$\mathcal{PAMET}$ '93

Poletni Astronomski MEteorski Tabor 93

ELEKTRONSKA KOMUNIKACIJA

zbral: *Aram Karalič*

From: MX%"rstachnik@smtpgmgw.ossa.hq.nasa.gov" 5-AUG-1993 00:41:30.16
To: FN23MIKUZ
CC:
Subj: Measurements of Perseid radiant
Date: 4 Aug 1993 18:35:42 -0500
From: "Stachnik, Bob" <rstachnik@smtpgmgw.ossa.hq.nasa.gov>
Subject: Measurements of Perseid radiant
Return-receipt-to: "Stachnik, Bob" <rstachnik@smtpgmgw.ossa.hq.nasa.gov>
To: "Boyarchuk, Alexander" <iaas@adonis.ias.msk.su>, "Green, Dan"
<green@cfa.harvard.edu>, "Gyssens, Mark" <gyssens@wins.uia.ac.be>,
"Kessler, Don / JSC" <kessler@sn.jsc.nasa.gov>, "Lequeux, James"
<aanda@frmeu51.bitnet>, "Loftus, Joe / JSC"
<jloftus@jscprofs.nasa.gov>, "Mattei, Janet" <aavso@cfa0.harvard.edu>,
"McGraw, John" <jmcgraw@as.arizona.edu>, "Mikusz, Herman"
<herman.mikuz@uni-lj.si>, "Nisenson, Peter"
<nisenson@cfassp8.harvard.edu>, "Polidan, Ron"
<polidan@stars.span.nasa.gov>, "Shustov, Boris"
<bshustov@airas.msk.su>, "Stockman, Peter" <stockman@stsci.edu>,
"Vaughan, Art" <avaughan@shakes.jpl.nasa.gov>
CC:
Cleggett-Haleim#m#_Paula.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
gnewton@smtpgmgw.ossa.hq.nasa.gov,
Rahe#m#_Jurgen.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
griegler@smtpgmgw.ossa.hq.nasa.gov,
rstachnik@smtpgmgw.ossa.hq.nasa.gov, eweiler@smtpgmgw.ossa.hq.nasa.gov
NASA is engaged in an effort to characterize a potential "storm" associated
with the upcoming Perseid meteor shower. The storm has been predicted to occur
on the evening of 11 August. The prospect of a storm arises from the fact that,
during the Earth's 1993 passage through the plane of the progenitor comet
P/Swift-Tuttle, the Earth's orbit almost exactly intersects that of the comet.
In addition to radar and visual count information already planned,
observations of a diffuse glow sometimes reported during storms are also
desirable. It is supposed that the glow, seen in the general direction of the
radiant and antiradiant, is due to scattering from meteoritic dust. A
particularly good description of the phenomenon appears in the August, 1993,
issue of Sky and Telescope, p 48. The radiant and glow are NOT co-incident, one
calculation suggesting a northern centroid approximately 10 degrees south of
Algol.
High quality observations could yield details of the structure of the stream
and, with color information, the particle size distribution. If the stream can
be observed several days in advance of the storm, such observations would have
predictive value, a circumstance of significant importance.
The ideal instrumentation would be a wide field CCD camera having a field
of at least several degrees. The instrument should be capable of being very
well calibrated. Ideally observations should be obtained in several colors.
A detailed observing program is still being developed. I would like to
request your assistance in calling to the attention of colleagues the fact that
data of the sort described would be very helpful to NASA in insuring an
improved characterization of these rare events.
With thanks for your assistance-
Robert Stachnik
Program Scientist / STS-51 ORFEUS ASTROSPAS payload
Internet: rstachnik@gm.ossa.hq.nasa.gov
Phone: 202 - 358 - 0351

From: MX%"rstachnik@smtpgmgw.ossa.hq.nasa.gov" 6-AUG-1993 18:37:18.86
To: FN23MIKUZ
CC:
Subj: FW: RSVP
Date: 6 Aug 1993 12:27:21 -0500
From: "Stachnik, Bob" <rstachnik@smtpgmgw.ossa.hq.nasa.gov>
Subject: FW: RSVP
CC: "Green, Dan" <green@cfa.harvard.edu>,
rstachnik@smtpgmgw.ossa.hq.nasa.gov
Following information is an aid to possible imaging of the Perseid stream in scattered light. (Additional ephemeris calculation to follow shortly).
Calculations are due to Dan Green, Central Bureau for Astronomical Telegrams.
-Bob

To: smtpgmgw.ossa.hq.nasa.gov::rstachnik%cfa.DECNET@cfa.harvard.edu
From: Daniel W. E. Green, SAO, 617-495-7440 on Fri, Aug 6, 1993 11:43 AM
Subject: RSVP
Bob, here's an ephemeris for a possible "cloud" of meteroids from the Perseid stream. I calculated it using the orbit for P/Swift-Tuttle, with the time of perihelion adjusted such that the comet would pass less than 0.001 AU from Earth early on Aug. 12 UT, thereby mimicking the Perseid stream. Brian agrees that this is about the best prediction we can offer, but he cautions that if any "cloud" were to be ever detected, surely it would be within a day or so of nodal crossing (Aug. 12.1 UT). But you can pass this around to potential observers, for what it's worth. Regards, Dan

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1
1993	08 07.0	03 05.94	+57 47.6	0.173	0.988	76.4	93.7	0.6
1993	08 07.5	03 06.14	+57 48.0	0.156	0.990	76.8	94.4	0.4
1993	08 08.0	03 06.41	+57 48.4	0.139	0.992	77.1	95.0	0.2
1993	08 08.5	03 06.77	+57 49.0	0.122	0.994	77.4	95.7	-0.1
1993	08 09.0	03 07.26	+57 49.9	0.105	0.997	77.7	96.4	-0.4
1993	08 09.5	03 07.96	+57 51.1	0.088	0.999	78.0	97.1	-0.8
1993	08 10.0	03 09.03	+57 52.8	0.071	1.002	78.2	97.8	-1.2
1993	08 10.5	03 10.80	+57 55.7	0.053	1.004	78.4	98.6	-1.8
1993	08 11.0	03 14.29	+58 01.1	0.036	1.007	78.3	99.7	-2.7
1993	08 11.5	03 24.15	+58 14.4	0.019	1.009	77.3	101.6	-4.0
1993	08 12.0	06 08.07	+54 37.2	0.0022	1.012	55.1	124.8	-8.7
1993	08 12.5	14 38.37	-56 45.4	0.015	1.015	95.6	83.5	-4.5
1993	08 13.0	14 51.50	-57 18.0	0.032	1.018	97.1	81.1	-2.8
1993	08 13.5	14 55.62	-57 26.9	0.050	1.021	97.3	79.9	-1.9
1993	08 14.0	14 57.64	-57 31.1	0.067	1.024	97.2	79.1	-1.2
1993	08 14.5	14 58.85	-57 33.5	0.084	1.027	97.0	78.3	-0.7
1993	08 15.0	14 59.66	-57 35.1	0.101	1.030	96.8	77.7	-0.3
1993	08 15.5	15 00.25	-57 36.3	0.118	1.033	96.5	77.0	0.1
1993	08 16.0	15 00.71	-57 37.2	0.135	1.036	96.2	76.4	0.4
1993	08 16.5	15 01.08	-57 37.9	0.152	1.039	95.8	75.8	0.7
1993	08 17.0	15 01.39	-57 38.5	0.169	1.042	95.5	75.2	0.9

```
From:  MX%"rstachnik@smtpgmgw.ossa.hq.nasa.gov" 6-AUG-1993 18:44:30.34
To:  FN23MIKUZ
CC:
Subj:  FW: more detailed ephemeris; RSVP
Date:  6 Aug 1993 12:37:09 -0500
From:  "Stachnik, Bob" <rstachnik@smtpgmgw.ossa.hq.nasa.gov>
Subject:  FW: more detailed ephemeris; RSVP
Additional ephemaris info follows:
-Bob
------------------------------------------------------------------------
To:  smtpgmgw.ossa.hq.nasa.gov::rstachnik%cfa.DECNET@cfa.harvard.edu
From:  Daniel W. E. Green, SAO, 617-495-7440 on Fri, Aug 6, 1993 11:53 AM
Subject:  more detailed ephemeris; RSVP
Bob, I realized that you might want something in the way of an ephemeris
for the night of closest approach to the Perseid stream, because it moves
across the sky so rapidly.  So here is an ephemeris, produced as before,
for 0.01-day intervals from Aug.  11.85-12.10 TDT:
1993 TT R. A. (2000) Decl.  Delta r Elong.  Phase m1
Aug.  11.85 3 59.82 +58 38.0 0.0072 1.011 72.9 106.7 -6.1
11.86 4 02.69 +58 38.3 0.0068 1.011 72.5 107.1 -6.3
11.87 4 05.87 +58 38.3 0.0065 1.011 72.1 107.5 -6.4
11.88 4 09.40 +58 38.0 0.0062 1.011 71.7 108.0 -6.5
11.89 4 13.34 +58 37.2 0.0058 1.011 71.2 108.5 -6.6
11.90 4 17.75 +58 35.8 0.0055 1.012 70.6 109.1 -6.7
11.91 4 22.74 +58 33.5 0.0051 1.012 70.0 109.8 -6.9
11.92 4 28.42 +58 30.0 0.0048 1.012 69.2 110.5 -7.0
11.93 4 34.92 +58 24.8 0.0045 1.012 68.4 111.4 -7.2
11.94 4 42.44 +58 17.3 0.0041 1.012 67.4 112.4 -7.3
11.95 4 51.20 +58 06.3 0.0038 1.012 66.2 113.6 -7.5
11.96 5 01.51 +57 50.3 0.0035 1.012 64.8 115.0 -7.7
11.97 5 13.77 +57 26.8 0.0031 1.012 63.2 116.7 -7.9
11.98 5 28.49 +56 51.9 0.0028 1.012 61.1 118.8 -8.2
11.99 5 46.32 +55 59.0 0.0025 1.012 58.5 121.4 -8.4
12.00 6 08.07 +54 37.2 0.0022 1.012 55.1 124.8 -8.7
12.01 6 34.66 +52 27.4 0.0019 1.012 50.6 129.3 -9.1
12.02 7 06.89 +48 56.9 0.0016 1.012 44.4 135.5 -9.4
12.03 7 45.05 +43 10.4 0.0013 1.012 35.7 144.3 -9.8
12.04 8 28.29 +33 47.2 0.0011 1.012 23.1 156.9 -10.2
???  bad sector
```

```
From:  MX%"rstachnik@smtpgmgw.ossa.hq.nasa.gov" 6-AUG-1993 19:23:53.09
To:  FN23MIKUZ
CC:
Subj:  FW:
Date:  6 Aug 1993 12:40:22 -0500
From:  "Stachnik, Bob" <rstachnik@smtpgmgw.ossa.hq.nasa.gov>
Subject:  FW:
A cautionary note:
-Bob
------------------------------------------------------------------------
To:  gm.ossa.hq.nasa.gov::rstachnik%cfa.DECNET@cfa.harvard.edu
Cc:  BRIAN
From:  brian%cfaps1.DECNET@cfa.harvard.edu on Fri, Aug 6, 1993 12:20 PM
I don't think the night-to-night motion is important, because one should
only be looking very close to the "storm", if there is one.  But now I'm
worried about Rao's figures, for it seems to me that for a fast-moving
stream like the Perseids, one should look much closer to the Perseid
radiant, which is well north of Algol.  I'm so involved with some other
urgent projects that I don't have time to do any further thinking on this
myself, but I am making enquiries of Duncan Steel in Australia.  (Rao is
already on a cruise in the Mediterranean himself, I think, and other
North American meteor experts have also gone to unreachable points in Europe.)
```

