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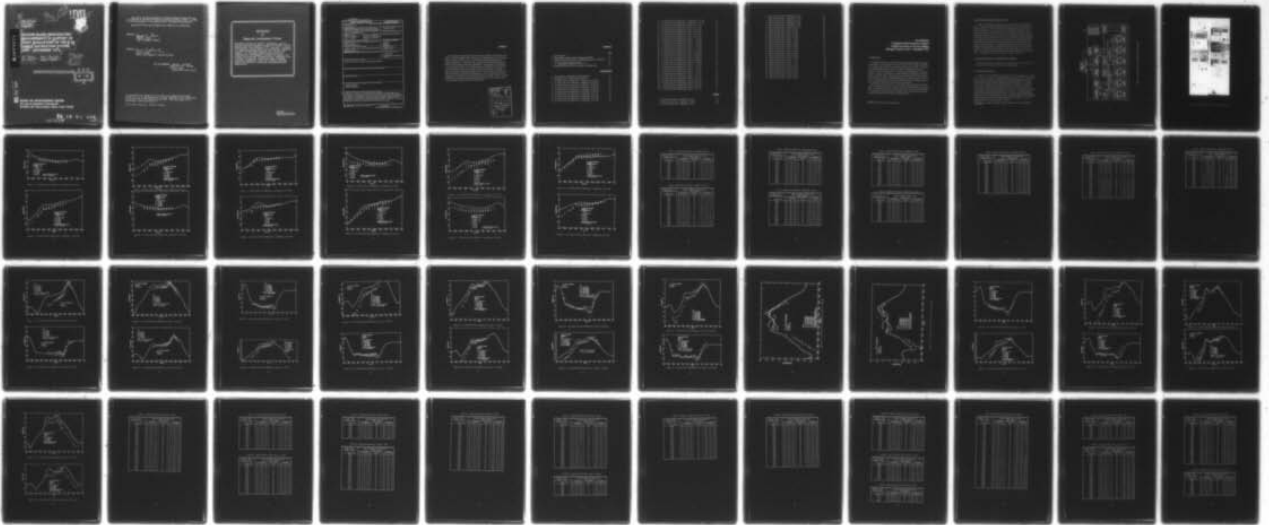
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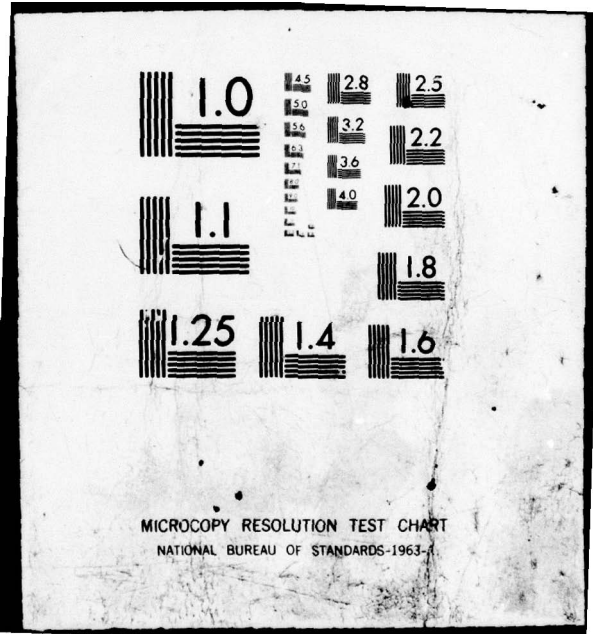
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February 1979

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GROUND-BASED PROPAGATION MEASUREMENTS IN SUPPORT OF FLIGHT EVALUATION OF THE E-3A OMEGA NAVIGATION SYSTEM, JUNE - NOVEMBER 1976

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John E. Rasmussen
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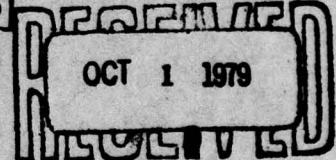
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Preface

The measurements described in this report were obtained at the request of the ESD 411L System Program Office, Hanscom AFB, Massachusetts, which provided funds to support the effort in part. The need for such data was brought to the authors' attention by Lt. Mark Tigerman, whose generous support throughout the period of the program is gratefully acknowledged. Appreciation is also extended to Airman William Johnson of the Propagation Branch of RADC for his efforts during the data-taking phase of the program at Almira, Washington. The authors wish to especially acknowledge the efforts of Mr. Royce C. Kahler of Barkley and Dexter Laboratories, Fitchburg, Massachusetts, in the development of the receiving system used throughout the measurements program, and Mr. Wayne I. Klemetti of Megapulse Corporation, Bedford, Massachusetts, for his aid in the data reduction and graphics presentation aspects of this report.

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**Ground-Based
Propagation Measurements in Support
of Flight Evaluation of the E-3A OMEGA
Navigation System, June — November 1976**

1. INTRODUCTION

During the period June—November 1976 the Propagation Branch of the Rome Air Development Center conducted a field program to provide support to the ESD 411-L System Program Office in evaluating the performance of the E-3A airborne long-range OMEGA navigation system. For this a ground-based very-low-frequency (VLF) receiving system was operated at Vandenberg AFB, California, and later, at Almira, Washington, to monitor OMEGA transmissions from Japan, Hawaii, and North Dakota. Both phase and amplitude information were recorded for comparison with similar data being observed on the E-3A aircraft, so that instrumental effects peculiar to the aircraft operations could be distinguished from wave propagation fluctuations and other natural phenomena.

This report provides a summary of the ground-based observations made during the E-3A flight test program. Signal strengths, time differences, and atmospheric noise data are given in the hope that they may be useful to those interested in the propagation characteristics of long radio waves, and to those particularly concerned with aspects of the OMEGA navigation system.

(Received for publication 27 February 1979)

2. THE GROUND-BASED OMEGA RECEIVING SYSTEM

Figure 1 shows the block-diagram representation of the receiving system used to monitor the OMEGA transmissions at Vandenberg AFB, California, and Almira, Washington. The system provided individual recordings of the amplitudes and phases of the 10.2 kHz and the 13.6 kHz transmissions from three OMEGA transmitters (Japan, Hawaii, and North Dakota). In addition, 10.6 kHz atmospheric noise data were recorded (in a 100 Hz bandwidth) so that signal-to-noise ratios could be estimated for each of the propagation paths being monitored. Calibrations were performed for all the paths so that time differences between station pairs could be quickly obtained and checked against expected nominal values at the receiving site. The station pairs monitored were: Hawaii-North Dakota (C-D), North Dakota-Japan (D-H), and Hawaii-Japan (C-H). Data were obtained at Vandenberg AFB, California, during E-3A flights in June and July 1976, and at Almira, Washington, for flights in August, September, and October 1976. A photograph of the receiving system is shown in Figure 2.

3. OMEGA PROPAGATION DATA—VANDENBERG AFB, CALIFORNIA

Data were obtained at Vandenberg AFB, California ($34^{\circ} 47' 45''$ N, $120^{\circ} 35' 16''$ W) on 22, 23, 25 June and 13, 19, 20, 21, 22 July 1976.

3.1 Time Difference Measurements

Figures 3 to 14 give OMEGA time differences (in microseconds) for 10.2 kHz and 13.6 kHz, as recorded at Vandenberg AFB in June and July 1976. Also shown are the nominal time differences predicted for Vandenberg using the standard Defense Mapping Agency OMEGA Propagation Prediction Tables.* The agreements between the observed and predicted values were usually very good for all station pairs. Exceptions to this occurred, however, for station pairs North Dakota-Japan (D-H) and Hawaii-Japan (C-H) at times when the paths to Japan were in transition from day-to-night conditions, or vice versa. For those times the observations may provide information that can be used to adjust the OMEGA Propagation Tables and improve the predictions. During the period of the Vandenberg observations there were no discernible ionospheric disturbances; that is, the OMEGA propagation environment was very good.

*Published by the Defense Mapping Agency Hydrographic Center, Washington, D. C. 20390

