Results for the August 11-12, 2025 Meteor Scatter QSO Party

Perseid Shower, Image by NASA/Preston Dyches

This paper summarizes the ham radio activity recorded during the inaugural HamSCI Meteor Scatter QSO Party (MSQP), held during the peak of the August, 2025 Perseid meteor shower. Hams, through reception reports and two-way QSOs, were prolific data generators during the MSQP. The open-source data from this event will be used by the HamSCI community (and beyond) to further our understanding of 6 and 10 meter propagation, and, perhaps, to generate new insights into meteoric behavior.

Author: Gary Mikitin, AF8A
Contact: hamsci@hamsci.org
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AI generated image

MSQP Science Objectives

Generate research-worthy data resulting from 6 and 10 meter meteor scatter operation. The data will be used by the research community in an attempt to answer science questions, such as:

1. What factors influence meteor scatter propagation?
    - What are the similarities and differences between HF and VHF meteor scatter propagation?
    - How does propagation change between between the Perseid and Geminid meteor showers due to their different speeds and radiant geometries?
    - How does propagation change between the various sporadic sources and minor showers with their different speeds and radiant geometries?
    - How does propagation change with radiant geometries, trail direction, meteoroid size, and speed?
2. What is the typical duration of useful meteor scatter propagation?
    - How does this duration vary with operating frequency, transmitter–receiver distance, and meteor velocity?
3. What is the minimum size of an amateur radio station needed to work meteor scatter operations?
    - What defines a 'successful' MS station? Power levels? Antenna type (directionality, gain, elevation, height, polarization)? System ERP (effective radiated power)?
    - Does the definition of a 'successful' station (judged by both the number of contacts and the contact distances) vary between HF and VHF bands? If so, what are the differences?
4. How can meteor scatter communication be distinguished from other propagation modes?
    - What percentage of reported meteor scatter QSOs are actually meteor scatter?
    - What percentage are due to other modes (e.g., tropospheric, F-layer, E-layer, auroral)?
5. How do optical and radar meteor observations compare with amateur radio observations?

The target communities included: Seasoned meteor scatter operators, meteor scatter 'rookies' (those who are new to the mode), researchers with an interest in radio wave propagation. Data sources will include participant's log files (ADIF format), 'spotting' databases, such as PSKReporter.info and operators' WAV files from MSK144 decodes.

MSQP by the Numbers
August 11-12, 2025

Entrant's Log and Spotting Data

Total Entrants (from MSQP Entry Forms on hamsci.org)	75
Total Reported 2-way Contacts (from submitted ADIF files)	974
All Entrant's Rx Spots (data extracted from PSKReporter.info)	116,033
Entrants Submitting WAV Files (data submitted to zenodo.org)	29

Close examination of the PSKReporter data for the event period revealed that **1,414 stations** were receiving on 6 and 10 meter MSK144 during the 48 hour event period. Their **764,374 spots** are a most welcome contribution to the PSKReporter data set.

HamSCI truly appreciates everyone's contribution to meteor scatter research!

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MSQP by the Numbers
August 11-12, 2025

Entrants were asked to note their choice of operating mode. Receive-only stations ('monitors') used WSJT-X software to monitor the 6 and 10 meter bands, decoding 'pings', recording WAV files and uploading decodes to PSKReporter.

Transmit stations called and answered CQs, making two-way contacts ('QSOs') while performing the the same monitoring activities. After the event, Tx stations uploaded their ADIF (Amateur Data Interchange Format) logs to the HamSCI website.

Receive-Only vs Transmit/Receive*

Receive-Only	21	28%
Transmit-Receive	54	72%

*Out of 75 total entries

Two-Way Contacts (QSOs), Band by Band^

6 meter QSOs	459	47%
10 meter QSOs	515	53%

^Out of 974 total contacts

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MSQP by the Numbers
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Entrants were asked to note their experience level on their entry form. HamSCI is very pleased to report that the majority of the entrants self-reported that they were operating meteor scatter for the first time in their ham radio careers. The rookies successfully attempted something new in the name of citizen science!

Rookies vs Non-Rookies*

Rookies	53	71%
Non-Rookies	22	29%

*Out of 75 total entries

We hope all rookies enjoyed the experience and that they join the next event (December 12-13, 2025) as meteor scatter veterans!

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MSQP by the Numbers
August 11-12, 2025

Entrants were asked to configure their WSJT-X software to 'Save Decodes Only' - saving WAV files of successfully decoded signals.

