Classified NOSS Navy Satellites Offered As Dover Triangle Explanation

"Each NOSS launch placed a cluster of one primary satellite and three smaller sub-satellites (that trail along at distances of several hundred kilometers) into low polar orbit. This satellite array can determine the location of radio and radars transmmitters, using triangulation, and the identity of naval units, by analysis of the operating frequencies and transmission patterns. NOSS used the ELINT (Electronic Intelligence) technique called 'time difference of arrival,' TDOA, rather than true interferometry."

- *Space Policy Agency: Military Space Programs* about White Cloud NOSS

April 27, 2002 Dover, Arkansas - Since my Earthfiles and *Coast to Coast AM* radio report on April 23-24, 2002, I have received several e-mails from viewers about the United States Naval Ocean Surveillance System (NOSS) satellite group as an explanation for the April 14, 2002 moving triangle of "stars" sighting described in the **04/22/02 Earthfiles**. These satellites were not acknowledged by the United States government as officially existing prior to 1996, even though the first experimental ones were launched in the early 1970s. Even today, for national security reasons, Navy intelligence does not want information about NOSS known in the general public. Aiding that secrecy, the trios of satellites are not easily seen with the naked human eye.

The following is an excerpt submitted by Ted Molczan in a document "containing my analysis which shows that NOSS 2-1 was observed at Piney River valley, Arkansas on 2002 April 14 CDT."

Summary of Pass Details
Date: Sunday, 14 April, 2002
Satellite: NOSS 2-1 (C)
Observer's Location: Dover (35.4010°N, 93.1140°W)
Local Time: Central Daylight Time (GMT - 5:00)
Orbit: 877 x 1,338 km, 63.4° (Epoch 23 Apr)
Sun altitude at time of maximum pass altitude: -36.1°

Event Time Altitude Azimuth Distance (km)
Rises above horizon 22:58:23 0° 327° (NNW) 4,041
Reaches 10° altitude 23:01:00 10° 327° (NNW) 3,140
Maximum altitude 23:07:51 73° 303° (WNW) 1,324
Enters shadow 23:07:51 73° 303° (WNW) 1,324

04/26/02 E-Mail from Ted Molczan, Energy Analyst Consultant, Toronto, Ontario, Canada:

"**NOSS Background**

Based on many years of experience as an amateur astronomer specializing in 'spy satellites,' the description of the Piney River valley event led me to suspect that one of the three 2nd generation NOSS triads had been observed. These objects usually are visible only in binoculars, but occasionally they are bright enough to be seen with the unaided eye.

NOSS means Naval Ocean Surveillance System. The operational system consists of several triads of satellites flying in a triangular formation. They are believed to be able to determine the position of ships at sea using a method known as TDOA (Time Difference of Arrival).

It works roughly as follows. Each member of the triad carries a radio receiver and a very accurate clock. All three satellites' clocks are closely synchronized. Their radios detect radio transmissions from ships at sea. Since each satellite in a triad is at a different distance from a ship's radio transmitter, each will receive the signal at a slightly different time. Knowing the precise location of each satellite and the difference in the time of signal arrival enables the solution of a set of equations that yields an accurate determination of the ship's co-ordinates.

The first experimental NOSS triad was launched late in 1971. The first operational launch occurred in 1976, followed by seven more successful launches through 1986. The 1986 triad is still operational, as evidenced by their occasional small orbit adjustment manoeuvres, detected by amateur satellite trackers.

Those early NOSS satellites are quite small, such that they are best seen using large aperture binoculars, such as 11x80. Only rarely do the early NOSS brighten sufficiently to be visible to the unaided eye. I witnessed one such event in the late 1980's.

In 1990, the first of a second generation of NOSS were launched. Those objects are two or three orders of magnitudes brighter than the first generation NOSS. They are readily visible in 7X50 binoculars. Most of the time they are too faint to be seen with the unaided eye, but like their first generation cousins, they do occasionally brighten sufficiently to be seen easily with the unaided eye. This happens much more often than with the first generation.

The second and third successful 2nd generation NOSS launches took place in 1991 and 1996. The latter event was well placed for observation by amateurs, who were able to document much of the 28 day long deployment sequence.

September 2001 saw the launch of possible third generation NOSS triad. A third generation was suspected in large part because of the move to a different booster rocket. Thus far, there has been an element of mystery about this launch, because only two satellites have appeared. They fly in formation in a standard NOSS orbit and are about as bright as the 2nd generation NOSS. I speculate that there are only two because one may have failed to deploy. We should be able to test this hunch later this year, when another launch using the same rocket is expected.