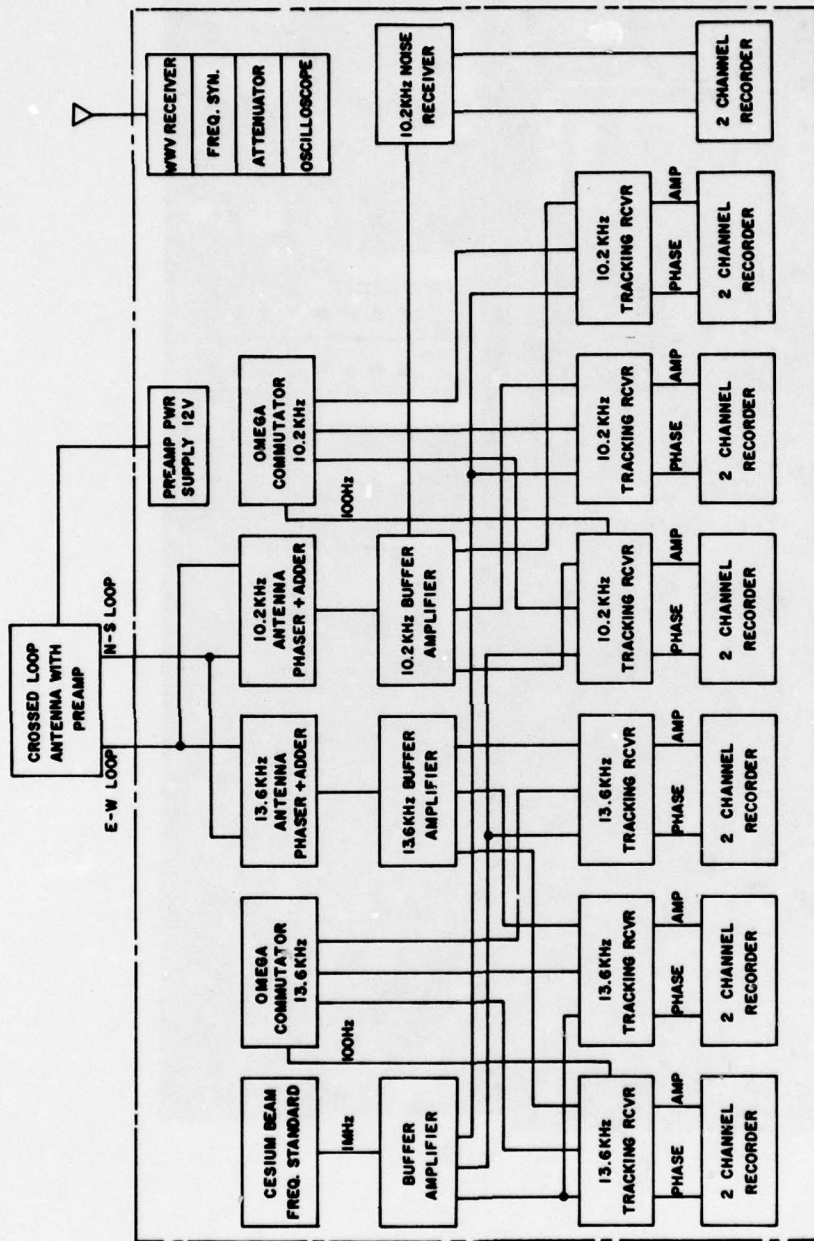


Figure 1. Block Diagram of the OMEGA Receiving System

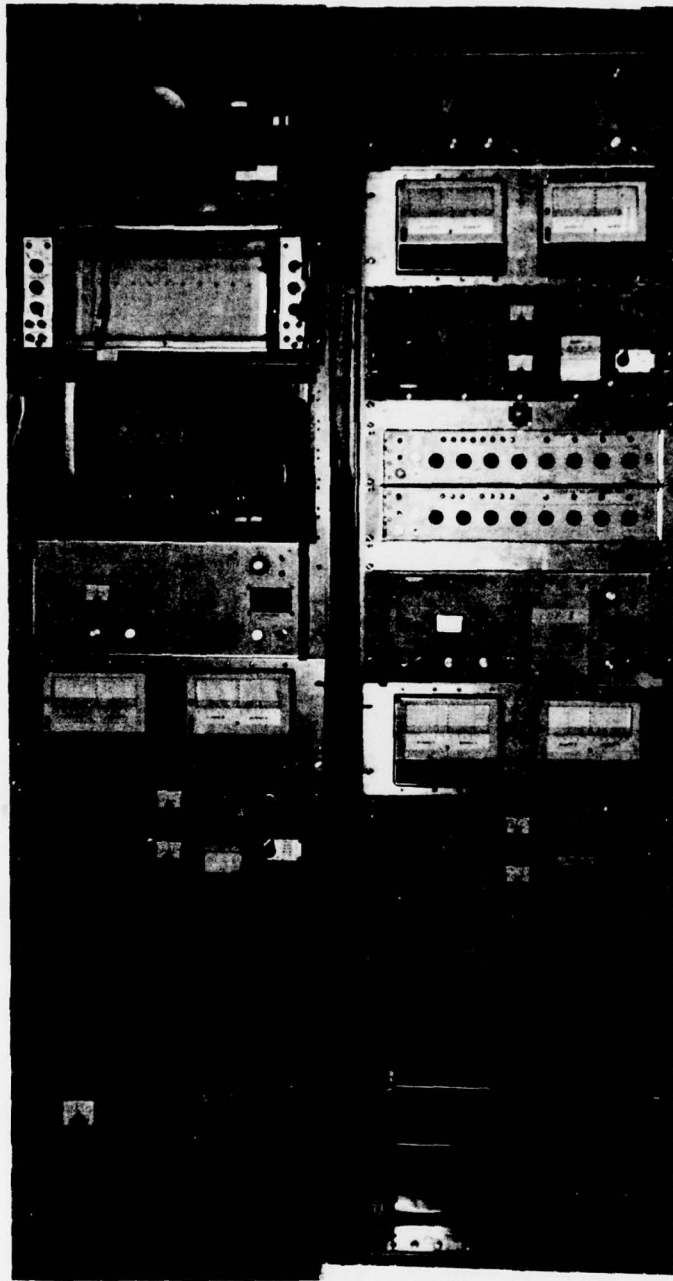


Figure 2. Photograph of the OMEGA Receiving System

3.2 Omega Signal Strengths and Noise Data

Tables 1 to 9 give OMEGA signal strengths and atmospheric noise as recorded at Vandenberg in June and July 1976. Since the noise data were recorded only at 10.6 kHz, the signal-to-noise ratios for 10.2 kHz and 13.6 kHz can only be estimated from the given data. Although the ground observations of the Omega transmissions from Japan were readable at all times, aircraft OMEGA systems could have experienced some difficulty with those transmissions, since the station operated only at quarter-power at times during the measurements program, and signal-to-noise ratios were often -15 dB to -20 dB, or worse.

4. OMEGA PROPAGATION DATA—ALMIRA, WASHINGTON

Propagation data, similar to that recorded at Vandenberg, were obtained at Almira, Washington (47° 46' 15" N, 118° 56' 00" W) in conjunction with E-3A flights during the months of August, September, and October 1976. Figures 15 to 44 give the observed time differences (in microseconds) for the Hawaii-North Dakota, North Dakota-Japan, and Hawaii-Japan station-pairs. Also shown are the predicted time differences derived from the appropriate Defense Mapping Agency Omega Propagation Prediction Tables. The agreements between the observed and predicted values were usually very good, except for station pairs that included Japan when the propagation paths to that country were in day-to-night (or night-to-day) transitions. In this regard the Almira data were consistent with that observed at Vandenberg. Throughout the period of the Almira observations, there were no significant ionospheric disturbances.

Tables 10 to 32 give Omega signal strengths and atmospheric noise data as recorded at Almira. At times the signal-to-noise ratios associated with the transmissions from Japan were -15 dB or worse, corresponding to times when that station was operating at greatly reduced power levels.