From: MX%"rstachnik@smtpgmgw.ossa.hq.nasa.gov" 6-AUG-1993 21:48:42.27
To: FN23MIKUZ
CC:
Subj: FW: my ephemeris
Date: 6 Aug 1993 15:43:49 -0500
From: "Stachnik, Bob" <rstachnik@smtpgmgw.ossa.hq.nasa.gov>
Subject: FW: my ephemeris
Return-receipt-to: "Stachnik, Bob" <rstachnik@smtpgmgw.ossa.hq.nasa.gov>
To: "Appenzeller, Immo" <ct0@vm.urz.uni-heidelberg.de>, "Brown, Peter"
<peter@canlon.physics.uwo.ca>, "Emerson, Gary"
<emerson%vega.colorado.edu@spot.colorado.edu>, "Fienberg, Rick"
<fienberg@cfa.harvard.edu>, "Guinan, Ed" <guinan@ucis.vill.edu>,
"Gyssens, Mark" <gyssens@wins.uia.ac.be>, "Kessler, Don / JSC"
<kessler@sn.jsc.nasa.gov>, "Loftus, Joe / KSC"
<jloftus@jscprofs.nasa.gov>, "Mattei, Janet" <aavso@cfa0.harvard.edu>,
"Mikusz, Herman" <herman.mikuz@uni-lj.si>, "Nisenson, Peter"
<nisenson@cfassp8.harvard.edu>, "Polidan, Ron"
<polidan@stars.span.nasa.gov>,
Blanchard#m#_Doug.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Morgan#m#_Tom.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
Rahe#m#_Jurgen.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
wspjeldvik@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, ewhipple@smtpgmgw.ossa.hq.nasa.gov
Colleagues-
The following is important update information regarding the location of the
Perseid meteor stream.
-Bob

To: smtpgmgw.ossa.hq.nasa.gov::rstachnik%cfa.DECNET@cfa.harvard.edu
From: Daniel W. E. Green, SAO, 617-495-7440 on Fri, Aug 6, 1993 3:24 PM
Subject: my ephemeris
I should add that there are two significant potential problems with the
ephemeris I sent you this morning:
1) the orbital elements of P/Swift-Tuttle that were used are from an epoch
in December 1992; I'm checking now to see what difference it might make
to use elements with epoch in August 1993, but I think that a more major
problem is:
2) The comet's orbit and the meteor stream are not one and the same,
especially considering that we may be looking on Aug. 11-12, 1993, at
debris that left the comet in 1862 or 1737; it is hard to say how the
center of such stream "clumps" have strayed off of the comet's actual
path.
If you look at my ephemeris, you'll see that the path of the comet is
shifted about an hour east of the actual radiant, and that this comes no-
where close to the "10 degrees south of Algol" that Joe Rao wrote about
in Sky and Telescope and in WGN. We don't know how Rao did his calcula-
tions, and he's evidently in Europe now and unreachable anyway. So my
best recommendation is that observers use my ephemeris as a guide to motion
of any potential cloud, but to be aware that wide-field observations
should be made of the whole region 10 to 30 degrees west of my ephemeris
positions! The rough direction and rate of motion of any possible cloud
should, however, move as indicated in my ephemeris, and we don't know how
large such a cloud might be. -- Dan

From: MX%"rstachnik@smtpgmgw.ossa.hq.nasa.gov" 6-AUG-1993 23:57:12.01
To: FN23MIKUZ
CC:
Subj: FW: New mailing address
Date: 6 Aug 1993 17:57:44 -0500
From: "Stachnik, Bob" <rstachnik@smtpgmgw.ossa.hq.nasa.gov>
Subject: FW: New mailing address
To: "Appenzeller, Immo" <ct0@vm.urz.uni-heidelberg.de>, "Bock, Jeanne"
<BOCK@corp.timeplex.com>, "Bowyer, Stu" <bowyer@ssl.berkeley.edu>,
"Boyce, Peter" <pboyce@blackhole.aas.org>, "Breckinridge, Jim"
<jbreck@huey.jpl.nasa.gov>, "Brown, Peter"
<peter@canlon.physics.uwo.ca>, "Chakrabarti, Supriya"
<supc@veebs.bu.edu>, "Clayton, Geoff" <gclayton@fenway.colorado.edu>,
"Dupree, Andrea" <dupree@cfassp8.harvard.edu>, "Emerson, Gary"
<emerson%vega.colorado.edu@spot.colorado.edu>, "Fienberg, Rick"
<fienberg@cfa.harvard.edu>, "Finoguenov, Alexis"
<alexis@yutan.harvard.edu>, "Green, Dan" <green@cfa.harvard.edu>,
"Guinan, Ed" <guinan@ucis.vill.edu>, "Gyssens, Mark"
<gyssens@wins.uia.ac.be>, "Hartmann, Gernot"
<GHARTMANN@nasamail.nasa.gov>, "Hurwitz, Mark"
<markh@sag4.ssl.berkeley.edu>, "Jenkins, Ed"
<ebj@astrovax.princeton.edu>, "Kappelmann, Norbert"
<kappelmann@ait.physik.uni-tuebingen.de>, "Kessler, Don / JSC"
<kessler@sn.jsc.nasa.gov>, "Koechlin, Laurant"
<koechlin@omptob.decnet>, "Lequeux, James" <aanda@frmeu51.bitnet>,
"Loftus, Joe / KSC" <jloftus@jscprofs.nasa.gov>, "Marsden, Brian"
<marsden@cfa.harvard.edu>, "Mattei, Janet" <aavso@cfa0.harvard.edu>,
"McGraw, John" <jmcgraw@as.arizona.edu>, "Meisel, David"
<meisel@uno.cc.geneseo.edu>, "Mendillo, Michael / BU"
<mendillo@buasta.bu.edu>, "Mikusz, Herman" <herman.mikuz@uni-lj.si>,
"Nisenson, Peter" <nisenson@cfassp8.harvard.edu>, "Noyes, Bob"
<noyes@cfa.harvard.edu>, "Oliversen, Ron"
<oliversen@stars.gsfc.nasa.gov>, "PERSEIDS" <perseids@sn.jsc.nasa.gov>,
"Peterson, Deane" <dpeterson@sbast1.ess.sunysb.edu>, "Polidan, Ron"
<polidan@stars.span.nasa.gov>, "Shipman, Harry"
<eod00391@udelvm.udel.edu>, "Shu, Frank" <shu@bkyast.berkeley.edu>,
"Shustov, Boris" <bshustov@airas.msk.su>, "Sonneborn, George"
<sonneborn@stars.gsfc.nasa.gov>, "Steel, Duncan AAS/Aust"
<dis@aaocbn3.aao.gov.au>, "Weedman, Dan" <weedman@astro.psu.edu>,
Blanchard#m#_Doug.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
Cleggett-Haleim#m#_Paula.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
Morgan#m#_Tom.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
gnewton@smtpgmgw.ossa.hq.nasa.gov,
Rahe#m#_Jurgen.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
RICHIE#m#_WAYNE.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
SZ_Scientists.Code_SZ_Mail_Server@smtpgmgw.ossa.hq.nasa.gov,
Yost#m#_Bruce_D#d#.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov
CC: rstachnik@smtpgmgw.ossa.hq.nasa.gov
Colleagues-
Johnson Spaceflight Center (JSC) has set up a Perseids Coordination Center.
Please cc them on all messages sent to me. They should, in fact, be the primary
point of contact for issues involving characterization of the Perseid storm.
-Bob Stachnik

To: Stachnik, Bob
From: PERSEIDS@sn.jsc.nasa.gov on Fri, Aug 6, 1993 5:39 PM
Subject: New mailing address
We have set up our new Perseids Coordination center...it should be

```
manned beginning Monday morning.  The Internet mailing address is
PERSEIDS@SN.JSC.NASA.GOV
(ie, the same as mine, except replace my name with perseids.)
The phone number is (713) 244 - 5023...this line can role over to 3 more
lines.  A speaker phone that can connect to a computer is (713) 483 - 1556.
You should start sending copies of your messages to this address, and
pass the information on to others.
Don Kessler
```

From: MX%"rstachnik@smtpgmgw.ossa.hq.nasa.gov" 9-AUG-1993 01:35:15.72
To: FN23MIKUZ
CC:
Subj: Second source of a glow!
Date: 8 Aug 1993 09:47:49 -0500
From: "Stachnik, Bob" <rstachnik@smtpgmgw.ossa.hq.nasa.gov>
The following describes a phenomenon, seperate from scattering by the stream itself, which could contribute to a diffuse glow at the time of the predicted storm.
Remarks on Phenomena in a Great Meteoric Shower
by A. F. Cook
Harvard-Smithsonian Center for Astrophysics
This document arises from discussions instigated by Robert Stachnik of NASA Headquarters involving at least Michael Mendillo of the Department of Astronomy at Boston University, B.G. Marsden and R.E. McCrosky of the Harvard-Smithsonian Center for Astrophysics, Stachnik and the author of this note. The essential point is to note two competing causes for the diffuse glows about the radiants of the great showers of the Leonids in 1866 and of the Andromedids in 1872 reported by visual observers and collected by W.J. Baggaley in 1978. His explanation was that they had seen the cloud of meteoritic dust along the orbit of the shower. An alternative explanation may apply to meteor showers in which observed trajectories start above a height of 100 km.
This occurs for all meteors which enter at the velocities of the Perseids and Leonids and also for slow meteors which ablate at anomalously great heights such as the October Draconids (associated with Comet Giacobini-Zinner) and the one accurately observed annual Andromedid from the Harvard meteor program. It is well known that every Perseid which is sufficiently bright starts its luminous path with emission of the forbidden oxygen green line at 5577 angstrom. This, in turn, is quenched once the spectrum becomes filled with the usual atomic lines associated with the vaporization of the meteoroid. This phenomenon manifests itself to visual observers as a train of about one second duration for every bright meteor. The lower state for this line is a metastable one and a further cascade is possible through the two red lines at 6300 and 6364 angstroms, with about three photons emitted by the former for each one from the later. The radiative lifetime of this state is about 110 s compared to 0.74 s for the upper state of the green line. In the absence of collisional quenching by atmospheric molecules, every four photons at 5577 angstrom will lead to the appearance of three photons at 6300 angstrom and one at 6364 angstrom.
But the dispersion of the by winds will be pronounced over the 110 s decay period for this radiation. Combine this with the perspective of convergence of trails seen looking toward the radiant and we have a recipe for producing a glow about the radiant provided the shower shows the great abundance of faint meteors often seen in great showers an d that the state of the upper atmosphere is such as not to cause the upper state of the red lines to be quenched.
The two possible sources of any observed glow about the radiant can be easily distinguished by wide angle photography through a filter passing 6300 angstrom and not one passing any expected atmospheric or galactic emissions other than starlight and reflected sunlight.
Further characteristics of dust in the orbital plane of Comet Swift-Tuttle that may be looked for are concentration to the orbital plane as we pass through it and a steeper gradient in the reflected light away from the sun than toward it. This gradient will change sides across the orbit as we pass through the plane. The possibility that the mean planes for larger meteors and smaller meteors may differ a bit should be considered. This has already been seen for a few showers from radar and photographic observations. Thus passage through the plane of any reflecting dust may occur earlier or later than the maximum of the shower.