Relationship of NOSS to the Piney River Valley Sighting

U.S. Space Command does not publish its orbital elements of NOSS and the hundreds of other spy satellites and related debris, so the only publicly available elements are those produced by the handful of amateur observers and analysts who routinely track and update their orbits.

I maintain a database of many hundreds of such orbital elements spanning almost the entire history of the 2nd generation NOSS. In order to determine whether or not it was NOSS that were seen at Piney River valley, I used my orbit prediction program to compute the time and path of all three 2nd generation NOSS relative that location.

I found that the 1990 triad, which we call NOSS 2-1, was an excellent match to the observations. These were the elements of each NOSS 2-1 member at the epoch nearest the Pine River valley sighting:

NOSS 2-1 (C
1 20691U 90050C 02107.00913672 .00000100 00000-0 13821-3 0 02
2 20691 63.4200 6.2895 0307000 1.1206 358.8794 13.40426664 05

NOSS 2-1 (D
1 20692U 90050D 02107.00922949 .00000090 00000-0 12484-3 0 02
2 20692 63.4200 6.1840 0305000 1.1780 358.8220 13.40426390 00

NOSS 2-1 (E)
1 20642U 90050E 02105.81547405 .00000090 00000-0 12595-3 0 07
2 20642 63.4180 8.6648 0300000 354.8098 5.1902 13.40425849 07

These elements were generated by Mike McCants of Austin, Texas, using the observations of a number of observers. They are in the standard NORAD "2-line" format used for Earth satellites. For additional information about 2-line elements, please see:

http://celestrak.com/NORAD/documentation/tle-fmt.shtml

http://celestrak.com/columns/v04n03/#FAQ01

Ephemeris of NOSS 2-1 Orbit Over Dover, Arkansas on April 14, 2002

Using the above elements, I generated the following ephemeris of the lead triad member, which we call NOSS 2-1 (C):

TIME CDT	Sunlight or Shadow	AZ deg	EL deg	R.A. hh:mm	DEC dd:mm	Range km	Altitude km	Constellation
23:04:31	Sunlight	324	31	05:36	60:14	2007	1244	Just north of Auriga
23:04:58	Sunlight	324	35	06:08	60:39	1881	1248	Lynx
23:05:22	Sunlight	323	39	06:42	60:33	1774	1252	Lynx
23:05:44	Sunlight	322	43	07:14	59:56	1683	1256	Camelopardalis
23:06:04	Sunlight	321	47	07:45	58:51	1605	1259	Lynx
23:06:23	Sunlight	320	51	08:14	57:17	1537	1262	Lynx
23:06:40	Sunlight	318	55	08:39	55:24	1482	1265	Ursa Major
23:06:56	Sunlight	317	59	09:02	53:14	1436	1267	Ursa Major
23:07:11	Sunlight	314	63	09:22	50:50	1397	1270	Ursa Major
23:07:26	Sunlight	311	67	09:41	48:07	1364	1272	Ursa Major
23:07:40	Sunlight	307	70	09:58	45:19	1339	1274	Ursa Major
23:07:53	Sunlight	302	74	10:12	42:30	1320	1276	Ursa Major
23:07:55	EP Sunlight	301	74	10:14	42:00	1317	1276	Ursa Major
23:08:06	EU Shadow	294	77	10:25	39:37	1307	1278	Ursa Major
23:08:19	Shadow	280	80	10:37	36:23	1297	1280	Leo Minor
23:08:32	Shadow	258	81	10:49	33:09	1293	1281	Leo Minor
23:08:45	Shadow	231	82	10:59	29:51	1295	1283	Leo Minor
23:08:58	Shadow	207	80	11:09	26:31	1301	1285	Leo Minor
23:09:11	Shadow	192	78	11:18	23:11	1313	1287	Leo Major
23:09:24	Shadow	182	75	11:27	19:53	1329	1288	Leo Major
23:09:37	Shadow	176	71	11:35	16:39	1350	1290	Leo Major

Notes:
- Sunlight means satellite was illuminated by the sun; therefore, visible
- Shadow means satellite was in Earth's shadow; therefore, invisible
- EP denotes entry into penumbra of Earth's shadow
- EU denotes entry into umbra of Earth's shadow
- For other terms, please see the Glossary.

I have annotated the ephemeris on the right with the names of the constellations

through which the triad passed. The path, direction of travel, and duration of travel are in excellent agreement with the description of the eyewitnesses at the Piney River valley.

Ephemeris Summary Explanation

At the first entry in the ephemeris, 23:04:31 CDT, the triad passed just north of the boundary of the constellation Auriga. Over the next nearly 3.5 minutes it passed through Lynx, Camelopardalis and Ursa Major (the constellation that contains the Big Dipper). It was heading toward Leo Major, but at about 23:07:55 CDT, as it reached Leo Minor, it entered the penumbra of Earth's shadow.

