

## PROJECT 10073 RECORD CARD

1. DATE 11/07/22	2. LOCATION Laredo, Texas		12. CONCLUSIONS <input type="checkbox"/> Was Balloon <input type="checkbox"/> Probably Balloon <input type="checkbox"/> Possibly Balloon
3. DATE-TIME GROUP Local _____ GMT 11/07/22	4. TYPE OF OBSERVATION <input type="checkbox"/> Ground-Visual <input type="checkbox"/> Ground-Radar <input type="checkbox"/> Air-Visual <input type="checkbox"/> Air-Intercept Radar		<input type="checkbox"/> Was Aircraft <input type="checkbox"/> Probably Aircraft <input type="checkbox"/> Possibly Aircraft
5. PHOTOS <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. SOURCE Military		<input type="checkbox"/> Was Astronomical Meteor <input checked="" type="checkbox"/> Probably Astronomical <input type="checkbox"/> Possibly Astronomical
7. LENGTH OF OBSERVATION 28 seconds	8. NUMBER OF OBJECTS two	9. COURSE not given	<input type="checkbox"/> Other _____ <input type="checkbox"/> Insufficient Data for Evaluation <input type="checkbox"/> Unknown
10. BRIEF SUMMARY OF SIGHTING A radar target was picked up at a range of 454 nautical miles & at 462 nautical miles at a height of 64 nautical miles. The targets lasted for a total of 28 seconds.		11. COMMENTS Probably a meteor.	

[REDACTED]  
UNCLASSIFIED

310-0461-1731

INTERIM LETTER REPORT

CONTRACT NO: AF30(602)-1741

UNIDENTIFIED TARGET OF AN/FPS-17(XW-2) RADAR MISSION 164

I. INTRODUCTION

The AN/FPS-17(XW-2) radar at the Laredo Test Site, Laredo, Texas was in operation on 11 October 1958. The expected target was 1958  $\Delta$  2, the instrumented portion of the third Russian satellite, Sputnik III. A target was observed, but the characteristics of the intercept would make one believe that the object observed was not the one expected. Other possible explanations are discussed below.

II. CONCLUSIONS

The object observed was most probably:

- (a) a meteor showing both a head echo type reflection and a specular type reflection from the trail, or
- (b) two meteors occurring in the same portion of space at very nearly the same time.

III. ANALYSIS

A. FACTS RELATED TO THE UNIDENTIFIED TARGET

The known facts related to the intercept of this unidentified target are:

DOWNGRADED AT 5 YEAR INTERVALS;  
DECLASSIFIED AT 10 YEAR INTERVALS.  
DDI 111 20010

UNCLASSIFIED

Classification Cancelled  
(or changed to UNCLASSIFIED)  
Auth. *Quantum*  
By *AFDPT (C/O)*  
Date *27 Jul 69*  
*AFR 205/para 1-126*

3-58



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- (a) A rocket launched from the vicinity of the White Sands Proving Grounds.
- (b) A satellite passing through the beams in a north-easterly direction.
- (c) A meteor or meteors.
- (d) Some unknown and unexpected object.

C. INTERPRETATION OF THE FACTS

A knowledge of the location and path of the observed object is desirable if one is to distinguish between the above possibilities. The range of about 470 nmi would position the observed object somewhere in the vicinity of the White Sands Proving Grounds. The observation of the object simultaneously by three of the four beams energized allows us to estimate the angular coordinates more exactly than if reflections were seen in only one beam. If the possibility of side lobe reflections are neglected, the object observed must have been at an elevation angle between 3.5 and 4.5 degrees and an azimuth angle from the radar between 312.5 and 313.5 degrees.

Conversion of these radar coordinates to a more meaningful form places the observed target probably within 5 nmi of a point in space defined as follows:

Origin: at the Air Force Missile Development Center,  
Holloman Air Force Base, New Mexico

Coordinates:      West      10 nmi  
                         South      2 nmi  
                         Height    64 nmi

DOWNGRADED AT 2 YEAR INTERVALS:  
DECLASSIFIED BY [REDACTED] [REDACTED]  
DATE [REDACTED]

[REDACTED]

UNCLASSIFIED

[REDACTED]

58-9601

[REDACTED]

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The path (direction and speed) of the target cannot be resolved to any great degree of accuracy. The sudden appearance of the signal in three beams indicates that the object suddenly appeared at this position in space and didn't gradually move into one beam and then another. The target should be considered as two separate parts, that which lasted for 0.75 seconds and the other, which had a duration of 28 seconds in Beam 2 High. The first target had a range rate of change of about + 25 nmi per second. The second target had an average range rate of change of 0.2 nmi per second.