It is expected that these WAV recordings will greatly contribute to the scientific observations and findings.

WAV files were uploaded to a long-term, publicly accessible data repository, Zenodo.org. The procedure was somewhat cumbersome, but many perservered, ensuring that their data will be preserved for years, if not decades, to come.

Entrants Submitting WAV File Recordings*

August 11-12 Perseids MSQP	29	28%

*Out of 75 total entries

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Aug 2025 MSQP: Top Three Rx and Tx Spots

Receive-Only*	Grid	Spot Count
Bernard, VA2CY	FN46	5,734
Steve, KA2YRA	FN22	5,121
Lee, W3LDB	FM19	4,639

Transmitters^	Grid	Spot Count
Rich, K1HTV	FM18	34,872
Bob, K2DRH	EN41	25,933
University of Scranton, W3USR	FN21	24,307

*Receive-Only Station Spots: Successful decode reports, uploaded to PSKReporter

^Transmitting Station Spots: Stations calling and answering CQs on 6 and 10 meters. Their transmissions were decoded by others who were listening and uploading to PSKReporter.

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Sampling of Photos/Videos From Entrants

Only one image was received - thanks to AE4JC:

https://youtu.be/B28WdPhqr3E?si=WOS9I2OdGAGJKuAf

Sampling of Soapbox Comments

Callsign	Comments
AF8A	It was good to see many familiar callsigns in the decode window, on both bands, on both days
K1HTV	Of the over 60 years of doing Meteor Scatter, this year's Perseids MSQP was one of the more fun times, surpassed only by experiencing the record 1966 Leonids meteor shower. At the start of the MSQP at 00:00 UTC on August 11, there was lots of E-skip. It continued on and off well into the night. It was difficult to know if contacts were via Es or meteor trails. The daylight hours of August 11 also produced a mix of Es and M/S propagation. On the morning of August 12,, most of the contacts appeared to be via M/S with the peak occurring between 1400 and 1600 UTC. I made 115 QSOs using the MSK144 mode. On 6 Meters, 10 of 85 contacts were made with local stations, a number of them using MSK144 for the first time. On 10 Meters, node of the 30 QSOs were with locals, all made via M/S or Es propagation. By the November Leonids shower, the will probably not be much, if any, E-skip. 73, Rich - K1HTV, doing Meteor scatter for over 60 years

Sampling of Soapbox Comments

Callsign	Comments
K3CDY	Great instructions and operating tips. I just wish meteors weren't such early risers.
K5TFL	Thanks for organizing this event. Very interesting and informative, my first time using a digital mode as its a worthwhile reason.
K8DTJ	Thanks for organizing the event. I had limited time to operate, so I only made a few contacts. Nevertheless, I feel like I have a better handle on how to use MSK144 to make contacts via meteor scatter.
K8LF	Tried to indicate the direction of antenna in ADI file for QSOs I completed. Used RFKit amplifier set to about 300 watts for all but 1st QSO with W1BOY was only 25 Watts.
K8VGL	I plan to improve 10M antenna height for Dec. MSQP
KA1DBE	Really enjoyed operating meteor scatter. Looking forward to the next one!
KA2YRA	Glad to participate. Looking forward to the December event, planning for better antenna and operation. Thanks and 73.
KD2UBX	A valuable learning experience and very enjoyable.
KD2WGB	Learned a lot about propagation during this contest. A lot of fun!
KE9SA	Thanks for holding the event, I would not have tried MSK144 and Meteor Scatter with my minimalist equipment without it.
KG6UDD	I have been actively promoting HamSCI activities to my fellow ham members of our club (Fullerton Radio Club, California).
KK0U/VE3	Meteor scatter was fun, even if the Perseids was kind of a dud
KK4BZ	Could operate only a limited time but did have both radios in receive only mode for a much greater period of time. Recorded 10m decodes in 319 wav files. Did not record 6m decodes due to limitation of the computer. Had several active stations nearby on both 6m and 10m.
KM4RK	Very interesting mode, some surprising paths too
KN4GDX	I look forward to these events in the future; and use of 10M MSK144 mode for both MS and other propagation modes.
KN4PHS	Sporadic-E interfered with meteor prop
KQ4SY	I am fairly new, 2 years. 4 showers. First time with the home made moxon. Multi band 80m dipole previously, oriented ends pointed N-S. *
KR4DES	Pretty neat data collection experiment. I need to plan ahead next time.