From: MX%"PERSEIDS@sn.jsc.nasa.gov" 10-AUG-1993 04:55:10.17
To: FN23MIKUZ
CC:
Subj: ANNOUNCEMENT OF NASA PERSEIDS STORM WATCH CENTER ACTIVATION
Date: Mon, 9 Aug 1993 21:49:17 -0500 (CDT)
From: PERSEIDS@sn.jsc.nasa.gov
Subject: ANNOUNCEMENT OF NASA PERSEIDS STORM WATCH CENTER ACTIVATION
To: GOJAKANGAS@UB.D.UMN.EDU, TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP,
rstachnik@smtpgmgw.ossa.hq.nasa.gov, kessler@sn.jsc.nasa.gov,
jloftus@jscprofs.nasa.gov,
Cleggett-Haleim#m#_Paula.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
stachnik#m#_bob.code_sz_mail_server@smtpgmgw.ossa.hq.nasa.gov,
%CFA.DECNET@cfa.harvard.edu,
emerson%vega.colorado.edu@spot.Colorado.EDU, AAVSO@CFA0.HARVARD.EDU,
POLIDAN@STARS.SPAN.NASA.GOV,
Morgan#m#_Tom.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
Rahe#m#_Jurgen.NHQ_OSSA_Common_Site@smtpgmgw.ossa.hq.nasa.gov,
DIS@AAOCBN3.AAO.GOV.AU, dsteel@physics.adelaide.edu.au,
dis@aaocbn.oz.au, dis@aaocbn.anu.edu.au
X-Vmsmail-To: @PERSEIDS
THIS MESSAGE IS SENT TO ADVISE YOU OF THE ACTIVATION OF THE NASA PERSEID STORM
WATCH CENTER, LOCATED AT NASA/JOHNSON SPACE CENTER IN HOUSTON, TEXAS, USA.
YOUR NAME/COMPUTER ADDRESS HAS BEEN COMPILED FROM PREVIOUS COMMUNICATIONS WITH
MR. JOE LOFTUS AND MR. DON KESSLER OF NASA. PLEASE ACKNOWLEDGE RECEIPT OF THIS
MESSAGE WITH A REPLY AND YOUR GEOGRAPHIC LOCATION.
THE GOAL OF THIS CENTER IS TO COLLECT AND DESSIMINATE OBSERVATIONS OF THE
PERSEID SHOWER AND TO PROVIDE ASSISTANCE TO SPACECRAFT OWNER/OPERATORS
CONCERNED WITH THE HAZARD POTENTIAL ASSOCIATED WITH THIS EVENT.
THE CENTER MAY BE CONTACTED VIA INTERNET AS:
PERSEIDS@SN.JSC.NASA.GOV
ALTERNATELY, WE MAY BE CONTACTED VIA TELEPHONE AT:
713-244-5023 (VOICE) OR
713-483-1556 (VOICE/DATA) OR
713-483-1573 (FAX)
PLEASE ACKNOWLEDGE RECEIPT OF THIS MESSAGE AT YOUR EARLIEST CONVENIENCE.
DR. PHILLIP ANZ-MEADOR
LOCKHEED ENGINEERING & SCIENCES COMPANY
DR. MARK CINTALA
NASA/JOHNSON SPACE CENTER

From: MX%"rstachnik@smtpgmgw.ossa.hq.nasa.gov" 10-AUG-1993 21:13:54.25
To: FN23MIKUZ
CC:
Subj: FW: where to see the "glow"
Date: 10 Aug 1993 15:15:35 -0500
From: "Stachnik, Bob" <rstachnik@smtpgmgw.ossa.hq.nasa.gov>
Subject: FW: where to see the "glow"
To: "Brown, Peter" <peter@canlon.physics.uwo.ca>, "Emerson, Gary"
<emerson%vega.colorado.edu@spot.colorado.edu>, "Fienberg, Rick"
<fienberg@cfa.harvard.edu>, "Green, Dan" <green@cfa.harvard.edu>,
"Gyssens, Mark" <gyssens@wins.uia.ac.be>, "Marsden, Brian"
<marsden@cfa.harvard.edu>, "Mattei, Janet" <aavso@cfa0.harvard.edu>,
"Meisel, David" <meisel@uno.cc.geneseo.edu>, "Mendillo, Michael / BU"
<mendillo@buasta.bu.edu>, "Mikusz, Herman" <herman.mikuz@uni-lj.si>,
"Niedner, Mal" <niedner@stars.gsfc.nasa.gov>, "Noyes, Bob"
<noyes@cfa.harvard.edu>
I believe you have already seen this?

To: Stachnik, Bob
From: KESSLER@sn.jsc.nasa.gov on Tue, Aug 10, 1993 1:45 PM
Subject: where to see the "glow"
Herb Zook and I (mostly Herb) have checked Duncan Steels calculations, and
agree with his location of the apparent "glow" expected as we pass through
the orbital plane of the comet...that is the glow radiant should be located
RA= 30 to 60 deg Dec =+83 to 87 deg
and the anti-glow radiant would be
RA= 210 to 240 deg Dec =-83 to -87 deg.
Herb and I also went through the calculation of where a glow might be
expected a day before passing through the comet plane. The answer depends
on where a concentration of material might be expected, but the glow will
always be on a line between the meteor stream radiant (ie around RA=46 deg
and Dec=58 deg) and the glow radiant given above. If there is a strong
concentration of material exactly such that it will collide with the Earth,
then the glow will be located at the meteor stream radiant; However, if the
concnetration is constant along the comet path, the optical depth (and
hense the brightness) will be greatest somewhere along the line connecting
the two radiants; as the Earth gets closer to passing throught the comet's
orbital plane, the brightness and contrast of the glow near the glow radiant
will increase, and reach a maximum as we pass through the plane.
I would suggest that a day before passage, we obtain data all along the
line between the 2 radiants. On the day of passage, we need only look at,
or near, the glow radiant. Any bias near the glow radiant should be along
a line between the glow radiant and the sun...this will ensure that we are
always looking in the plane of the comet. I suggest any bias be less than
5 deg at the time of passage through the plane.
Good Luck on any observations,
Don Kessler

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From:  MX%"PERSEIDS@sn.jsc.nasa.gov" 11-AUG-1993 07:06:27.30
To:  FN23MIKUZ
CC:
Subj:  NASA Perseid Stormwatch Center Announcement No.  3
Date:  Tue, 10 Aug 1993 23:57:58 -0500 (CDT)
From:  PERSEIDS@sn.jsc.nasa.gov
Subject:  NASA Perseid Stormwatch Center Announcement No.  3
To:  niiler@spica.bu.edu, GOJAKANG@UB.D.UMN.EDU,
TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP, rstachnik@smtpgmgw.ossa.hq.nasa.gov,
kessler@sn.jsc.nasa.gov, jloftus@jscprofs.nasa.gov,
stachnik#m#_bob.code_sz_mail_server@smtpgmgw.ossa.hq.nasa.gov,
CFA.DECNET@cfa.harvard.edu,
emerson%vega.colorado.edu@spot.Colorado.EDU, AAVSO@CFA0.HARVARD.EDU,
POLIDAN@STARS.SPAN.NASA.GOV, JRahe@sl.ms.ossa.hq.nasa.gov,
DIS@AAOCBN3.AAO.GOV.AU, zidian@maths.qmw.ac.uk, ipw@maths.qmw.ac.uk,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, DBlanchard@sl.ms.ossa.hq.nasa.gov,
gyssens@wins.uia.ac.be, pwv@cea.berkeley.edu,
brian%cfaps1.DECNET@cfa.harvard.edu, green@cfa.harvard.edu,
marsden@cfa.harvard.edu, ct0@vm.hd-net.uni-heidelberg.de,
peter@canlon.physics.uwo.ca, fienberg@cfa.harvard.edu,
guinan@ucis.vill.ed, aavso@cfa0.harvard.edu, herman.mikuz@uni-lj.si,
nisenson@cfassp8.harvard.edu, dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Dave@incubus.aftac.gov, JB@astro.as.utexas.edu,
ericco@cea.berkeley.edu, patr@cea.berkeley.edu,
kj9u@montebello.soest.hawaii.edu
X-Vmsmail-To:  @PERSEIDS
NASA Perseids Stormwatch Center
Announcement No.  3
11 Aug 1993, 0400 UT
This message requests that all observational data, either from ground-based
observers or spacecraft owner/operators, be forwarded AT THE OBSERVER'S
EARLIEST POSSIBLE CONVENIENCE to the NASA Perseids Stormwatch Center.
The Center may be reached via E-mail as a 'reply' to this message or sent to:
PERSEIDS@SN.JSC.NASA.GOV
Alternately, we may be contacted 24 hours a day at:
713-244-5023 (primary voice line)
713-483-1556 (simultaneous voice/data modem line)
713-483-1573 (telefax)
For international contactees, the preceding numbers should be prefixed by 1,
the US country code.
We request that all data be reported in the following format for ground-based
observers:
observer name
observer telephone/telefax/e-mail address, as appropriate
observer location (lat,lon,alt)
observation start time (UT)
observation end time (UT)
number of meteors observed during this interval
local sky quality during this interval
observer field of view, if applicable
After listing these data, any other comments regarding your observations would
be welcome.  If possible, multiple time intervals are requested so as to better
define the temporal nature of the event as observed from your site.
We request that satellite owner/operators utilize the following format:
reporter name
reporter telephone/telefax/e-mail address, as appropriate
reporter's company or agency
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reporter's satellite
- common name
- international designator (e.g. 1995-017A)
- US Space Command catalog number, if known
satellite event(s) time (UT)
nature of event(s)
Again we request that these data be reported to us at the operator's EARLIEST CONVENIENCE. We appreciate your cooperation and forebearance with this additional imposition on your schedule.
We intend to summarize these observations as quickly as possible and forward them to the individuals on our email list, as well as to those on our fax list. It is our hope that all of you will find them timely enough to consider them in planning your observations.
The data assembled from your observations will be integrated into an encounter model of the Perseid storm passage. NASA plans to sponsor a workshop in the spring of 1994 to discuss the results of the analysis of the data.
Dr. Phillip D. Anz-Meador
Lockheed Engineering & Sciences Company
Dr. Mark J. Cintala
NASA/Johnson Space Center
Solar System Exploration Division

```
From:  MX%"PERSEIDS@sn.jsc.nasa.gov" 11-AUG-1993 07:37:53.74
To:  FN23MIKUZ
CC:
Subj:  announcement no.  4
Date:  Wed, 11 Aug 1993 0:34:41 -0500 (CDT)
From:  PERSEIDS@sn.jsc.nasa.gov
Subject:  announcement no.  4
To:  niiler@spica.bu.edu, GOJAKANG@UB.D.UMN.EDU,
TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP, rstachnik@smtpgmgw.ossa.hq.nasa.gov,
kessler@sn.jsc.nasa.gov, jloftus@jscprofs.nasa.gov,
stachnik#m#_bob.code_sz_mail_server@smtpgmgw.ossa.hq.nasa.gov,
%CFA.DECNET@cfa.harvard.edu,
emerson%vega.colorado.edu@spot.Colorado.EDU, AAVSO@CFA0.HARVARD.EDU,
POLIDAN@STARS.SPAN.NASA.GOV, JRahe@sl.ms.ossa.hq.nasa.gov,
DIS@AAOCBN3.AAO.GOV.AU, zidian@maths.qmw.ac.uk, ipw@maths.qmw.ac.uk,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, DBlanchard@sl.ms.ossa.hq.nasa.gov,
gyssens@wins.uia.ac.be, pwv@cea.berkeley.edu,
brian%cfaps1.DECNET@cfa.harvard.edu, green@cfa.harvard.edu,
marsden@cfa.harvard.edu, ct0@vm.hd-net.uni-heidelberg.de,
peter@canlon.physics.uwo.ca, fienberg@cfa.harvard.edu,
guinan@ucis.vill.ed, aavso@cfa0.harvard.edu, herman.mikuz@uni-lj.si,
nisenson@cfassp8.harvard.edu, dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Dave@incubus.aftac.gov, JB@astro.as.utexas.edu,
ericco@cea.berkeley.edu, patr@cea.berkeley.edu,
kj9u@montebello.soest.hawaii.edu
X-Vmsmail-To:  @PERSEIDS
NASA Perseids Stormwatch Center
Announcement No.  4
11 AUG 1993
0530 GMT
NASA's Transportable Radar System, Johnson Space Center, has detected an
increase in the meteor flux overhead.  Radar frequency is 49.92 MHz.
Shortly after midnight, Houston local time, the radar began seeing meteors at a
rate of 1.5 per minute, with a flurry of 10 meteors in one 3 minute interval.
Earlier today, the radar had measured an effective rate of 1 per minute.
Aviano, Italy, has reported from 0140 UT to 0155 UT 4 meteors .  Fort Hunter,
Georgia, USA, about 0200 UT, observed the same effective rate.
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From:  MX%"PERSEIDS@sn.jsc.nasa.gov" 11-AUG-1993 16:51:23.08
To:  FN23MIKUZ
CC:
Subj:  Very good!!
Date:  Wed, 11 Aug 1993 9:51:19 -0500 (CDT)
From:  PERSEIDS@sn.jsc.nasa.gov
Subject:  Very good!!
To:  herman.mikuz@uni-lj.si
X-Vmsmail-To:  SMTP%"herman.mikuz@uni-lj.si"
Thank you for your report!  You have the honor of having transmitted the first
data to us.  We will be including it in our first bulletin, which we have begun
to assemble.  Please note that, as we approach the time of peak activity, we
probably will not be able to respond to each message you send.  You can be sure
that your information will be included in our bulletins.
Thank you, and good luck!!
```