The accompanying photographs show that the signal died out of Beam 1 H1 before it died out of Beam 2 H1. This could be explained by the passage of the target from one beam into the other, or by a decrease in the strength of the reflected signal. If the target were closer to the center of Beam 2 H1, we would expect to get the stronger signal in that beam.

#### D. ELIMINATION OF POSSIBLE TARGETS

Consideration of the facts available indicates that several of those objects listed as possible targets would not give rise to a signal such as that received.

- (a) A rocket launched from the White Sands Proving Ground would have been picked up in a low beam about 30 to 40 seconds before it was seen in the high beams, and it normally is seen for longer than 28 seconds. No such phenomena as that demonstrated by the early portion of the target has been observed on previous rockets launched at White Sands.

DOWNGRADED AT 5 YEAR INTERVALS;  
DECLASSIFIED AT 12 YEARS.  
DOD DIR. 5200.10

[REDACTED]

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- (b) Only one satellite was known to have been in the vicinity at the time of observation. This one should have passed through the beams over 200 nmi to the northwest about 12 minutes later. The prediction bulletins are subject to some error, but they are seldom far enough off in either position of the orbit or time of passage for this observed object to have been the satellite.

All previous observations of satellites on south-to-north passes have shown similar range rate characteristics. But they have also gradually moved into Beam 1 and then Beam 2, which is not the case here. No satellites in orbit come so close to the earth as the indicated 64 nmi. If they did, they would soon fall out of orbit or burn up in the atmosphere.

One should note that there may be several pieces of satellites in orbit which nobody is keeping track of. These pieces could, at times, be observed, but the sudden appearance in three beams and a rate of change of range of 25 nmi per second are not characteristics of satellite intercepts.

- (c) The observed target height, 64 nmi, is in the meteor band. A very sudden appearance of a strong signal is characteristic of meteors. The appearance of the signal suddenly in three beams is quite possible in the case of a meteor. Although there is much yet to be learned about meteors, it is known that not all meteors in a beam are detected by a radar. There are requirements regarding the orientation of the meteor trail with respect to the radar beam which must be met.

Then, too, the exact height at which a meteor trail becomes detectable varies. Either one or both, the orientation of the trail and the ionization formation, could explain why the meteor was not seen until such a time as it reached a position within the beams.

The first portion of the observed trail might well have been an echo from the so-called meteor head, thus giving us the very high rate of change of range (the meteor head moves with the speed of the meteor itself). Meteor velocities vary over a wide range, but they may be as high as twice that range rate of change observed.

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The second portion of the trail is characteristic of meteor trail echoes, where the echo actually comes from the ionized trail left behind the meteor. This type of echo has a very little change in range, since once the trail exists its only movement is caused by expansion of the trail or movements of the air in which the trail lies.

IV. RECOMMENDATIONS

Two possible sources of information pertaining to this target have not been approached as yet. The first of these is the White Sands Proving Ground. They ordinarily notify the Laredo Test Site of any rockets they plan to fire, which may pass through the radar beams. The absence of any firings on 11 October 1958 should be verified by contacting the authorities of the White Sands Proving Ground.

The Harvard College Observatory has two cameras recording pictures of meteors which occur in the vicinity of the White Sands Proving Ground. There is a possibility that they would have observed any meteor, or other phenomena which created visible light, at the time and location of this unidentified target.

KBCross/r  
3 November 1958

DOWN...  
DEC...  
DOR DIE 20010



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58-4601

3 JUNE 1958

UNIDENTIFIED TARGET  
11 OCTOBER 1958 (XW-2)

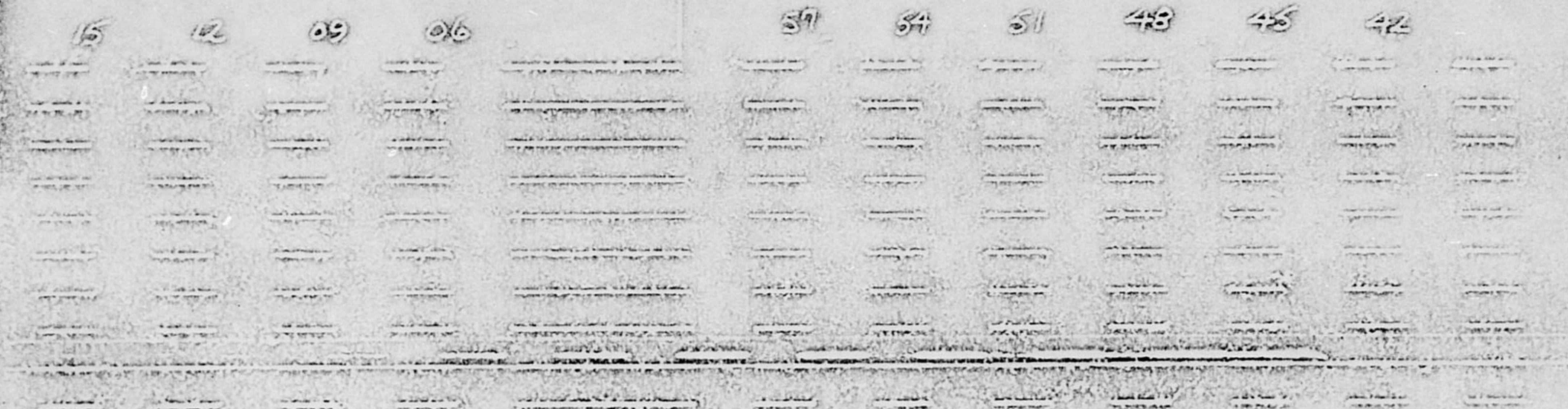
TIME SWITCHING - Bms. 1Hii + 2Hii  
(1 Hii when range marks are on)