I note that the time of the events is about 2.5 to 3 minutes later than reported, but it is common for wristwatches to be off by several minutes, so that is not a major difference.

There is also a discrepancy in one of the reported directions of travel, from "northeast to southwest". The NOSS traveled from northwest to a bit south of east. Directions can easily be misjudged under the circumstances, especially since the objects were seen over only a part of their arc across the sky. I place greater weight on the description of their path relative the constellations, since they were plainly visible.

After entering the penumbra, over the next 5 seconds or so, it would have rapidly faded from naked eye visibility. Just eleven seconds after entering the penumbra, it entered the umbra, and faded totally from view. From the vantage point of the satellite, one would have seen the sun set in 11 seconds!

Note that this fadeout began as the objects reached 74 degrees elevation, which is nearly overhead, just as described by Nancy Martin in the original 04/22/02 Earthfiles report.

Ms. Martin, watching through binoculars, also observed that they faded 'just slightly behind each other,' which I can confirm with the predicted penumbra and umbra entry times of all three triad members. Here they are in chronological order:

Predicted Entry of NOSS Satellites Into Earth's Shadow

Time AZ EL R.A. DEC Range Altitude
CDT deg deg hh:mm dd:mm km km
NOSS 2-1 C
23:07:55 EP 301 74 10:14 42:00 1317 1276
23:08:06 EU 294 77 10:25 39:37 1307 1278

NOSS 2-1 D
23:08:04 EP 299 74 10:12 41:42 1318 1275
23:08:15 EU 292 76 10:22 39:19 1307 1277

NOSS 2-1 E
23:08:10 EP 290 74 10:09 39:11 1334 1290
23:08:21 EU 281 76 10:19 36:49 1325 1292

So over a span of about 20 seconds, all three objects disappeared into Earth's shadow, one after the other.

Triangle Pattern of NOSS Satellites On April 14, 2002

In case you wish to plot the triangular formation, here are "snap-shots" of their simultaneous positions at one minute intervals during the 3 minutes that they were observed:

Triad Member	TIME CDT	AZ deg	EL deg	R.A. hh:mm	DEC dd:mm	Range km	Altitude km
NOSS 2-1 C	23:05:00	324	36	06:11	60:40	1872	1249
NOSS 2-1 D	23:05:00	324	34	05:59	60:16	1915	1246
NOSS 2-1 E	23:05:00	322	34	06:03	59:07	1935	1265
NOSS 2-1 C	23:06:00	321	46	07:39	59:06	1620	1259
NOSS 2-1 D	23:06:00	321	45	07:24	59:15	1657	1256
NOSS 2-1 E	23:06:00	319	44	07:23	57:46	1679	1273
NOSS 2-1 C	23:07:00	316	60	09:07	52:38	1425	1268
NOSS 2-1 D	23:07:00	316	58	08:53	53:36	1451	1266
NOSS 2-1 E	23:07:00	313	57	08:47	52:05	1475	1281
NOSS 2-1 C	23:08:00	298	75	10:19	40:52	1312	1277
NOSS 2-1 D	23:08:00	301	73	10:07	42:39	1324	1274
NOSS 2-1 E	23:08:00	296	71	09:58	41:24	1347	1289

The triangle effect is evident from the AZimuth and Elevation angles, but for best precision, I suggest plotting their right ascension (R.A.) and declination (DEC) in a star atlas. The R.A. angles are expressed in units of hours and minutes, and DEC angles are in degrees and minutes of arc.

On rare occasions, NOSS have been known to flare brilliantly, as in this 1996 report by Craig Cholar, of the same triad seen by the Piney River valley observers: "Imagine seeing Venus in formation with itself separated by less than 7 degrees, with Saturn trailing along; that's what the spectacle looked like."
http://satobs.org/seesat/Sep-1996/0056.html

I hope this will prove helpful in understanding the Piney River valley event in Arkansas on April 14, 2002, 11:02-11:05 p.m. CDT.

If you would like to observe a NOSS pass, I would be pleased to provide predictions for your location. Let me know when you expect to have a clear night. Binoculars of at least 7x35 and preferably 7x50 are required, because the objects seldom are as bright as they were on 14 April. Also, it would help if you have a star map. Alternatively, I can direct you to the Heavens-Above web site, which has all of our NOSS elements, and provides excellent predictions, including charts.

Best wishes,
Ted Molczan
Toronto, Canada
Molczan@hotmail.com
2002 Apr 26"

Credits