VANDENBERG AFB DATA

Figures 3-14
Tables 1-9

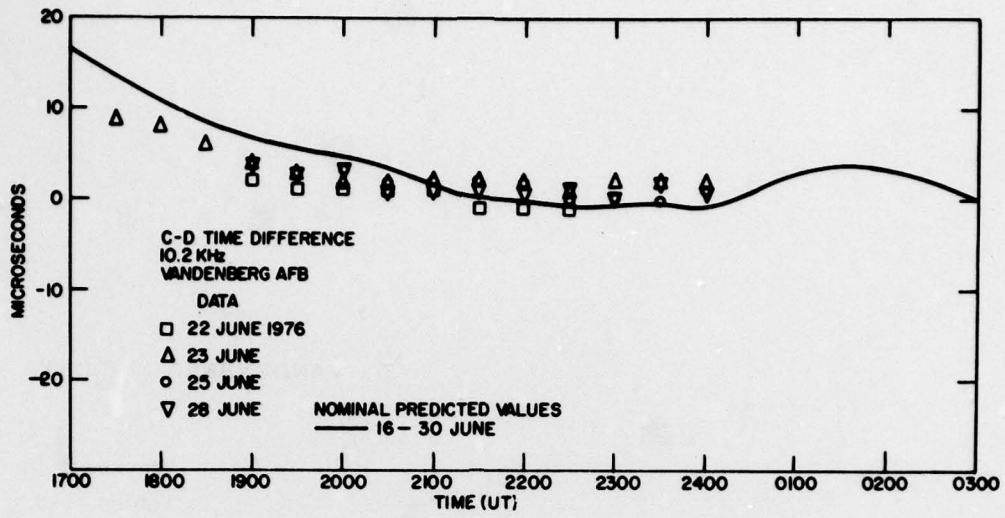


Figure 3. 10.2 kHz (C-D) Time Differences, Vandenberg, 16-30 June

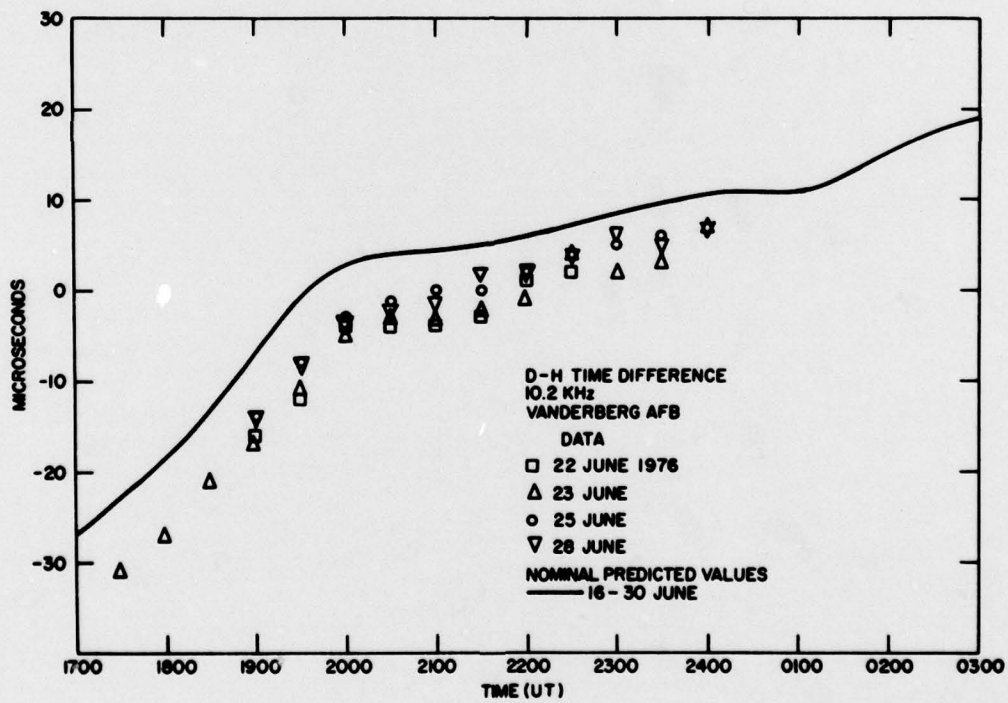


Figure 4. 10.2 kHz (D-H) Time Differences, Vandenberg, 16-30 June

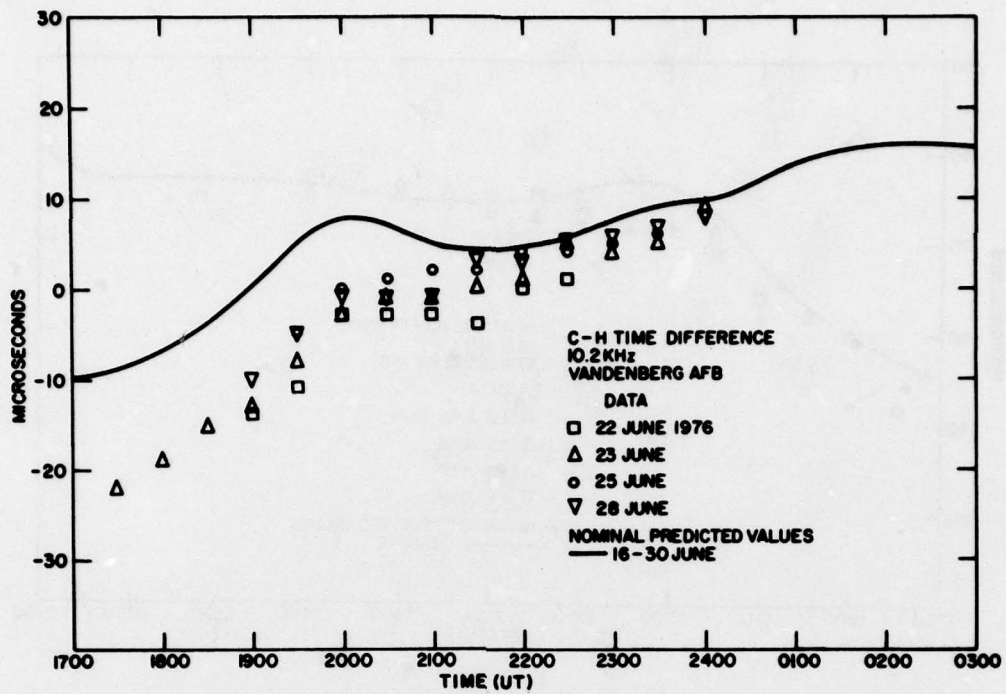


Figure 5. 10.2 kHz (C-H) Time Differences, Vandenberg, 16-30 June

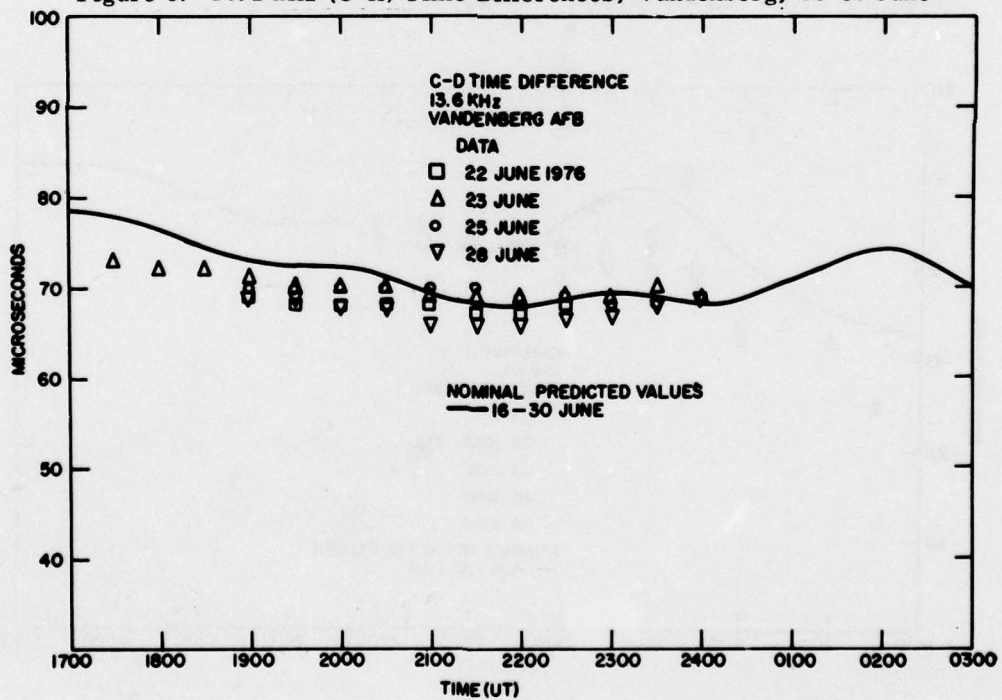


Figure 6. 13.6 kHz (C-D) Time Differences, Vandenberg, 16-30 June

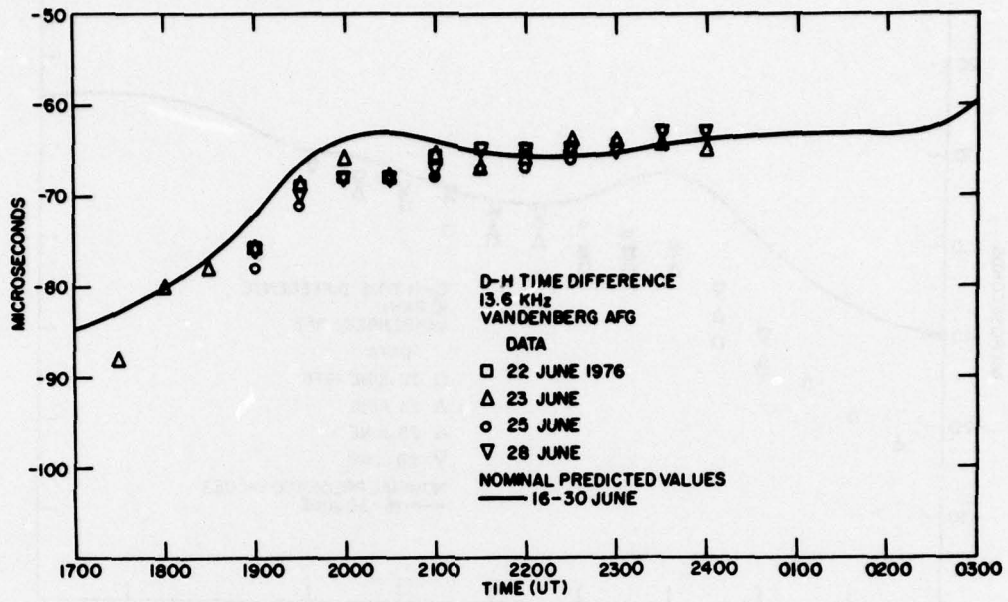


Figure 7. 13.6 kHz (D-H) Time Differences, Vandenberg, 16-30 June

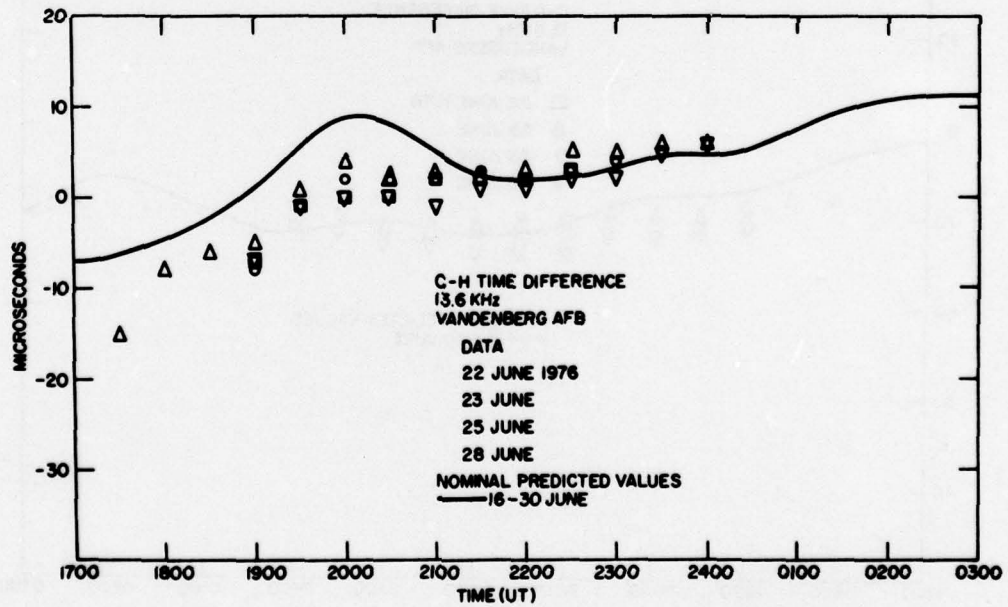


Figure 8. 13.6 kHz (C-H) Time Differences, Vandenberg, 16-30 June

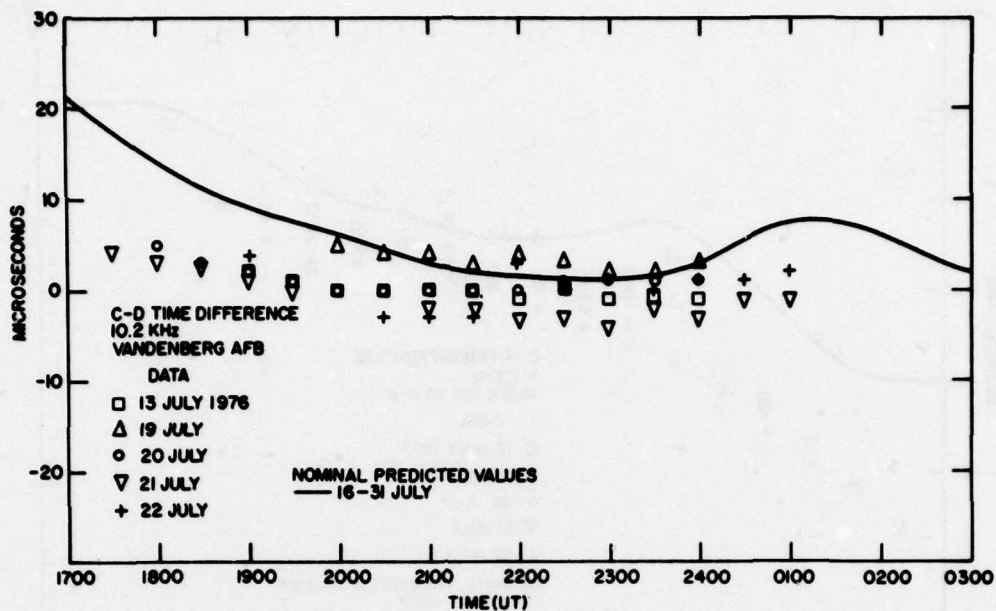


Figure 9. 10.2 kHz (C-D) Time Differences, Vandenberg, 13-31 July

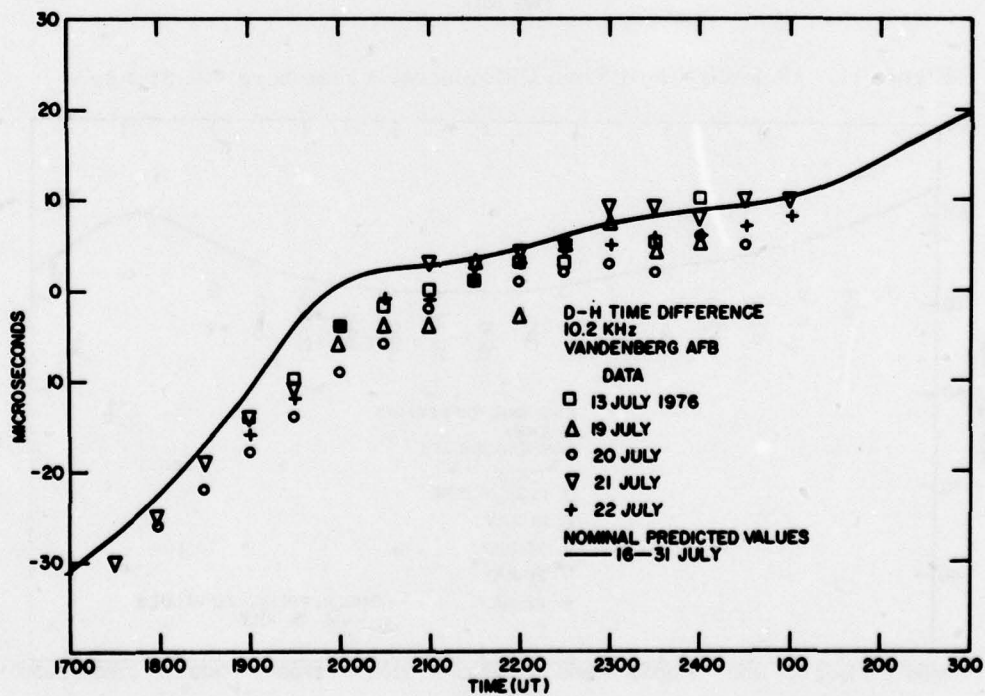


Figure 10. 10.2 kHz (D-H) Time Differences, Vandenberg, 13-31 July

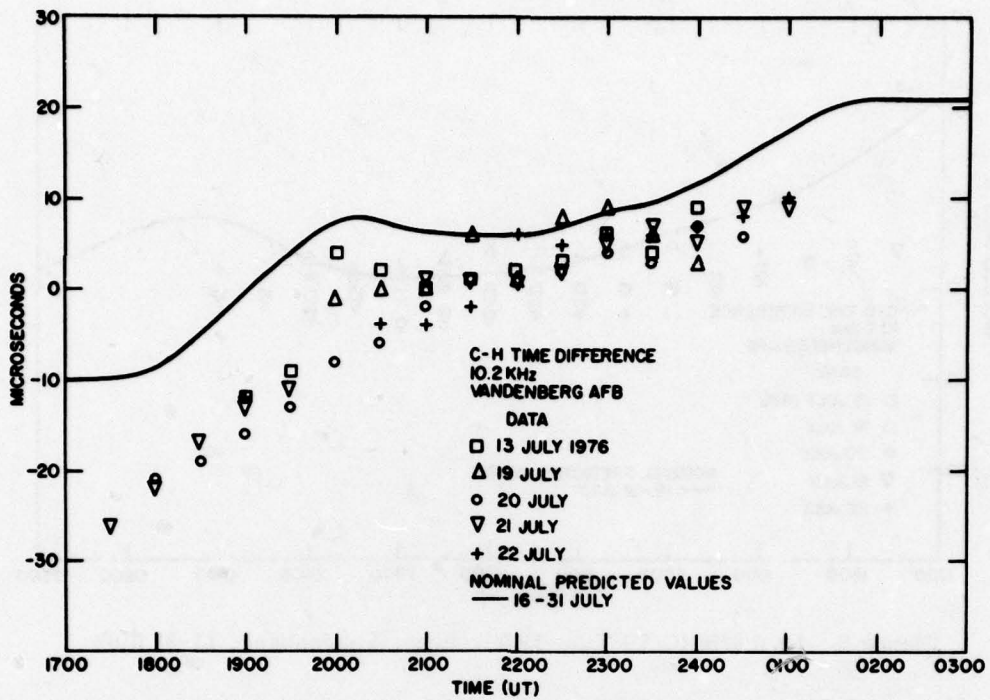


Figure 11. 10.2 kHz (C-H) Time Differences, Vandenberg, 13-31 July

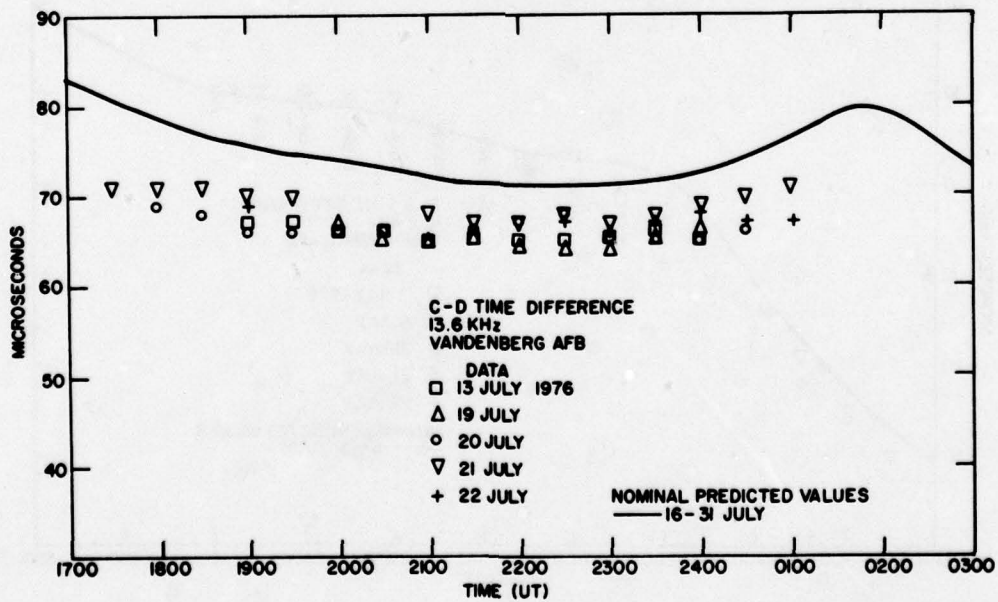


Figure 12. 13.6 kHz (C-D) Time Differences, Vandenberg, 13-31 July

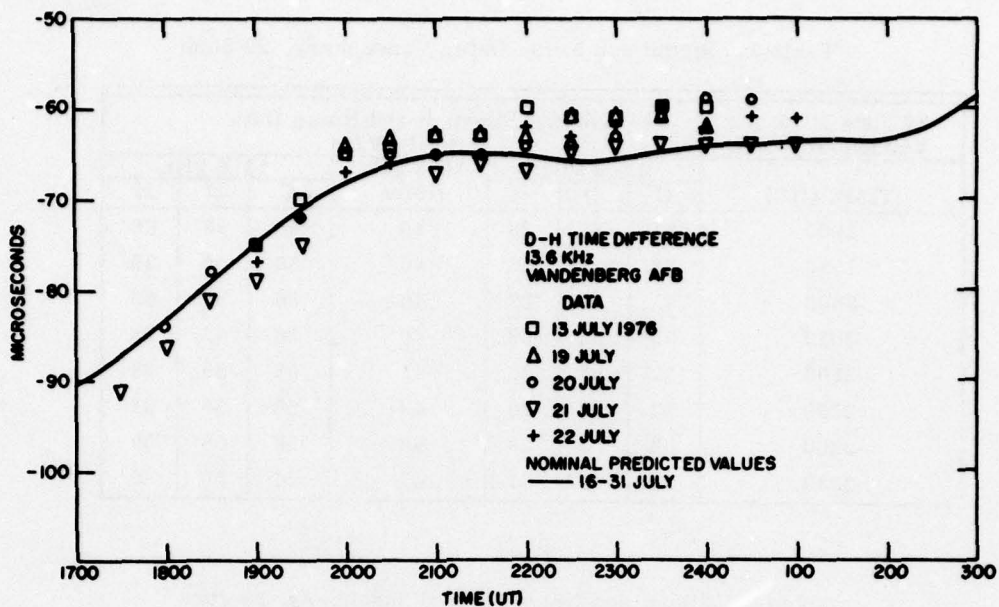


Figure 13. 13.6 kHz (D-H) Time Differences, Vandenberg, 13-31 July

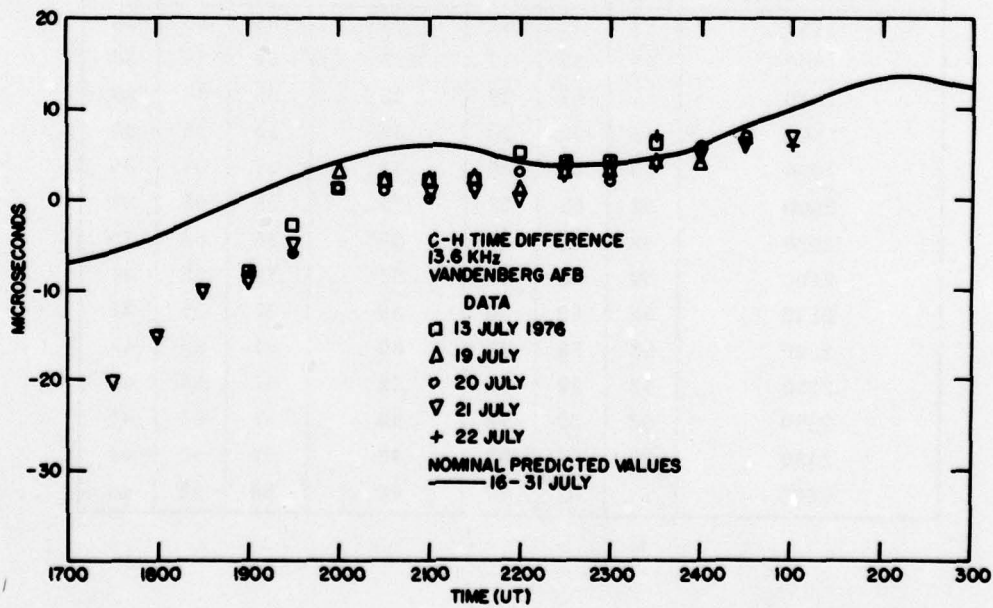


Figure 14. 13.6 kHz (C-H) Time Differences, Vandenberg, 13-31 July

Table 1. Signal and Noise Data, Vandenberg, 22 June

| 22 June 1976 Vandenberg AFB | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|--------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 1900 | 53 | 52 | 28 | 40 | 56 | 55 | 36 |
| 1930 | 53 | 52 | 25 | 40 | 56 | 55 | 35 |
| 2000 | 53 | 52 | 27 | 40 | 56 | 55 | 36 |
| 2030 | 53 | 52 | 28 | 40 | 56 | 55 | 36 |
| 2100 | 52 | 53 | 28 | 41 | 56 | 55 | 38 |
| 2130 | 52 | 52 | 28 | 43 | 56 | 55 | 37 |
| 2200 | 52 | 53 | 29 | 43 | 56 | 55 | 39 |
| 2230 | 52 | 52 | 31 | 42 | 56 | 55 | 39 |