From: MX%"PERSEIDS@sn.jsc.nasa.gov" 11-AUG-1993 18:46:36.95
To: FN23MIKUZ
CC:
Subj: Observations from Slovenia and Hawaii
Date: Wed, 11 Aug 1993 11:40:32 -0500 (CDT)
From: PERSEIDS@sn.jsc.nasa.gov
Subject: Observations from Slovenia and Hawaii
To: barbieri@astrpd.astro.it, niiler@spica.bu.edu, GOJAKANG@UB.D.UMN.EDU,
TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP, rstachnik@smtpgmgw.ossa.hq.nasa.gov,
kessler@sn.jsc.nasa.gov, jloftus@jscprofs.nasa.gov,
emerson%vega.colorado.edu@spot.Colorado.EDU, AAVSO@CFA0.HARVARD.EDU,
POLIDAN@STARS.SPAN.NASA.GOV, JRahe@sl.ms.ossa.hq.nasa.gov,
DIS@AAOCBN3.AAO.GOV.AU, zidian@maths.qmw.ac.uk, ipw@maths.qmw.ac.uk,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, DBlanchard@sl.ms.ossa.hq.nasa.gov,
gyssens@wins.uia.ac.be, pwv@cea.berkeley.edu,
brian%cfaps1.DECNET@cfa.harvard.edu, green@cfa.harvard.edu,
marsden@cfa.harvard.edu, ct0@vm.hd-net.uni-heidelberg.de,
peter@canlon.physics.uwo.ca, fienberg@cfa.harvard.edu,
guinan@ucis.vill.edu, aavso@cfa0.harvard.edu, herman.mikuz@uni-lj.si,
nisenson@cfassp8.harvard.edu, dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Dave@incubus.aftac.gov, JB@astro.as.utexas.edu,
ericco@cea.berkeley.edu, patr@cea.berkeley.edu,
kj9u@montebello.soest.hawaii.edu, I.P.Williams@qmw.ac.uk,
bshustov@airas.msk.su, stockman@stsci.edu, iaas@adonis.ias.msk.su,
Fairall@uctvax.uct.ac.za
X-Vmsmail-To: @PERSEIDS
NASA Perseids Stormwatch Center
Announcement No. 6
11 August 1993, 1640 UT
The following table describes, in compressed format, a summary of the latest
observations as reported to the Perseid Stormwatch Center in Houston, Texas,
USA. The name of the location is given, accompanied by its coordinates, when
avaialable. The time interval of the observation is indicated in the column
labeled "UT." The frequency of meteors (all meteors observed, unless
specifically described as Perseids with a "P" following the number) reduced to
the number per hour is given next; this figure applies only to the period given
in the UT column. The estimated magnitude of the faintest star visible at the
reporting site is given in the next column, followed by a short description of
the sky conditions. Note that the presence of the Moon will not be included in
the sky conditions, which are expressed in terms of the percent of the sky
estimated to be clear at the reporting site, whenever possible. Comments should
be self-explanatory.
Freq. Limiting
Location UT (no./hr) Mag. Sky Comments
Slovenia 2100-2300 10 P 5.2 90% 10 August
(45.9N, 2300-0100 15 P 5.2 90% 10/11 August
14.0E) 0100-0300 20 P 5.2 100% 11 August
Hawaii 1000-1030 16 P 6.0 "Cloudy" Intermittant clouds
1340-1415 12 P 6.0 "Cloudy" Intermittant clouds

```
From:  MX%"PERSEIDS@sn.jsc.nasa.gov" 11-AUG-1993 23:15:11.44
To:  FN23MIKUZ
CC:
Subj:  The first report of The Big Night
Date:  Wed, 11 Aug 1993 16:00:16 -0500 (CDT)
From:  PERSEIDS@sn.jsc.nasa.gov
Subject:  The first report of The Big Night
To:  mcfadden@astro.umd.edu, emerson%vega.colorado.edu@spot.colorado.edu,
barbieri@astrpd.astro.it, niiler@spica.bu.edu, GOJAKANG@UB.D.UMN.EDU,
TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP, rstachnik@smtpgmgw.ossa.hq.nasa.gov,
kessler@sn.jsc.nasa.gov, jloftus@jscprofs.nasa.gov,
emerson%vega.colorado.edu@spot.Colorado.EDU, AAVSO@CFA0.HARVARD.EDU,
POLIDAN@STARS.SPAN.NASA.GOV, JRahe@sl.ms.ossa.hq.nasa.gov,
DIS@AAOCBN3.AAO.GOV.AU, zidian@maths.qmw.ac.uk, ipw@maths.qmw.ac.uk,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, DBlanchard@sl.ms.ossa.hq.nasa.gov,
gyssens@wins.uia.ac.be, pwv@cea.berkeley.edu,
brian%cfaps1.DECNET@cfa.harvard.edu, green@cfa.harvard.edu,
marsden@cfa.harvard.edu, ct0@vm.hd-net.uni-heidelberg.de,
peter@canlon.physics.uwo.ca, fienberg@cfa.harvard.edu,
guinan@ucis.vill.edu, aavso@cfa0.harvard.edu, herman.mikuz@uni-lj.si,
nisenson@cfassp8.harvard.edu, dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Dave@incubus.aftac.gov, JB@astro.as.utexas.edu,
ericco@cea.berkeley.edu, patr@cea.berkeley.edu,
kj9u@montebello.soest.hawaii.edu, I.P.Williams@qmw.ac.uk,
bshustov@airas.msk.su, stockman@stsci.edu, Fairall@uctvax.uct.ac.za,
Pevec@srce3.srce.hr
X-Vmsmail-To:  @PERSEIDS
Visnjan Observatory
Istarska 5
HR-51460 Visnjan, Istra, Croatia
latitude 45 16 39
longitude 13 46 26
Korado Korlevic
Alan Pevec
We are performing visual observations with naked eye and telescopic,
radio on low frequencies and scaning CCD wide angle camera.
So far, naked eye visual observations are reported as follows:
09.  Aug 1993.  UT 2100-2205 ZHR of Perseids = 25 +/- 9
11.  Aug 1993.  UT 0016-0254 ZHR of Perseids = 40 +/- 8
CCD wide angle camera has program of searching for meteorid particles.
We will be scaning stripe of the sky from the radiant of Perseids to the
head of the Draco.  It follows from our calculations that most luminous
part of meteoroids will be seen in that direction.  Results will be E-mailed
after the watch.
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```
From:  MX%"PERSEIDS@sn.jsc.nasa.gov" 11-AUG-1993 23:33:20.49
To:  FN23MIKUZ
CC:
Subj:  obs from japan
Date:  Wed, 11 Aug 1993 16:29:05 -0500 (CDT)
From:  PERSEIDS@sn.jsc.nasa.gov
Subject:  obs from japan
To:  mcfadden@astro.umd.edu, emerson%vega.colorado.edu@spot.colorado.edu,
barbieri@astrpd.astro.it, niiler@spica.bu.edu, GOJAKANG@UB.D.UMN.EDU,
TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP, rstachnik@smtpgmgw.ossa.hq.nasa.gov,
kessler@sn.jsc.nasa.gov, jloftus@jscprofs.nasa.gov,
emerson%vega.colorado.edu@spot.Colorado.EDU, AAVSO@CFA0.HARVARD.EDU,
POLIDAN@STARS.SPAN.NASA.GOV, JRahe@sl.ms.ossa.hq.nasa.gov,
DIS@AAOCBN3.AAO.GOV.AU, zidian@maths.qmw.ac.uk, ipw@maths.qmw.ac.uk,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, DBlanchard@sl.ms.ossa.hq.nasa.gov,
gyssens@wins.uia.ac.be, pwv@cea.berkeley.edu,
brian%cfaps1.DECNET@cfa.harvard.edu, green@cfa.harvard.edu,
marsden@cfa.harvard.edu, ct0@vm.hd-net.uni-heidelberg.de,
peter@canlon.physics.uwo.ca, fienberg@cfa.harvard.edu,
guinan@ucis.vill.edu, aavso@cfa0.harvard.edu, herman.mikuz@uni-lj.si,
nisenson@cfassp8.harvard.edu, dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Dave@incubus.aftac.gov, JB@astro.as.utexas.edu,
ericco@cea.berkeley.edu, patr@cea.berkeley.edu,
kj9u@montebello.soest.hawaii.edu, I.P.Williams@qmw.ac.uk,
bshustov@airas.msk.su, stockman@stsci.edu, Fairall@uctvax.uct.ac.za,
Pevec@srce3.srce.hr
X-Vmsmail-To:  @PERSEIDS
From:  SMTP%"green%cfaps2.DECNET@cfa.harvard.edu" 11-AUG-1993 16:27:22.30
To:  sn.jsc.nasa.gov::perseids%cfa.DECNET@cfa.harvard.edu
CC:
Subj:  report from Syuichi Nakano in Sumoto, Awaji Island, Japan
Date:  Wed, 11 Aug 93 17:27:26 -0400
Message-Id:  <9308112127.AA25159@cfa.harvard.edu>
From:  green%cfaps2.DECNET@cfa.harvard.edu (Daniel W. E. Green, SAO, 617-495-7440)
To:  sn.jsc.nasa.gov::perseids%cfa.DECNET@cfa.harvard.edu
Subject:  report from Syuichi Nakano in Sumoto, Awaji Island, Japan
From:  CFAPS1::SYUICHI 11-AUG-1993 15:37:18.03
To:  BRIAN,DAN
CC: SYUICHI
Subj:
Dear Brian & Dan:
We had a clear sky!  What this is the first night in this summer!
I have observed Perseid meteor during 13h - 19h UT on August 11.
There was no shower and appearance of Perseids was rather fewer
than an average year.  Appearance of Perseids was HR 14-23 (note
no corrections Facter and elevation of Radiant point).
I have never seen such weak appearance of Perseids!  Will we
have a shower just after a few hours?
Syuichi
```

```
From:  MX%"PERSEIDS@sn.jsc.nasa.gov" 12-AUG-1993 03:13:14.24
To:  FN23MIKUZ
CC:
Subj:  latest update
Date:  Wed, 11 Aug 1993 20:07:51 -0500 (CDT)
From:  PERSEIDS@sn.jsc.nasa.gov
Subject:  latest update
To:  mcfadden@astro.umd.edu, emerson%vega.colorado.edu@spot.colorado.edu,
barbieri@astrpd.astro.it, niiler@spica.bu.edu, GOJAKANG@UB.D.UMN.EDU,
TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP, rstachnik@smtpgmgw.ossa.hq.nasa.gov,
kessler@sn.jsc.nasa.gov, jloftus@jscprofs.nasa.gov,
AAVSO@CFA0.HARVARD.EDU, POLIDAN@STARS.SPAN.NASA.GOV,
JRahe@sl.ms.ossa.hq.nasa.gov, DIS@AAOCBN3.AAO.GOV.AU,
zidian@maths.qmw.ac.uk, ipw@maths.qmw.ac.uk,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, DBlanchard@sl.ms.ossa.hq.nasa.gov,
gyssens@wins.uia.ac.be, pwv@cea.berkeley.edu,
brian%cfaps1.DECNET@cfa.harvard.edu, green@cfa.harvard.edu,
marsden@cfa.harvard.edu, ct0@vm.hd-net.uni-heidelberg.de,
peter@canlon.physics.uwo.ca, fienberg@cfa.harvard.edu,
guinan@ucis.vill.edu, aavso@cfa0.harvard.edu, herman.mikuz@uni-lj.si,
nisenson@cfassp8.harvard.edu, dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Dave@incubus.aftac.gov, JB@astro.as.utexas.edu,
ericco@cea.berkeley.edu, patr@cea.berkeley.edu,
kj9u@montebello.soest.hawaii.edu, I.P.Williams@qmw.ac.uk,
bshustov@airas.msk.su, stockman@stsci.edu, Fairall@uctvax.uct.ac.za,
Pevec@srce3.srce.hr, joe@montebello.soest.hawaii.edu
X-Vmsmail-To:  @PERSEIDS
The following table describes, in compressed format, a summary of the
latest observations as reported to the Perseid Stormwatch Center in Houston
, Texas, USA. Column headers are self explanatory, with the exceptions of
M_V (visual magnitude) and L_M (limiting magnitude).  The "sky" column
denotes the clarity of the sky expressed as a percentage of sky free of
clouds or a short description of local conditions particular to that site.
Note that the presence of the Moon will not be included in this column.
location UTday UTtime #/hour m_v l_m sky comments
================================================================================
Croatia 9 Aug 2100-2205 25 +/- 9 - - -
Slovenia 10 Aug 2100-2300 10 - 5.2 90% Perseids only
" 10-11 2300-0100 15 - 5.2 90% "
" 11 Aug 0100-0300 20 - 5.2 100% "
Croatia 11 Aug 0016-0254 40 +/- 8 - - -
Hawaii 11 Aug 1000-1030 16 - 6.0 cloudy Perseids only
" 11 Aug 1340-1415 12 - 6.0 cloudy "
Japan 11 Aug 1300-1900 14-23 - - 100% 'no shower';'weak'
Slovenia 11 Aug 2000-2100 25 - 4.9 clear Perseids only
" 11 Aug 2100-2200 38 - 5.4 " "
" 11 Aug 2205-2255 49 - 5.1 " "
================================================================================
```