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Sampling of Soapbox Comments

Callsign	Comments
N0AX	An excellent way to both generate scientifically useful data and introduce new operators to a competitive operating event and environment. More!
N0LX	Interesting first experiences with meteor scatter. Lots to learn.
N3RN	Have not done MS in over 20 years. Things sure have changed! Antennas were temporary in the driveway.
N7CKJ	I'm going to be interested in the 10 Meter results, I've never operated MSK on that band!
NC6V	I had fun and I look forward to the Dec 2025 Meteor Shower event
ON6NL	In Europe there is a lot of MS activity. Data sources for you could be the logs of the ARI MS contest. I am active in meteor scatter for over 40 years and still exited about every contact.
VE2DVG	This was a good introduction for meteor scatter communications!
VU3GMW	Great event! Enjoyed receiving meteor scatter signals with simple gear. Looking forward to next time!
W0DTM	This was my first time trying meteor scatter. Even with a poor antenna, I had a lot of fun. I will have a better setup before the next one! Thank you.
W0JW	This would be a lot more fun at solar minimum but this was good also. Thanks for doing it 73
W1BOY	This was an interesting experience. I'll certainly try again in December.
W2JC	First time used MSK144 ... interesting experience !
W3OA	The FTdx5000 has two independent receivers so I was able two run two instances of WSJT-X, one driven by audio on 50.260 and one driven by audio from 28.145.
W3RGA	Lots of sporadic E made picking out the M/S difficult.
W4UTZ	After learning about MSK144 during this period, I am interested to see if there are further applications for the mode now that it is permissible on the HF bands
W5RRX	I really enjoyed this event, especially in that I'm also an amateur astronomer. This was my first ever attempt at meteor scatter and I was pretty excited to make two contacts. I'm looking forward to working the Geminids in December, and will be making a tech-talk presentation on my experience with the contest to the Mesilla Valley Radio Club in November to try and encourage participation in December.
W9XT	This was a great idea. I hope it encouraged others to try meteor scatter. I have done MS for years on 6 & 2M. I often make SSB or CW MS contacts during the ARRL 10M contest, but this is the first time I used digital modes on 10M MS.

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Sampling of Soapbox Comments

Callsign	Comments
WA4KFZ	Great event. Can't wait to hear about the science analysis!
WB9YIG	Interesting exercise, I'm pretty sure more than one mode was in play. Some contacts seemed too long for meteor scatter.
WD0FHK	Being HamSCI gave me extra reason to try MS for the 1st time.
WG2Z	MSQP operating conducted via six RemoteHamRadio sites as follows: CN87SJ (6m/10m), DM34OB (6m/10m), EM73XB (6m/10m), FN31AI (6m/10m), FN31EP (6m), FN31WT (10m). Additional data entries defining TX Power, ERP, and antenna type for each QSO have been added to the ADIF file. Note that the Grid Squares sent to PSK Reporter by WSJT-X only contain four alphanumeric characters instead of the recommended six due to my inadvertent omission of the fifth and sixth characters when setting up WSJT-X. The ADIF file contains all six recommended Grid Square characters.
WP3R	Listened on 50.260 and later on 28.145 Have PSK reporter ADIF. MS Rookie! Tnx for the event! De Angel WP3R
K0JDD	Great Fun and Educational
W0DAS	Thanks for organizing the event!

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Aug 2025 MSQP: Receive-Only Spots

Callsign)	Rx Records in PSKR*	Bonus: WAV File Submission
VA2CY	5734	
KA2YRA	5121	
W3LDB	4639	✓
W3OA	4320	✓
W2QL	2858	
NY1E	2546	
KD8RV	1276	✓
KG6UDD	1065	✓
AF8A	774	✓
W3RGA/RX2	770	✓
WP3R	562	
WD0FHK	355	
KO6FKX	171	
N7CKJ	162	
KD9MAP	133	
NC6V	121	
KN4PHS	61	
KR4CPB	55	
KF6FLJ	26	✓
N3XUS	0	
VU3GMW	0	

*The Rx Records column indicates how many times these stations successfully decoded signals from other stations (and then uploaded the decodes to PSK Reporter)

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Aug 2025 MSQP: Transmit QSOs and Spots