Table 2. Signal and Noise Data, Vandenberg, 23 June

| 23 June 1976 Vandenberg AFB | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|--------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 1730 | 52 | 52 | 31 | 33 | 53 | 55 | 38 |
| 1800 | 53 | 52 | 30 | 33 | 54 | 55 | 36 |
| 1830 | 53 | 52 | 29 | 32 | 55 | 55 | 38 |
| 1900 | 53 | 52 | 29 | 33 | 55 | 55 | 36 |
| 1930 | 52 | 52 | 26 | 35 | 56 | 55 | 35 |
| 2000 | 52 | 52 | 27 | 35 | 56 | 55 | 37 |
| 2030 | 52 | 52 | 29 | 37 | 56 | 55 | 39 |
| 2100 | 52 | 52 | 29 | 37 | 56 | 55 | 41 |
| 2130 | 52 | 52 | 30 | 39 | 57 | 55 | 41 |
| 2200 | 53 | 52 | 31 | 40 | 57 | 55 | 43 |
| 2230 | 53 | 52 | 31 | 42 | 57 | 55 | 43 |
| 2300 | 53 | 52 | 32 | 42 | 57 | 55 | 44 |
| 2330 | 53 | 52 | 32 | 42 | 57 | 55 | 44 |
| 0000 | 53 | 52 | 37 | 40 | 58 | 55 | 46 |

Table 3. Signal and Noise Data, Vandenberg, 25 June

| 25 June 1976 Vandenberg AFB | | Signal Strength and Noise Data dB > 1 μ V/m | | | | | |
|--------------------------------|----------|--|----|----------|----------|----|----|
| TIME (UT) | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 1900 | 52 | 52 | 37 | 33 | 58 | 56 | 48 |
| 1930 | 53 | 52 | 35 | 33 | 58 | 55 | 46 |
| 2000 | 53 | 52 | 36 | 34 | 59 | 56 | 48 |
| 2030 | 53 | 52 | 37 | 36 | 59 | 55 | 48 |
| 2100 | 53 | 52 | 37 | 36 | 59 | 55 | 49 |
| 2130 | 53 | 52 | 37 | 36 | 59 | 55 | 49 |
| 2200 | 53 | 52 | 38 | 37 | 59 | 55 | 51 |
| 2230 | 53 | 52 | 38 | 39 | 59 | 55 | 51 |
| 2300 | 53 | 52 | 38 | 37 | 59 | 55 | 51 |
| 2330 | 53 | 52 | 38 | 39 | 58 | 55 | 51 |
| 0000 | 52 | 52 | 39 | 39 | 59 | 55 | 51 |

Table 4. Signal and Noise Data, Vandenberg, 28 June

| 28 June 1976 Vandenberg AFB | | Signal Strength and Noise Data dB > 1 μ V/m | | | | | |
|--------------------------------|----------|--|----|----------|----------|----|----|
| TIME (UT) | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 1900 | 53 | 52 | 36 | 37 | 58 | 55 | 48 |