From: MX%"PERSEIDS@sn.jsc.nasa.gov" 12-AUG-1993 04:58:44.54
To: FN23MIKUZ
CC:
Subj: Nonstandard, but very interesting, observations
Date: Wed, 11 Aug 1993 21:54:53 -0500 (CDT)
From: PERSEIDS@sn.jsc.nasa.gov
Subject: Nonstandard, but very interesting, observations
To: mcfadden@astro.umd.edu, emerson%vega.colorado.edu@spot.colorado.edu,
barbieri@astrpd.astro.it, niiler@spica.bu.edu, GOJAKANG@UB.D.UMN.EDU,
TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP, rstachnik@smtpgmgw.ossa.hq.nasa.gov,
kessler@sn.jsc.nasa.gov, jloftus@jscprofs.nasa.gov,
AAVSO@CFA0.HARVARD.EDU, POLIDAN@STARS.SPAN.NASA.GOV,
JRahe@sl.ms.ossa.hq.nasa.gov, DIS@AAOCBN3.AAO.GOV.AU,
zidian@maths.qmw.ac.uk, ipw@maths.qmw.ac.uk,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, DBlanchard@sl.ms.ossa.hq.nasa.gov,
gyssens@wins.uia.ac.be, pwv@cea.berkeley.edu,
brian%cfaps1.DECNET@cfa.harvard.edu, green@cfa.harvard.edu,
marsden@cfa.harvard.edu, ct0@vm.hd-net.uni-heidelberg.de,
peter@canlon.physics.uwo.ca, fienberg@cfa.harvard.edu,
guinan@ucis.vill.edu, aavso@cfa0.harvard.edu, herman.mikuz@uni-lj.si,
nisenson@cfassp8.harvard.edu, dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Dave@incubus.aftac.gov, JB@astro.as.utexas.edu,
ericco@cea.berkeley.edu, patr@cea.berkeley.edu,
kj9u@montebello.soest.hawaii.edu, I.P.Williams@qmw.ac.uk,
bshustov@airas.msk.su, stockman@stsci.edu, Fairall@uctvax.uct.ac.za,
Pevec@srce3.srce.hr, joe@montebello.soest.hawaii.edu
X-Vmsmail-To: @PERSEIDS
Anthony C. Beresford
phacb@cc.flinders.edu.au
lat -34.9 deg, ling 138.65 E, altitude 150meters
1840Ut- 1940 UT 75% coverage no impacts seen
2000-2015 UT 80% coverage no impacts seen
2035 -2112 Ut 80% coverage no impacts seen
all August 11, 1993
Sky Quality clear sky no cloud, suburban back yard
7 derees [7 by 50 binoculars]
These observations were prompted by predictions of possible mag 1
flashes mentioned in iau Circ 5839. Coverage is not complete
because 1. need to move observing site to avoid blocking by trees
2. Resting arm muscles.
3. Checking latest information on Perseids
No impacts means I saw nothing as bright as magnitude 4.
No glow at the counter apparent radiant was seen but
sky conditions were too bright anyway for that.
****
Meteor Group Hawaii observations on 50.064MHz of meteor trail echoes.
(Beacon is located on the North Shore of Oahu, receiver is at Ewa Beach on the
SouthWest shore.)
Preliminary results (number of echoes heard by person monitoring
receiver versus time):
Date UTC interval #pings
9Aug 21-22 9
10Aug 00-01 11
01-02 4
02-03 2
03-04 8
04-05 3

```
19-20 8
20-21 17
21-22 17
22-23 6
23-24 17
11Aug
00-01 24
01-02 6 (Severe radio frequency interference
02-03 8 during 01-05 UTC
03-04 5 from 47KV power lines arcing in rain.)
04-05 3
18-19 14
19-20 28
20-21 26
21-22 25
22-23 17
23-00 17
12Aug
00-01 16 (at 01 radiant is only .6 degrees
above horizon as seen from Oahu)
01-02 15 (at 02 radiant 4.71 degrees below
horizon)
******************************************************
Further monitoring for the possible cloud of meteoritic dust show no
evidence of these phenomena.
Series of 5 min frames covering the areas proposed by D. Green,
H. Zook and D. Kessler, as well as those suggested by K. Korlevic were
taken during 1993 Aug.  11.87-11.93UT in moonless conditions with Zeiss
2.8/20mm wide angle lens (stopped to f/5.6) + 574x384 CCD + Schott RG610
filter.  The camera field was  35x24deg.
H. Mikuz, Crni vrh Observatory, Slovenia
1993 Aug.  12
```

```
From:  MX%"PERSEIDS@sn.jsc.nasa.gov" 12-AUG-1993 06:17:57.30
To:  FN23MIKUZ
CC:
Subj:  update
Date:  Wed, 11 Aug 1993 23:07:46 -0500 (CDT)
From:  PERSEIDS@sn.jsc.nasa.gov
Subject:  update
To:  mcfadden@astro.umd.edu, emerson%vega.colorado.edu@spot.colorado.edu,
barbieri@astrpd.astro.it, niiler@spica.bu.edu, GOJAKANG@UB.D.UMN.EDU,
TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP, rstachnik@smtpgmgw.ossa.hq.nasa.gov,
kessler@sn.jsc.nasa.gov, jloftus@jscprofs.nasa.gov,
AAVSO@CFA0.HARVARD.EDU, POLIDAN@STARS.SPAN.NASA.GOV,
JRahe@sl.ms.ossa.hq.nasa.gov, DIS@AAOCBN3.AAO.GOV.AU,
zidian@maths.qmw.ac.uk, ipw@maths.qmw.ac.uk,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, DBlanchard@sl.ms.ossa.hq.nasa.gov,
gyssens@wins.uia.ac.be, pwv@cea.berkeley.edu,
brian%cfaps1.DECNET@cfa.harvard.edu, green@cfa.harvard.edu,
marsden@cfa.harvard.edu, ct0@vm.hd-net.uni-heidelberg.de,
peter@canlon.physics.uwo.ca, fienberg@cfa.harvard.edu,
guinan@ucis.vill.edu, aavso@cfa0.harvard.edu, herman.mikuz@uni-lj.si,
nisenson@cfassp8.harvard.edu, dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Dave@incubus.aftac.gov, JB@astro.as.utexas.edu,
ericco@cea.berkeley.edu, patr@cea.berkeley.edu,
kj9u@montebello.soest.hawaii.edu, I.P.Williams@qmw.ac.uk,
bshustov@airas.msk.su, stockman@stsci.edu, Fairall@uctvax.uct.ac.za,
Pevec@srce3.srce.hr, joe@montebello.soest.hawaii.edu
X-Vmsmail-To:  @PERSEIDS
The following table describes, in compressed format, a summary of the
latest observations as reported to the Perseid Stormwatch Center in Houston
, Texas, USA. Column headers are self explanatory, with the exceptions of
M_V (visual magnitude) and L_M (limiting magnitude).  The "sky" column
denotes the clarity of the sky expressed as a percentage of sky free of
clouds or a short description of local conditions particular to that site.
Note that the presence of the Moon will not be included in this column.
location UTday UTtime #/hour m_v l_m sky comments
================================================================================
Croatia 9 Aug 2100-2205 25 +/- 9 - - -
Slovenia 10 Aug 2100-2300 10 - 5.2 90% Perseids only
" 10-11 2300-0100 15 - 5.2 90% "
" 11 Aug 0100-0300 20 - 5.2 100% "
Croatia 11 Aug 0016-0254 40 +/- 8 - - -
Hawaii 11 Aug 1000-1030 16 - 6.0 cloudy Perseids only
" 11 Aug 1340-1415 12 - 6.0 cloudy "
Japan 11 Aug 1300-1900 14-23 - - 100% 'no shower';'weak'
Slovenia 11 Aug 2000-2100 25 - 4.9 clear Perseids only
" 11 Aug 2100-2200 38 - 5.4 " "
" 11 Aug 2205-2255 49 - 5.1 " "
Slovenia 11-12 2300-0000 56 - 5.4 clear Perseids only
" 12 Aug 0019-0112 65 - 4.9 " "
Croatia 11 Aug 1952-2052 91 +/- 25 - 6.0 - Perseids only
" 11 Aug 2052-2130 182 +/- 36 - 5.9 - "
" 11 Aug 2212-2312 92 +/- 17 - 5.9 - "
" 11-12 2312-0012 127 +/- 20 - 5.7 - "
" 12 Aug 0012-0112 260 +/- 30 - 5.5 - "
" 12 Aug 0112-0200 269 +/- 33 - 5.5 - "
Colorado 11-12 -  60 - - scattered lots of RF
USA clouds
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From:  MX%"PERSEIDS@sn.jsc.nasa.gov" 12-AUG-1993 08:57:04.48
To:  FN23MIKUZ
CC:
Subj:  aavso update
Date:  Thu, 12 Aug 1993 1:37:39 -0500 (CDT)
From:  PERSEIDS@sn.jsc.nasa.gov
Subject:  aavso update
To:  mcfadden@astro.umd.edu, emerson%vega.colorado.edu@spot.colorado.edu,
barbieri@astrpd.astro.it, niiler@spica.bu.edu, GOJAKANG@UB.D.UMN.EDU,
TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP, rstachnik@smtpgmgw.ossa.hq.nasa.gov,
kessler@sn.jsc.nasa.gov, jloftus@jscprofs.nasa.gov,
AAVSO@CFA0.HARVARD.EDU, POLIDAN@STARS.SPAN.NASA.GOV,
JRahe@sl.ms.ossa.hq.nasa.gov, DIS@AAOCBN3.AAO.GOV.AU,
zidian@maths.qmw.ac.uk, ipw@maths.qmw.ac.uk,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, DBlanchard@sl.ms.ossa.hq.nasa.gov,
gyssens@wins.uia.ac.be, pwv@cea.berkeley.edu,
brian%cfaps1.DECNET@cfa.harvard.edu, green@cfa.harvard.edu,
marsden@cfa.harvard.edu, ct0@vm.hd-net.uni-heidelberg.de,
peter@canlon.physics.uwo.ca, fienberg@cfa.harvard.edu,
guinan@ucis.vill.edu, aavso@cfa0.harvard.edu, herman.mikuz@uni-lj.si,
nisenson@cfassp8.harvard.edu, dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Dave@incubus.aftac.gov, JB@astro.as.utexas.edu,
ericco@cea.berkeley.edu, patr@cea.berkeley.edu,
kj9u@montebello.soest.hawaii.edu, I.P.Williams@qmw.ac.uk,
bshustov@airas.msk.su, stockman@stsci.edu, Fairall@uctvax.uct.ac.za,
Pevec@srce3.srce.hr, joe@montebello.soest.hawaii.edu
X-Vmsmail-To:  @PERSEIDS
From:  SMTP%"aavso@cfa0.harvard.edu" 12-AUG-1993 01:35:22.23
To:  PERSEIDS@sn.jsc.nasa.gov
CC:
Subj:
Date:  Thu, 12 Aug 93 02:35:18 EDT
From:  aavso@cfa0.harvard.edu (Janet Mattei)
Message-Id:  <9308120635.AA22591@cfa0.harvard.edu.HARVARD.EDU>
To:  PERSEIDS@sn.jsc.nasa.gov
TO:PERSEIDS@sn.jsc.nasa.gov "Drs.  Phillip D. Anz-Meador, Mark Cintala"
FROM:aavso@cfa0.harvard.edu "Dr.  Janet A. Mattei"
Date:12 Aug.  1993
Subj.  PERSEID Meteor Shower report
The 450 AAVSO observers worldwide have been alerted to call in their
report of the Perseid meteor shower activity, if they observe
more than 2 per minute.  No phone calls were received on the
evening of Aug.  11/12 reporting such activity.
AAVSO summer research assistant Ben Oppenheimer, observing in Vermont
reported observing about 60 per hour on Aug.  12, at 2 UT.
AAVSO member Mike Mattei observing in Littleton, Massachusetts,
(Lat:+42.521 degrees, Long.  71.472 degrees west, alt.  75 m.)
reported the following:
Aug.  12 03:47-04:22 UT 6 meteors of magnitude -3 to +2
Aug.  12 05:24-05:41 UT 6 meteors of magnitude -1 to 1
Sky conditions:  patchy fog with 25% clear sky.
Reported by:
Dr.  Janet A. Mattei
AAVSO
Tel:617 354 0484 (W)
508 264 0017 (H)
e-mail:  aavso@cfa0.harvard.edu
```

```
From:  MX%"PERSEIDS@sn.jsc.nasa.gov" 12-AUG-1993 10:07:08.23
To:  FN23MIKUZ
CC:
Subj:  IMO update/summary report
Date:  Thu, 12 Aug 1993 2:56:11 -0500 (CDT)
From:  PERSEIDS@sn.jsc.nasa.gov
Subject:  IMO update/summary report
To:  mcfadden@astro.umd.edu, emerson%vega.colorado.edu@spot.colorado.edu,
barbieri@astrpd.astro.it, niiler@spica.bu.edu, GOJAKANG@UB.D.UMN.EDU,
TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP, rstachnik@smtpgmgw.ossa.hq.nasa.gov,
kessler@sn.jsc.nasa.gov, jloftus@jscprofs.nasa.gov,
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JRahe@sl.ms.ossa.hq.nasa.gov, DIS@AAOCBN3.AAO.GOV.AU,
zidian@maths.qmw.ac.uk, ipw@maths.qmw.ac.uk,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, DBlanchard@sl.ms.ossa.hq.nasa.gov,
gyssens@wins.uia.ac.be, pwv@cea.berkeley.edu,
brian%cfaps1.DECNET@cfa.harvard.edu, green@cfa.harvard.edu,
marsden@cfa.harvard.edu, ct0@vm.hd-net.uni-heidelberg.de,
peter@canlon.physics.uwo.ca, fienberg@cfa.harvard.edu,
guinan@ucis.vill.edu, aavso@cfa0.harvard.edu, herman.mikuz@uni-lj.si,
nisenson@cfassp8.harvard.edu, dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Dave@incubus.aftac.gov, JB@astro.as.utexas.edu,
ericco@cea.berkeley.edu, patr@cea.berkeley.edu,
kj9u@montebello.soest.hawaii.edu, I.P.Williams@qmw.ac.uk,
bshustov@airas.msk.su, stockman@stsci.edu, Fairall@uctvax.uct.ac.za,
Pevec@srce3.srce.hr, joe@montebello.soest.hawaii.edu
X-Vmsmail-To:  @PERSEIDS
From:  SMTP%"DIS@AAOCBN3.AAO.GOV.AU" 12-AUG-1993 02:46:21.25
To:  PERSEIDS@SN.JSC.NASA.GOV
CC:
Subj:  IMO REPORT...
Date:  Thu, 12 Aug 1993 17:39:32 +1000 (EST)
From:  DIS@AAOCBN3.AAO.GOV.AU
Message-Id:  <930812173932.19de@AAOCBN3.AAO.GOV.AU>
Subject:  IMO REPORT...
To:  PERSEIDS@SN.JSC.NASA.GOV
X-Vmsmail-To:  SMTP%"PERSEIDS@SN.JSC.NASA.GOV"
From:  SMTP%"PETER@CANLON.PHYSICS.UWO.CA" 12-AUG-1993 17:33:45.91
To:  mjc@astrophysics.starlink.rutherford.ac.uk, rhawkes@mta.ca,
heinlein@dhdmpi5.bitnet, CanlonJones@CANLON.PHYSICS.UWO.CA,
dis@aaocbn3.aao.gov.au, pegasoft@cc.ruu.nl, gyssens@wins.uia.ac.be,
owatana@c1.mtk.nao.ac.jp, phgp@ruchem.ru.ac.za,
CC:
Subj:  IMO Perseid Report
Date:  Thu, 12 Aug 1993 7:16:40 -0400 (EDT)
From:  PETER@CANLON.PHYSICS.UWO.CA
To:  mjc@astrophysics.starlink.rutherford.ac.uk, rhawkes@mta.ca,
heinlein@dhdmpi5.bitnet, CanlonJones@CANLON.PHYSICS.UWO.CA,
dis@aaocbn3.aao.gov.au, pegasoft@cc.ruu.nl, gyssens@wins.uia.ac.be,
owatana@c1.mtk.nao.ac.jp, phgp@ruchem.ru.ac.za, ipw@maths.qmw.ac.uk,
a2670@nve.uwo.ca, meier@software.mitel.com, roper@eas.gatech.edu,
rnl@babel.aip.de, ok@siberia-ltd.tomsk.su, linasu@gemini.ldc.lu.se,
tholen@galileo.ifa.hawaii.edu, jscotti@lpl.arizona.edu,
dja@astrophysics.oxford.ac.uk, astmph@csearn.bitnet, lance@tonga.wustl.edu,
gustaf@venus.astro.ufl.edu, lien@coral.bucknell.edu,
meisel@uno.cc.geneseo.edu, c09630gk@wuvmd.wustl.edu,
"canott::mcintosh"@CANLON.PHYSICS.UWO.CA, 6700BRIAN@CANLON.PHYSICS.UWO.CA,
```