Callsign	Total QSOs	10m QSOs	6m QSOs	Tx Spots*	Bonus: ERP Calculation	Bonus: WAV File Submission
K1HTV	115	81	34	34872	✓	
K2DRH	111	81	30	25933	✓	
AB4EJ	83	31	52	10660	✓	
W3USR	61	17	44	24307		✓
WG2Z	40	26	14	7041	✓	✓
N3RN	32	24	8	6495		✓
WA4KFZ	31	14	17	5315	✓	
W1UE	27	0	27	2081		
ON6NL	26	26	0	2452	✓	✓
KN4GDX	26	4	22	2391		
KQ4SY	25	15	10	3666		
KD2WGB	25	8	17	3454	✓	✓
N0AX	24	13	11	2296		
W0JW	20	1	19	2440		
W0DTM	19	3	16	2692	✓	
AE4JC	17	12	5	2093	✓	
K5TFL	16	9	7	1808	✓	
W2JC	15	0	15	511		✓
K8VGL	13	4	9	2275		
W9XT	13	7	6	1862		

*The Tx Spots column indicates how many times each station's transmissions were successfully decoded by other stations (and then uploaded to PSK Reporter)

Aug 2025 MSQP: Transmit QSOs and Spots

Callsign	Total QSOs	10m QSOs	6m QSOs	Tx Spots*	Bonus: ERP Calculation	Bonus: WAV File Submission
KB9TBB	13	5	8	1016		
KE9SA	13	6	7	975		
K8LF	13	0	13	853		
W1BOY	12	0	12	2697		
KK4BZ	11	3	8	5064		
K0JDD	11	11	0	637		
WN3A	11	11	0	147	✓	✓
W4PPC	10	0	10	1392		
WB9YIG	10	0	10	357		✓
KB8PAI	10	0	10	89		
KA1DBE	10	0	10	76		
N8IK	8	6	2	13166		
N6GP	8	2	6	842		
KM4RK	8	8	0	399		
K3CDY	7	7	0	4206		
KD2UBX	7	0	7	1013		
KC3ZVZ	7	7	0	578		
W0DAS	7	0	7	315		
AD7FC	7	5	2	286		
NN4NT	7	0	7	114		✓

*The Tx Spots column indicates how many times each station's transmissions were successfully decoded by other stations (and then uploaded to PSK Reporter)

Aug 2025 MSQP: Transmit QSOs and Spots

Callsign	Total QSOs	10m QSOs	6m QSOs	Tx Spots*	Bonus: ERP Calculation	Bonus: WAV File Submission
W4UTZ	6	0	6	1138		✓
KF8DTF	6	0	6	205		
N1HAC	5	0	5	107		
N0LX	4	4	0	1963		
N7CKJ	4	4	0	1461		
K8DTJ	4	0	4	477	✓	✓
W3RGA	4	0	4	468	✓	✓
VE2DVG	3	0	3	384		
KK0U/VE3	3	3	0	322		
KR4DES	3	0	3	174		
W5RRX	2	0	2	10		
NN4SA	1	1	0	279		✓
KN6NMV^	0	0	0	26		
W2NAF^	0	0	0	0		✓

*The Tx Spots column indicates how many times each station's transmissions were successfully decoded by other stations (and then uploaded to PSK Reporter)

^While some stations did not submit logs for actual QSOs, their participation still had value - they generated reception reports and, in some cases, WAV files for future analysis.

Credits

Ham Radio operating events like the inaugural MSQP don't happen without significant volunteer efforts. HamSCI would like to recognize (in no particular order):

McKenzie Denton KO4GLN: Originator of the MSQP concept, plus Social Media and School Club/Youth promoter

Robert Suggs NN4NT: For sharing years of personal and professional meteor scatter experience

Bruce Crandall KN4GDX and Rich Zwirko K1HVT: For assistance with defining the event and for encouragoing involvement throughout the meteor scatter community

Kuldeep Pandey, Mary Lou West KC2NMC and Jay Weitzen AC1SN: For guidance and perspective from the science/research community

Ed Efchak WX2R: HamSCI's Public Information Officer, and his 'all media' promotional efforts

Nina Tormann KD3BJV: For creating WAV file collection and classification procedures

Philip Gladstone N1DQ: Designer/Developer/Maintainer of PSKReporter.info

Joe Taylor K1JT and the entire WSJT-X development team

W3USR, The University of Scranton Amateur Radio Club and its members

Nathaniel Frissell W2NAF: HamSCI Founder (2016), HamSCI Lead, and all-around supporter of the MSQP

Further, we recognize the support of our many partners and collaborators:

Omissions or errors are the sole responsibility of the author - Gary Mikitin, AF8A

Questions or corrections to this document should be directed to hamsci@hamsci.org

Join us for the next MSQP
December 12-13, 2025