| 1930 | 53 | 52 | 34 | 36 | 58 | 55 | 45 |
| 2000 | 53 | 53 | 36 | 37 | 58 | 55 | 46 |
| 2030 | 53 | 52 | 37 | 37 | 58 | 55 | 47 |
| 2100 | 53 | 53 | 37 | 39 | 58 | 55 | 47 |
| 2130 | 53 | 53 | 37 | 39 | 58 | 56 | 48 |
| 2200 | 53 | 52 | 36 | 40 | 58 | 56 | 48 |
| 2230 | 53 | 52 | 37 | 40 | 58 | 56 | 48 |
| 2300 | 53 | 52 | 37 | 40 | 58 | 55 | 48 |
| 2330 | 53 | 52 | 38 | 40 | 58 | 55 | 48 |
| 0000 | 53 | 53 | 38 | 40 | 58 | 55 | 49 |

Table 5. Signal and Noise Data, Vandenberg, 13 July

| 13 July 1976 Vandenberg AFB | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|--------------------------------|--|----|----|-------------------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz Noise | 13.6 kHz | | |
| | C | D | H | | C | D | H |
| 1900 | 52 | 52 | 29 | 40 | 53 | 53 | 35 |
| 1930 | 53 | 52 | 27 | 41 | 53 | 53 | 35 |
| 2000 | 53 | 52 | 29 | 43 | 53 | 53 | 36 |
| 2030 | 53 | 52 | 28 | 45 | 54 | 53 | 36 |
| 2100 | 53 | 52 | 27 | 44 | 53 | 54 | 37 |
| 2130 | 52 | 52 | 30 | 44 | 53 | 54 | 38 |
| 2200 | 52 | 52 | 30 | 44 | 53 | 56 | 39 |
| 2230 | 52 | 52 | 30 | 44 | 53 | 56 | 39 |
| 2300 | 52 | 52 | 31 | 44 | 53 | 56 | 41 |
| 2330 | 52 | 52 | 29 | 44 | 53 | 57 | 40 |
| 0000 | 53 | 52 | 30 | 44 | 53 | 57 | 41 |

Table 6. Signal and Noise Data, Vandenberg, 19 July

| 19 July 1976 Vandenberg AFB | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|--------------------------------|--|----|----|-------------------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz Noise | 13.6 kHz | | |
| | C | D | H | | C | D | H |
| 2000 | 53 | 52 | 27 | 42 | 54 | 55 | 35 |
| 2030 | 52 | 52 | 27 | 44 | 54 | 55 | 36 |
| 2100 | 52 | 52 | 28 | 44 | 53 | 55 | 38 |
| 2130 | 52 | 52 | 30 | 45 | 54 | 55 | 38 |
| 2200 | 52 | 52 | 27 | 46 | 54 | 55 | 38 |
| 2230 | 52 | 52 | 27 | 46 | 54 | 55 | 38 |
| 2300 | 52 | 52 | 29 | 47 | 54 | 55 | 39 |
| 2330 | 53 | 52 | 27 | 47 | 55 | 55 | 38 |
| 0000 | 53 | 52 | 31 | 47 | 55 | 55 | 39 |