CanottCardinal@CANLON.PHYSICS.UWO.CA, dky@naif.jpl.nasa.gov,
72650.3513@compuserve.com, PHCSLK@cc.newcastle.edu.au,
ph1wj@ibm.sheffield.ac.uk, phys051@canterbury.ac.nz,
gliba@grossc.gsfc.nasa.gov, M.C.deLignie@research.ptt.nl,
70721.1706@compuserve.com, starex@tron.gun.de,
ghs@savax750.rutherford.ac.uk, astropor@savba.cs,
pocock@ecsuc.ctstateu.edu, baalke@kelvin.jpl.nasa.gov, Trondh@nft.no,
mt_vodicka@fencer.cis.dsto.gov.au, AMACROBE%cfa7.decnet@cfa.harvard.edu,
eao@astro.kazan.su
Message-Id: <930812071640.20e01eb9@CANLON.PHYSICS.UWO.CA>
Subject: IMO Perseid Report
I N T E R N A T I O N A L M E T E O R O R G A N I Z A T I O N
Preliminary report on Perseid observations on August 11-12 up to 03 30 UTC.
****
This is a first, preliminary report based on all available data pertaining
to observations on August 11-12 up to 03 30 UTC. These data come from
observers in Japan, Germany, Southern France, Belgium, England, the Czech
Republic and Croatia. It goes without saying that in view of the limited
number of observations and discrepancies that inevitably occur among
reported rates, the findings in this report should be treated with due care.
Observers in Japan reported that no unusual activity occurred up the time
they had to cease observations at daybreak on August 12. Almost all European
observers confirm this finding and reported that at the beginning of their
evening on August 11, activity was not at all unusual. Tentatively the ZHR
around 20 30 UTC was in the order of magnitude of 40.
A majority of European observers report a gradual increase in activity
between roughly August 11 20 UTC and August 12 01 UTC, for which time a
tentative ZHR of around 100 could be proposed.
A significant increase of activity was reported around 01 UTC.
A tentative value for the ZHR in the period 01 UTC to 03 UTC is
200 +/- 50.
The European observers that could pursue their observations the longest
up to our present knowledge were those in Southern France. They report that
that the activity kept increasing after 01 UTC and that meteor counts tended
to increase strongly during the latest part of their observations (say,
02 45 UTC to 03 30 UTC) despite the decreasing limiting magnitude due to
moonlight and twilight. In the interval 03 00 UTC to 03 30 UTC, ZHR values
may well have surpassed 300.
From the available data it is clear that Europe did NOT see an outburst
of activity, although rates after 1 UTC were increased by a factor 2-4
compared to a normal "maximum". In particular,
Mr. Yasuo Yabu, who observed last night
from Puimichel, Southern France, and also witnessed the 1991 Perseid
outburst in Japan, remarked that last night's display was distinctively
less impressive than the 1991 display.
However, if the observations from Southern France during the last hour
of the European night are sufficiently representative for the shower's
activity (i.e., that activity was still increasing when observations
ceased), it seems that the European observers missed the highest rates.
Consequently, higher rates may have been seen by North American East
Coast based observers AFTER 3 UT. At the time of this writing however,
no observations which might confirm or refute this possibility were
available to the IMO.
Almost all observers mentioned a remarkably high percentage of bright
meteors and fireballs and of meteors leaving trains. As this appreciation
is largely based on first impressions rather than magnitude distributions,
it should be treated with caution. Nevertheless, an increased number of
bright meteors seems genuine.

