing errors to be expected, etc. Suggested reference material links:

[KH6/K6MIO](#)

[K9LA](#)

[EY8MM](#)

UNATTENDED DATA COLLECTION

Placeholder describing methods/procedures and tools.

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PLEASE BE SURE TO HIT RELOAD THE NEXT TIME YOU STOP BY as THINGS MAY HAVE CHANGED!!

STILL UNDER CONSTRUCTION- HANG IN THERE ☺