Table 7. Signal and Noise Data, Vandenberg, 20 July

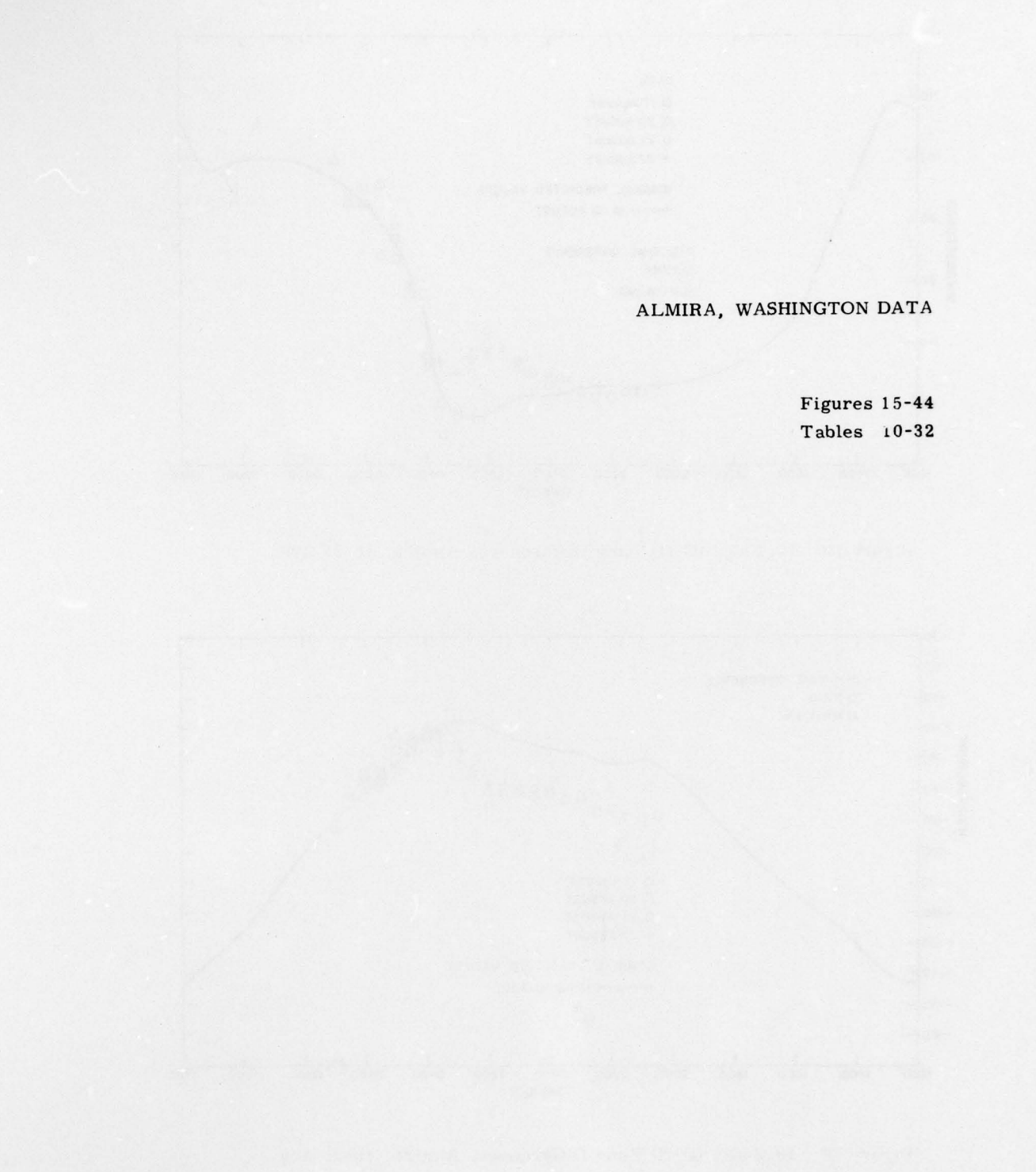
| 20 July 1976 Vandenberg AFB | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|--------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 1800 | 53 | 52 | 31 | 37 | 55 | 56 | 36 |
| 1830 | 53 | 52 | 30 | 40 | 55 | 56 | 37 |
| 1900 | 53 | 53 | 30 | 42 | 55 | 56 | 37 |
| 1930 | 53 | 53 | 27 | 44 | 55 | 56 | 34 |
| 2000 | 53 | 53 | 31 | 46 | 55 | 56 | 38 |
| 2030 | 53 | 53 | 27 | 46 | 55 | 56 | 38 |
| 2100 | 53 | 53 | 30 | 47 | 55 | 56 | 40 |
| 2130 | 53 | 53 | 30 | 47 | 55 | 56 | 39 |
| 2200 | 53 | 53 | 27 | 48 | 55 | 56 | 39 |
| 2230 | 53 | 53 | 29 | 48 | 55 | 56 | 40 |
| 2300 | 53 | 53 | 31 | 48 | 55 | 56 | 40 |
| 2330 | 53 | 53 | 30 | 48 | 55 | 56 | 40 |
| 0000 | 53 | 53 | 30 | 48 | 56 | 56 | 40 |
| 0030 | 53 | 52 | 32 | 48 | 55 | 56 | 40 |

Table 8. Signal and Noise Data, Vandenberg, 21 July

| 21 July 1976 Vandenberg AFB | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|--------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 1730 | 53 | 53 | 39 | 35 | 53 | 56 | 46 |
| 1800 | 53 | 52 | 39 | 37 | 53 | 56 | 42 |
| 1830 | 53 | 52 | 39 | 38 | 54 | 56 | 44 |
| 1900 | 53 | 52 | 38 | 42 | 55 | 56 | 44 |
| 1930 | 53 | 52 | 38 | 43 | 55 | 56 | 40 |
| 2000 | -- | -- | -- | -- | -- | -- | -- |
| 2030 | -- | -- | -- | -- | -- | -- | -- |
| 2100 | 53 | 52 | 38 | 48 | 55 | 56 | 45 |
| 2130 | 53 | 53 | 36 | 48 | 55 | 56 | 44 |
| 2200 | 53 | 53 | 39 | 48 | 55 | 56 | 45 |
| 2230 | 53 | 53 | 39 | 48 | 55 | 56 | 44 |
| 2300 | 53 | 53 | 38 | 46 | 55 | 56 | 46 |
| 2330 | 53 | 53 | 41 | 45 | 56 | 56 | 46 |
| 0000 | 53 | 53 | 39 | 44 | 56 | 56 | 46 |
| 0030 | 53 | 53 | 41 | 44 | 56 | 56 | 46 |
| 0100 | 53 | 52 | 39 | 42 | 56 | 56 | 46 |

Table 9. Signal and Noise Data, Vandenberg, 22 July

| 22 July 1976 Vandenberg AFB | Signal Strength and Noise Data db > 1 μ V/m | | | | | | |
|--------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 1900 | 53 | 53 | 36 | 40 | 54 | 56 | 44 |
| 1930 | -- | 53 | 36 | 43 | -- | 56 | 41 |
| 2000 | -- | 53 | 38 | 43 | -- | 56 | 43 |
| 2030 | -- | 53 | 36 | 45 | -- | 56 | 42 |
| 2100 | -- | 52 | 37 | 44 | -- | 56 | 44 |
| 2130 | -- | 53 | 38 | 46 | -- | 56 | 44 |
| 2200 | -- | 53 | 38 | 46 | -- | 56 | 44 |
| 2230 | 53 | 53 | 39 | 46 | 55 | 56 | 46 |
| 2300 | 53 | 53 | 39 | 46 | 56 | 56 | 46 |
| 2330 | 54 | 53 | 39 | 46 | 56 | 56 | 46 |
| 0000 | 54 | 53 | 40 | 45 | 56 | 56 | 46 |
| 0030 | 53 | 53 | 40 | 45 | 56 | 56 | 46 |
| 0100 | 54 | 52 | 42 | 45 | 56 | 56 | 46 |