Several observers in Europe had to deal with shorter or longer periods of cloudiness thereby missing a significant part of the ativity period (Czech Republic, Belgium, England). However, observers in parts of Germany and Southern France were able to observe the entire night under perfectly clear skies.
(Marc Gyssens)

```
From:  MX%"PERSEIDS@sn.jsc.nasa.gov" 13-AUG-1993 04:59:54.05
To:  FN23MIKUZ
CC:
Subj:  query
Date:  Thu, 12 Aug 1993 22:00:10 -0500 (CDT)
From:  PERSEIDS@sn.jsc.nasa.gov
Subject:  query
To:  herman.mikuz@uni-lj.si, Pevec@srce3.srce.hr
X-Vmsmail-To:  @EEUROPE.DIS
hello from houston, texas!
after your excellant reporting of yesterday, i am intrigued to know if you had
any observations of the perseids this evening?  we are maintaining the watch
until friday, 1700 UT, visually and with our simple radar.
i look forward to hearing from you, and again extend my congratulations for an
excellant set of reports from your observing team members.
dr.  phillip anz-meador
lockheed engineering & sciences co.
```

From: MX%"PERSEIDS@sn.jsc.nasa.gov" 27-SEP-1993 22:11:43.66
To: FN23MIKUZ
CC:
Subj: Thank you for your participation in the 1993 Perseid Stormwatch
Date: Mon, 27 Sep 1993 16:06:47 -0500 (CDT)
From: PERSEIDS@sn.jsc.nasa.gov
Subject: Thank you for your participation in the 1993 Perseid Stormwatch
To: mcfadden@astro.umd.edu, MA@ASTRO.UMD.EDU,
emerson%vega.colorado.edu@spot.colorado.edu, barbieri@astrpd.astro.it,
niiler@spica.bu.edu, GOJAKANG@UB.D.UMN.EDU,
TSATO@KIMURA2.KUEE.KYOTO-U.AC.JP, rstachnik@smtpgmgw.ossa.hq.nasa.gov,
kessler@sn.jsc.nasa.gov, jloftus@jscprofs.nasa.gov,
AAVSO@CFA0.HARVARD.EDU, POLIDAN@STARS.SPAN.NASA.GOV,
JRahe@sl.ms.ossa.hq.nasa.gov, DIS@AAOCBN3.AAO.GOV.AU,
zidian@maths.qmw.ac.uk, ipw@maths.qmw.ac.uk,
jrosendhal@smtpgmgw.ossa.hq.nasa.gov,
pvedder@smtpgmgw.ossa.hq.nasa.gov, DBlanchard@sl.ms.ossa.hq.nasa.gov,
gyssens@wins.uia.ac.be, pwv@cea.berkeley.edu,
brian%cfaps1.DECNET@cfa.harvard.edu, green@cfa.harvard.edu,
marsden@cfa.harvard.edu, ct0@vm.hd-net.uni-heidelberg.de,
peter@canlon.physics.uwo.ca, fienberg@cfa.harvard.edu,
guinan@ucis.vill.edu, aavso@cfa0.harvard.edu, herman.mikuz@uni-lj.si,
nisenson@cfassp8.harvard.edu, dicmiller@smtpgmgw.ossa.hq.nasa.gov,
Dave@incubus.aftac.gov, JB@astro.as.utexas.edu,
ericco@cea.berkeley.edu, patr@cea.berkeley.edu,
kj9u@montebello.soest.hawaii.edu, I.P.Williams@qmw.ac.uk,
bshustov@airas.msk.su, stockman@stsci.edu, Fairall@uctvax.uct.ac.za,
Pevec@srce3.srce.hr, korlevic@mvsrce.srce.hr,
joe@montebello.soest.hawaii.edu, RNL@BABEL.AIP.DE
X-Vmsmail-To: @PERSEIDS

On behalf of the Perseid Stormwatch Center and those involved in planning the launch of STS-51, we would like to extend our gratitude to you and your group for your contributions to the realtime monitoring of the 1993 Perseid meteor shower. Your reports were important to the timely advice we were able to give to the Shuttle Mission Management Team, as well as to satellite owners and operators. We have since learned that two different spacecraft suffered fatal anomalies near the peak in the Perseid shower. While we have no unambiguous data that demonstrate they were damaged by meteoroid impacts, impact is among the potential causes for each loss. The first reports we have received from Russia also tell of a significant number of impacts suffered by the Mir space station.

If nothing else, the 1993 Perseid shower has shown that our understanding of the relationships between parent bodies, orbital dynamics, and meteoroid fluxes remains poorly understood. Clearly, this is an unacceptable state of affairs at a time when more and more of the world's communication, weather- forecasting, and other capabilities are being conducted with assets in Earth orbit, and when the permanent presence of humans in space is a reality.

Addressing these shortcomings will not be simple, but it is important to begin the process. We are hoping to convene a workshop on the 1993 Perseid meteor shower here in Houston next spring, tentatively in early May 1994. Its purpose will be twofold. The first will be to review the data collected during observations of the 1993 shower, and to consolidate it into a database. We appreciate that many of these data are proprietary pending publication of papers or other reports; the process of disseminating such information will also be discussed at the workshop. The second purpose entails planning observations and lines of communication for the 1994 Perseid shower which, as suggested by Drs. Wu

and Williams (in an article to be published in the Monthly Notices of the Royal Astronomical Society), could be more intense than the 1993 event. We would appreciate it if you would send to us your mailing address so we will be able to send you information on the proposed workshop as planning proceeds. Included will be registration forms and applications for travel funds, which we anticipate will be available in limited quantities. We are, of course, always open to suggestions regarding the workshop, planning for next year's Perseids, or any other topic you feel might be relevant to the effort.
Again, thank you very much for your unselfish participation in the 1993 Perseid Stormwatch, and we hope to see you next spring in Houston!
Sincerely,
Dr. Phillip D. Anz-Meador / Lockheed Engineering and Science Company Dr. Mark J. Cintala / NASA Johnson Space Center

A. Karalic, leader of Javornik Astronomical Society group, observing
from Javornik mountains, Slovenia, report the following results:
Observer name: M. Pratniker
Observer telephone: +38 609 610 766
Observer location (lat,lon,alt): +45deg 53' 12"; 14deg 02' 12" E; 1150m
Observation start time (UT): 1993 Aug. 10; 21h 16
Observation end time (UT): 1993 Aug. 10; 23h 00
Number of meteors observed during this interval: 29 (20 Perseids)
Local sky quality during this interval: lim. mag. 5.1, 10% cloudiness
Observer field of view, if applicable: field centered at
alpha= 295deg; delta=45deg
Comments: moonlight
Observer name: S. Hribar
Observer telephone: +38 609 610 766
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 10; 23h 10
Observation end time (UT): 1993 Aug. 11; 1h 01
Number of meteors observed during this interval: 48
Local sky quality during this interval: lim. mag. 5.2, 10% cloudiness
Observer field of view, if applicable: field centered at
alpha=295deg; delta=45deg
Comments: moonlight
Observer name: S. Dekleva
Observer telephone: +38 609 610 766
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 11; 1h 05
Observation end time (UT): 1993 Aug. 11; 2h 55
Number of meteors observed during this interval: 71 (40 Perseids)
Local sky quality during this interval: lim. mag. 5.2, clear
Observer field of view, if applicable: field centered at
alpha=0deg; delta=50deg
Comments: moonlight
==========
H. Mikuz, Ljubljana, Slovenia
1993 Aug. 11

A. Karalic, leader of Javornik Astronomical Society group, observing
from Javornik mountains, Slovenia, report further results:
Observer name: I. Macek
Observer telephone: +38 609 610 766
Observer location (lat,lon,alt): +45deg 53' 12"; 14deg 02' 12" E; 1150m
Observation start time (UT): 1993 Aug. 11; 20h 00
Observation end time (UT): 1993 Aug. 11; 21h 00
Number of meteors observed during this interval: 29 (25 Perseids)
Local sky quality during this interval: lim. mag. 4.9, clear
Observer field of view, if applicable: field centered at
alpha= 320deg; delta=65deg
Comments:
Observer name: M. Albreht
Observer telephone: +38 609 610 766
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 11; 21h 00
Observation end time (UT): 1993 Aug. 11; 22h 00
Number of meteors observed during this interval: 49 (38 Perseids)
Local sky quality during this interval: lim. mag. 5.4, clear
Observer field of view, if applicable: field centered at
alpha=320deg; delta=65deg
Comments:
Observer name: J. Prudic
Observer telephone: +38 609 610 766
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 11; 22h 05
Observation end time (UT): 1993 Aug. 11; 22h 55
Number of meteors observed during this interval: 48 (41 Perseids)
Local sky quality during this interval: lim. mag. 5.1, clear
Observer field of view, if applicable: field centered at
alpha=320deg; delta=65deg
Comments: moonlight
==========
H. Mikuz, Ljubljana, Slovenia
1993 Aug. 11; 23:40UT

A. Karalic, leader of Javornik Astronomical Society group, observing
from Javornik mountains, Slovenia, report further results:
Observer name: S. Hribar
Observer telephone: +38 609 610 766
Observer location (lat,lon,alt): +45deg 53' 12"; 14deg 02' 12" E; 1150m
Observation start time (UT): 1993 Aug. 11; 23h 00
Observation end time (UT): 1993 Aug. 12; 00h 00
Number of meteors observed during this interval: 72 (56 Perseids)
Local sky quality during this interval: lim. mag. 5.4, clear
Observer field of view, if applicable: field centered at
alpha= 320deg; delta=65deg
Comments: moonlight
Observer name:
Observer telephone: +38 609 610 766
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 12; 00h 19
Observation end time (UT): 1993 Aug. 12; 01h 12
Number of meteors observed during this interval: 63 (57 Perseids)
Local sky quality during this interval: lim. mag. 4.9, clear
Observer field of view, if applicable: field centered at
alpha=320deg; delta=65deg
Comments: moonlight
==========
H. Mikuz, Ljubljana, Slovenia
1993 Aug. 12; 01:55UT