Range reference (upper continuous  
line) = 504 nms

Range marks are 100nm apart  
Lincoln G.O. #1

58-21-1

072200Z



100-85

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UNIDENTIFIED TARGET  
 11 OCTOBER 1958 (XW-2)  
 Time Switching Begins 11:26  
 (No other range marks are on)  
 Range reference (upper continuous line)  
 = 504 mm  
 Range marks are 100mm apart  
 Lincoln G.O. #2

0722:00Z

0721:42Z

TIME

37

34

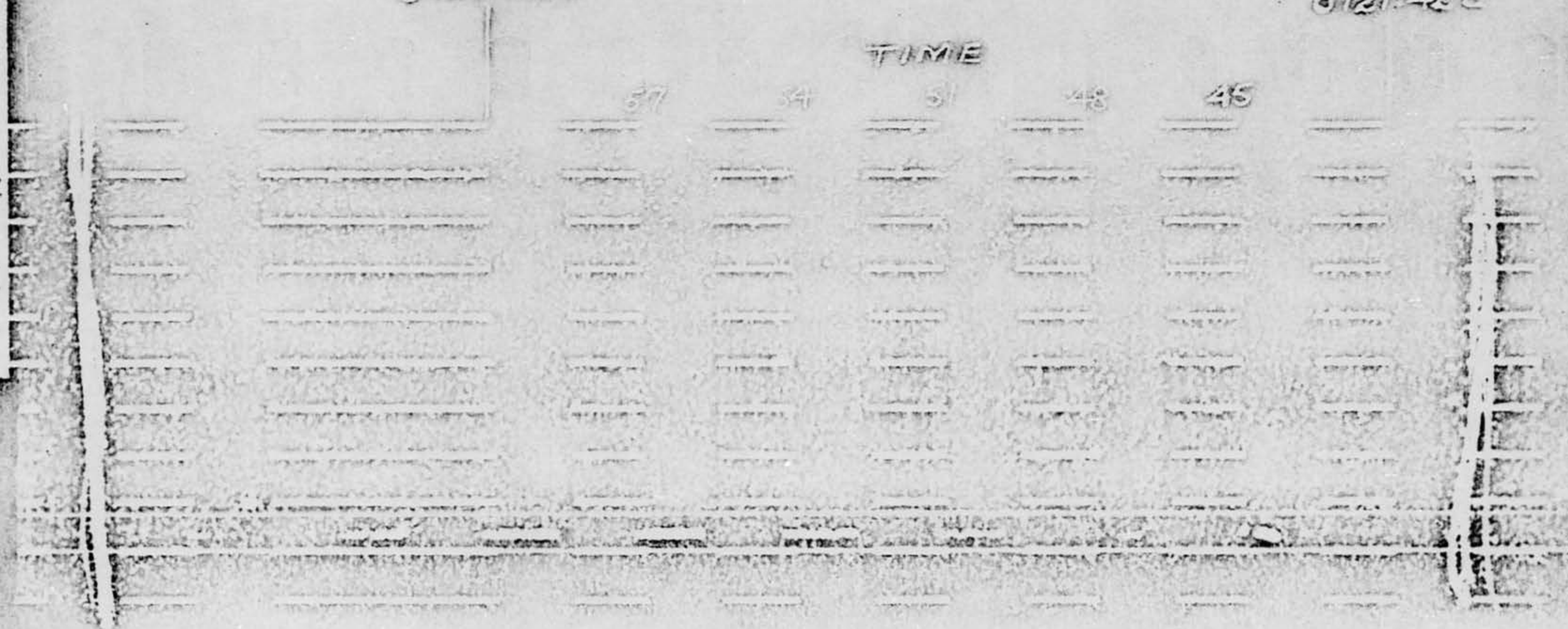
31

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107-9601

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