ALMIRA, WASHINGTON DATA

Figures 15-44

Tables 10-32

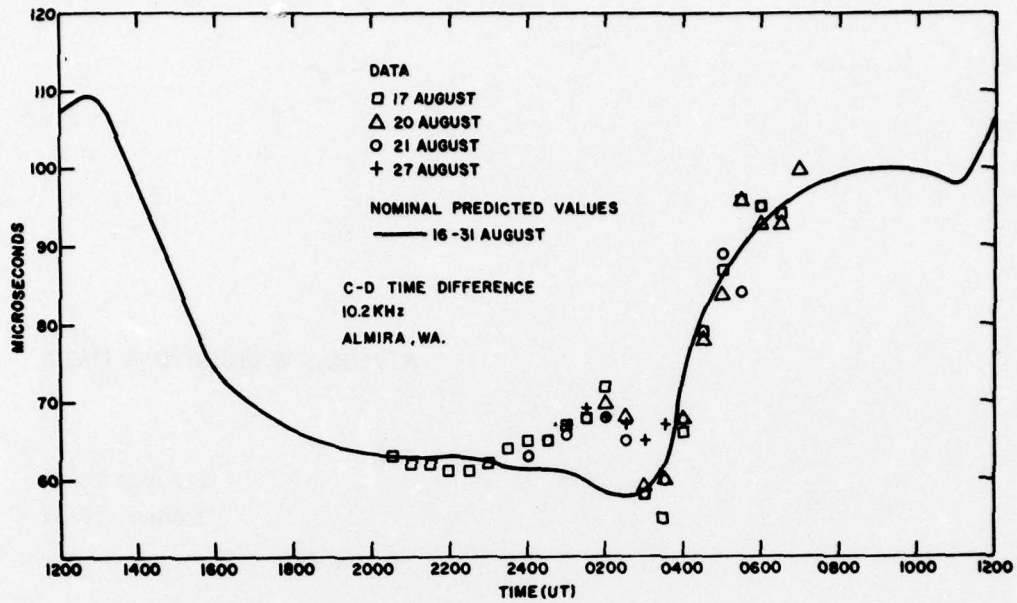


Figure 15. 10.2 kHz (C-D) Time Differences, Almira, 16-31 Aug

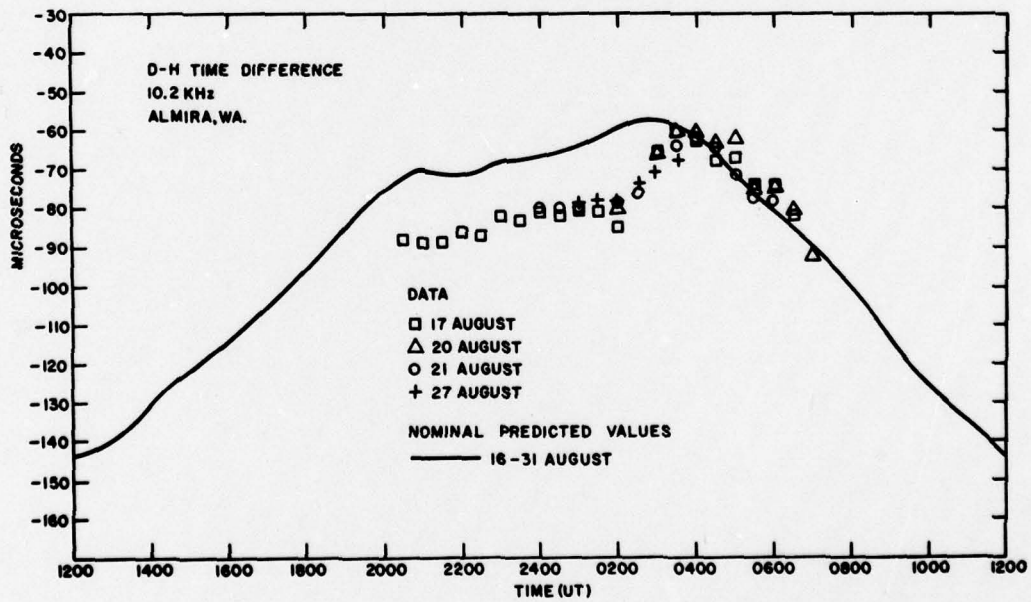


Figure 16. 10.2 kHz (D-H) Time Differences, Almira, 16-31 Aug

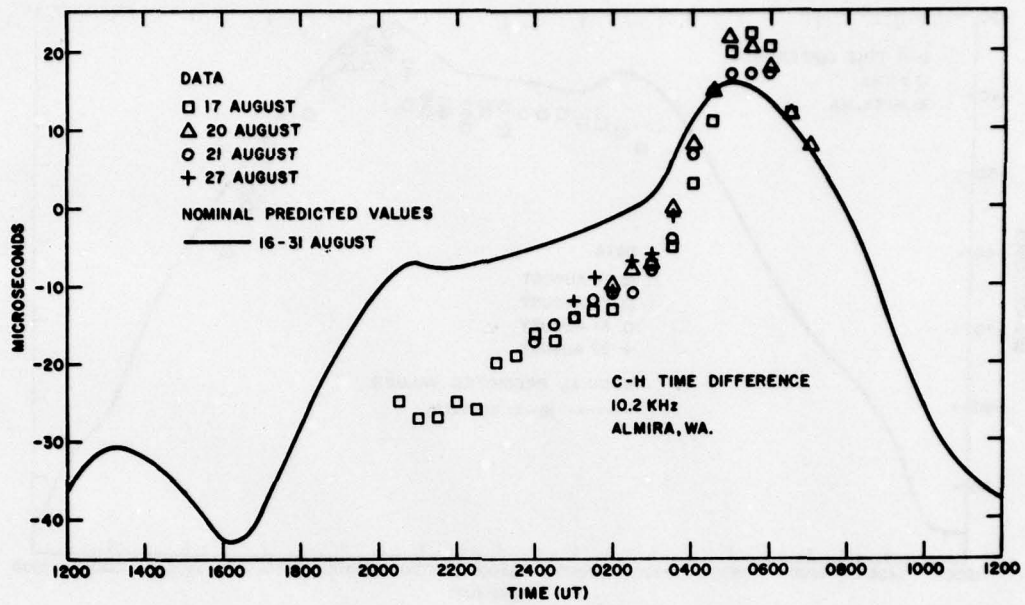


Figure 17. 10.2 kHz (C-H) Time Differences, Almira, 16-31 Aug

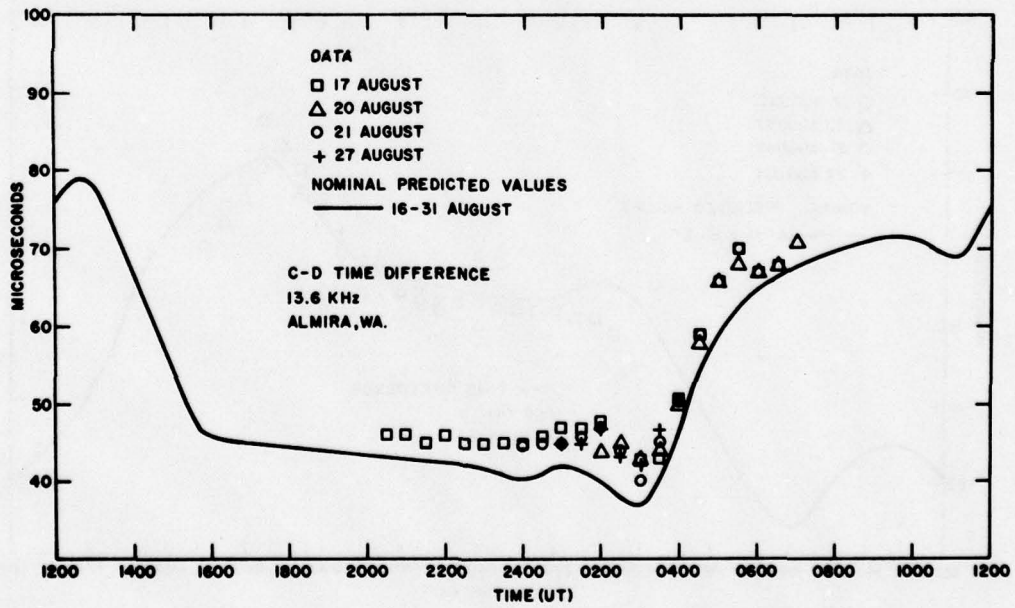


Figure 18. 13.6 kHz (C-D) Time Differences, Almira, 16-31 Aug

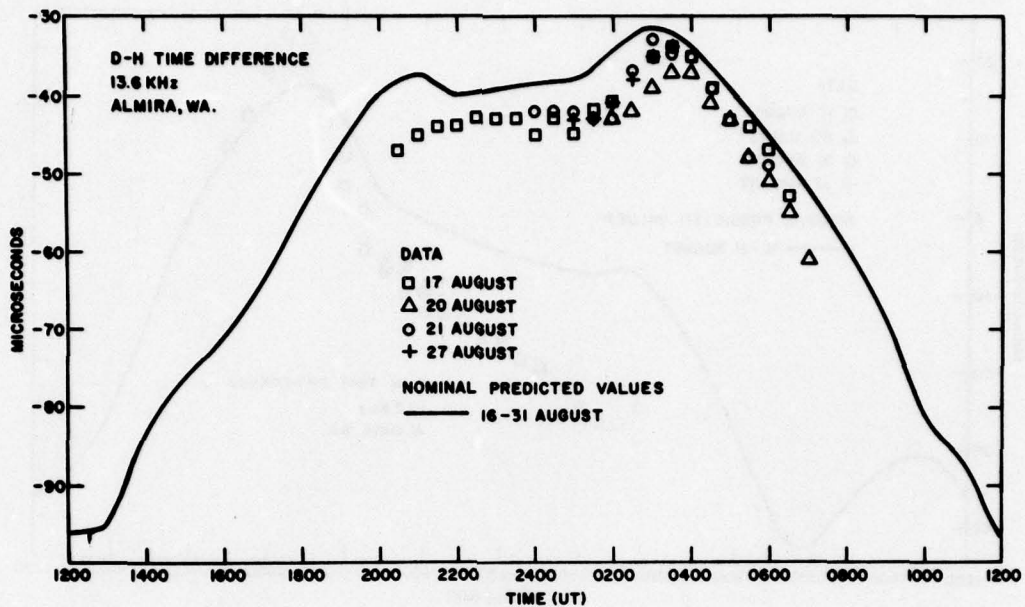


Figure 19. 13.6 kHz (D-H) Time Differences, Almira, 16-31 Aug

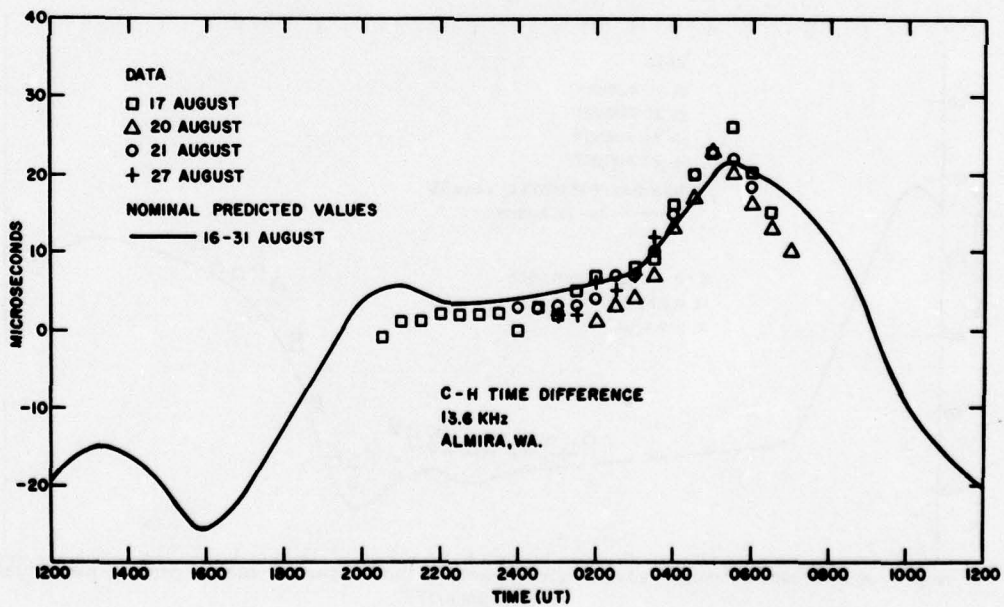