A. Karalic, leader of Javornik Astronomical Society group, observing
from Javornik mountains, Slovenia, report further results:
Observer name: M. Albreht
Observer telephone: +38 609 610 766
Observer location (lat,lon,alt): +45deg 53' 12"; 14deg 02' 12" E; 1150m
Observation start time (UT): 1993 Aug. 12; 02h 02
Observation end time (UT): 1993 Aug. 12; 03h 27
Number of meteors observed during this interval: 105 (101 Perseid)
Local sky quality during this interval: lim. mag. 5.4-2, clear
Observer field of view, if applicable: field centered at
alpha= 2100deg; delta=60deg
Comments: moonlight, morning dawn
Magnitude distribution during the period above:
Mag. No. of Perseids
-4 2
-2 8
-1 16
0 22
1 17
2 19
3 16
4 1
ZHR values for 1993 Aug. 11-12. They are calculated for +/-0.5h period
of the given time.
UT ZHR
20h 30 250 +/-50
21 30 210 +/-30
22 30 290 +/-45
23 30 260 +/-40
0 30 211 +/-30
1 00 220 +/-30
2 30 320 +/-10
3 00 700 +/-90*
* - less accurate due to dawn conditions and corresponding errors that
may appear in determination of a lim. mag.
A. Karalic suggested that the maximum probably occured during the local
twilight when they observed rapid increase of activity. Numerous bright
meteors were observed during the morning dawn when the lim. mag. was
3.9-2.
H. Mikuz, Ljubljana, Slovenia
1993 Aug. 12; 17:45UT

A. Karalic, leader of Javornik Astronomical Society group, observing
from Javornik mountains, Slovenia, report the results of Aug. 12-13
Perseid observations.
1993 Aug. 12-13
Observer name: M. Kokole
Observer location (lat,lon,alt): +45deg 53' 12"; 14deg 02' 12" E; 1150m
Observation start time (UT): 1993 Aug. 12; 19h 45
Observation end time (UT): 1993 Aug. 12; 21h 10
Number of meteors observed during this interval: 56 (38 Perseids)
Local sky quality during this interval: lim. mag. 5.7, clear
Observer field of view, if applicable: field centered at
alpha= 285deg; delta=60deg
Observer name: I. Macek
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 12; 21h 12
Observation end time (UT): 1993 Aug. 12; 22h 15
Number of meteors observed during this interval: 38 (34 Perseids)
Local sky quality during this interval: lim. mag. 5.4, clear
Observer field of view, if applicable: field centered at
alpha=310deg; delta=75deg
Observer name: M. Albreht
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 12; 22h 28
Observation end time (UT): 1993 Aug. 12; 23h 02
Number of meteors observed during this interval: 35 (33 Perseids)
Local sky quality during this interval: lim. mag. 5.5, clear
Observer field of view, if applicable: field centered at
alpha=0deg; delta=60deg
Observer name: S. Hribar
Observer location (lat,lon,alt): +45deg 53' 12"; 14deg 02' 12" E; 1150m
Observation start time (UT): 1993 Aug. 12; 23h 09
Observation end time (UT): 1993 Aug. 13; 01h 19
Number of meteors observed during this interval: 159 (107 Perseids)
Local sky quality during this interval: lim. mag. 5.5, clear
Observer field of view, if applicable: field centered at
alpha= 330deg; delta=70deg
Observer name: I. Macek
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 13; 01h 23
Observation end time (UT): 1993 Aug. 13; 02h 58
Number of meteors observed during this interval: 57 (54 Perseids)
Local sky quality during this interval: lim. mag. 5.0, clear
Observer field of view, if applicable: field centered at
alpha=330deg; delta=75deg
==========
Regards from members of our group at Javornik mountains.
They will continue to monitor the Perseids until Sunday.
Best Wishes,
H. Mikuz, Ljubljana, Slovenia
1993 Aug. 13

A. Karalic, of the Javornik Astronomical Society group, observing
from Javornik mountains, Slovenia, report calculated ZHR values for
1993 Aug. 11-12 observations. They are for the +/-0.5h period
of the given time.
UT ZHR
20h 30 250 +/-50
21 30 210 +/-30
22 30 290 +/-45
23 30 260 +/-40
0 30 211 +/-30
1 00 220 +/-30
2 30 320 +/-10
3 00 700 +/-90*
* - less accurate due to dawn conditions and corresponding errors that
may appear in determination of a lim. mag.
A. Karalic suggested that the maximum probably occured during the local
twilight during which they observed numerous bright meteors. They completed
observations on Aug. 12.145UT.
Observer location (lat,lon,alt): +45deg 53' 12"; 14deg 02' 12" E; 1150m
Magnitude distribution of Perseids during the period Aug. 12.084-12.145UT:
Mag. Number ob met.
-4 2
-2 8
-1 16
0 22
1 17
2 19
3 16
4 1
==========
H. Mikuz, Ljubljana, Slovenia

A. Karalic, leader of Javornik Astronomical Society group, observing
from Javornik mountains, Slovenia, report the results of Aug. 10-11
and 11-12 observations.
1993 Aug. 10-11
Observer name: M. Pratniker
Observer location (lat,lon,alt): +45deg 53' 12"; 14deg 02' 12" E; 1150m
Observation start time (UT): 1993 Aug. 10; 21h 16
Observation end time (UT): 1993 Aug. 10; 23h 00
Number of meteors observed during this interval: 29 (20 Perseids)
Local sky quality during this interval: lim. mag. 5.1, 10% cloudiness
Observer field of view, if applicable: field centered at
alpha= 295deg; delta=45deg
Comments: moonlight
Observer name: S. Hribar
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 10; 23h 10
Observation end time (UT): 1993 Aug. 11; 1h 01
Number of meteors observed during this interval: 48
Local sky quality during this interval: lim. mag. 5.2, 10% cloudiness
Observer field of view, if applicable: field centered at
alpha=295deg; delta=45deg
Comments: moonlight
Observer name: S. Dekleva
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 11; 1h 05
Observation end time (UT): 1993 Aug. 11; 2h 55
Number of meteors observed during this interval: 71 (40 Perseids)
Local sky quality during this interval: lim. mag. 5.2, clear
Observer field of view, if applicable: field centered at
alpha=0deg; delta=50deg
Comments: moonlight
1993 Aug. 11-12
Observer name: I. Macek
Observer location (lat,lon,alt): +45deg 53' 12"; 14deg 02' 12" E; 1150m
Observation start time (UT): 1993 Aug. 11; 20h 00
Observation end time (UT): 1993 Aug. 11; 21h 00
Number of meteors observed during this interval: 29 (25 Perseids)
Local sky quality during this interval: lim. mag. 4.9, clear
Observer field of view, if applicable: field centered at
alpha= 320deg; delta=65deg
Comments:
Observer name: M. Albreht
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 11; 21h 00
Observation end time (UT): 1993 Aug. 11; 22h 00
Number of meteors observed during this interval: 49 (38 Perseids)
Local sky quality during this interval: lim. mag. 5.4, clear
Observer field of view, if applicable: field centered at
alpha=320deg; delta=65deg
Comments:
Observer name: J. Prudic
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 11; 22h 05
Observation end time (UT): 1993 Aug. 11; 22h 55
Number of meteors observed during this interval: 48 (41 Perseids)
Local sky quality during this interval: lim. mag. 5.1, clear
Observer field of view, if applicable: field centered at
alpha=320deg; delta=65deg

Comments: moonlight
Observer name: S. Hribar
Observer location (lat,lon,alt): +45deg 53' 12"; 14deg 02' 12" E; 1150m
Observation start time (UT): 1993 Aug. 11; 23h 00
Observation end time (UT): 1993 Aug. 12; 00h 00
Number of meteors observed during this interval: 72 (56 Perseids)
Local sky quality during this interval: lim. mag. 5.4, clear
Observer field of view, if applicable: field centered at
alpha= 320deg; delta=65deg
Comments: moonlight
Observer name: J. Prudic
Observer location (lat,lon,alt): same as above
Observation start time (UT): 1993 Aug. 12; 00h 19
Observation end time (UT): 1993 Aug. 12; 01h 12
Number of meteors observed during this interval: 63 (57 Perseids)
Local sky quality during this interval: lim. mag. 4.9, clear
Observer field of view, if applicable: field centered at
alpha=320deg; delta=65deg
Comments: moonlight
Clouds 1h 12 - 2h 02 - no observations
Observer name: M. Albreht
Observer location (lat,lon,alt): +45deg 53' 12"; 14deg 02' 12" E; 1150m
Observation start time (UT): 1993 Aug. 12; 02h 02
Observation end time (UT): 1993 Aug. 12; 03h 27
Number of meteors observed during this interval: 105 (101 Perseid)
Local sky quality during this interval: lim. mag. 5.4-2, clear
Observer field of view, if applicable: field centered at
alpha= 2100deg; delta=60deg
Comments: moonlight, morning dawn
Magnitude distribution during the period 02h 02 - 03h 27:
Mag. No. of Perseids
-4 2
-2 8
-1 16
0 22
1 17
2 19
3 16
4 1
ZHR values for 1993 Aug. 11-12. They are calculated for +/-0.5h period
of the given time.
UT ZHR
20h 30 250 +/-50
21 30 210 +/-30
22 30 290 +/-45
23 30 260 +/-40
0 30 211 +/-30
1 00 220 +/-30
2 30 320 +/-10
3 00 700 +/-90*
* - less accurate due to dawn conditions and corresponding errors that
may appear in determination of a lim. mag.
A. Karalic suggested that the maxima probably occured during the local
twilight when they observed rapid increase of activity. Numerous bright
meteors were observed during the morning dawn when the lim. mag. was
3.9-2.
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H. Mikuz, Ljubljana, Slovenia

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1993 Aug.  13
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Dear Colleagues,
Here are some details of my observing site, you wish to obtain.
Crni vrh Observatory:
Longitude:  14deg 04' 25" East
Latitude:  45deg 56' 48" North
Altitude:  730m
Unpolluted , dark location
Regards, Herman Mikuz
====================================
Early attempt to detect possible cloud of meteoritic dust show no evidence
of these phenomena.  Several 5 min frames of the field (proposed by D. Green)
were taken on 1993 Aug.  9.85-9.88UT in moonless conditions with Zeiss 2.8/20mm
wide angle lens (stopped to f/5.6) + 574x384 CCD + Schott RG610 filter.  The
camera covers the field of  35x24deg.
H. Mikuz, Ljubljana, Slovenia
1993 Aug.  10
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Further monitoring for the possible cloud of meteoritic dust show no
evidence of these phenomena.
Series of 5 min frames covering the areas proposed by D. Green,
H. Zook and D. Kessler, as well as those suggested by K. Korlevic were
taken during 1993 Aug. 11.87-11.93UT in moonless conditions with Zeiss
2.8/20mm wide angle lens (stopped to f/5.6) + 574x384 CCD + Schott RG610
filter. The camera field was 35x24deg.
H. Mikuz, Crni vrh Observatory, Slovenia
1993 Aug. 12