Figure 20. 13.6 kHz (C-H) Time Differences, Almira, 16-31 Aug

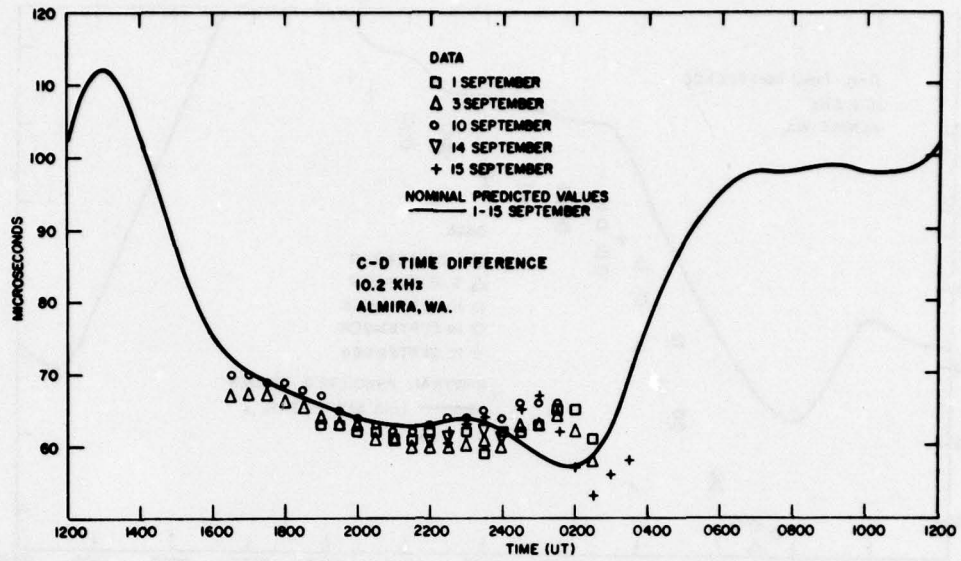


Figure 21. 10.2 kHz (C-D) Time Differences, Almira, 1-15 Sept

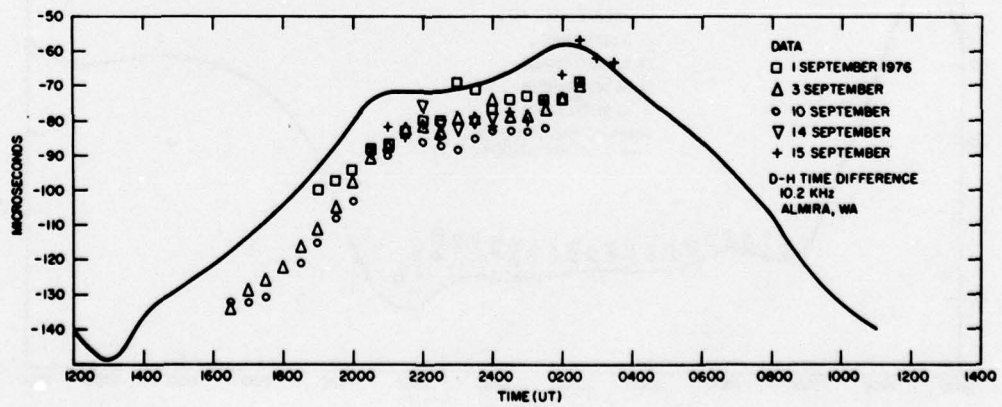


Figure 22. 10.2 kHz (D-H) Time Differences, Almira, 1-15 Sept

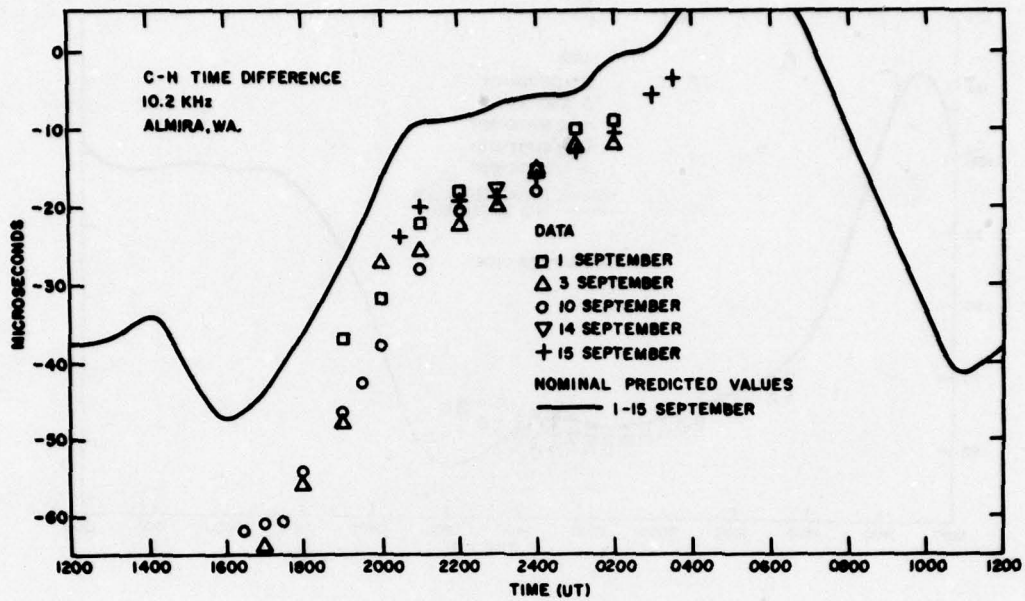


Figure 23. 10.2 kHz (C-H) Time Differences, Almira, 1-15 Sept

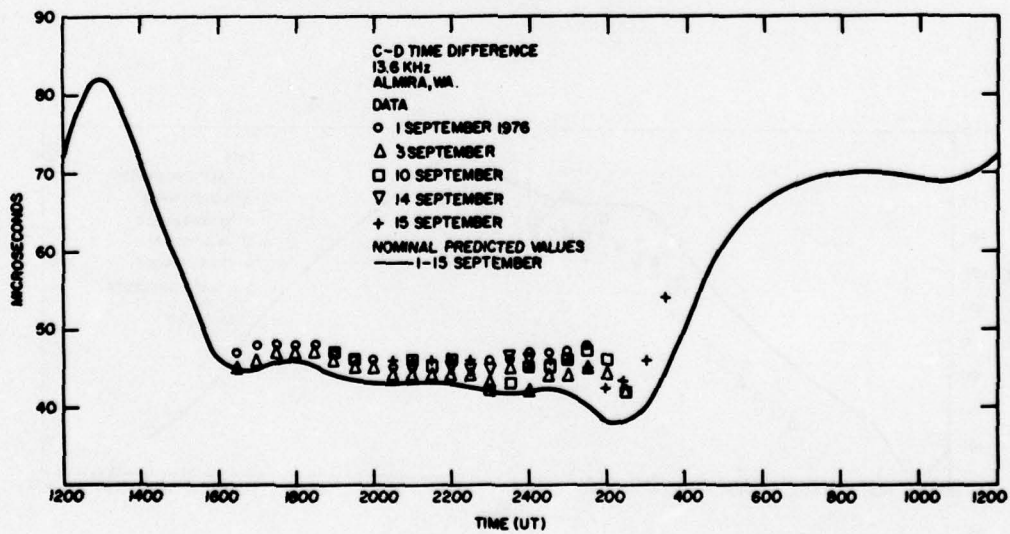


Figure 24. 13.6 kHz (C-D) Time Differences, Almira, 1-15 Sept

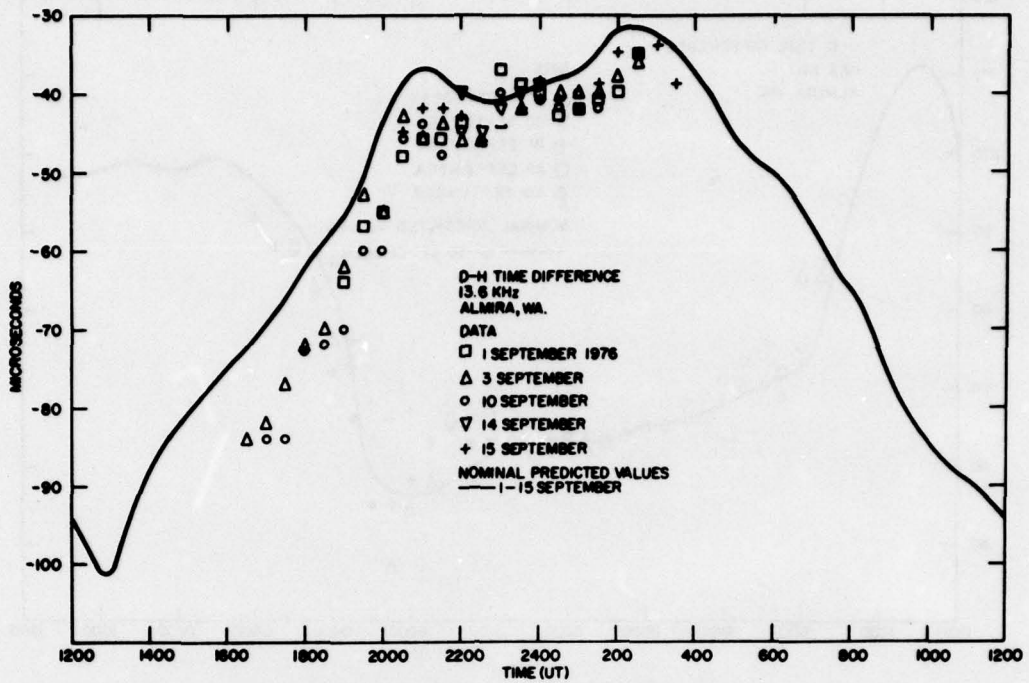


Figure 25. 13.6 kHz (D-H) Time Differences, Almira, 1-15 Sept

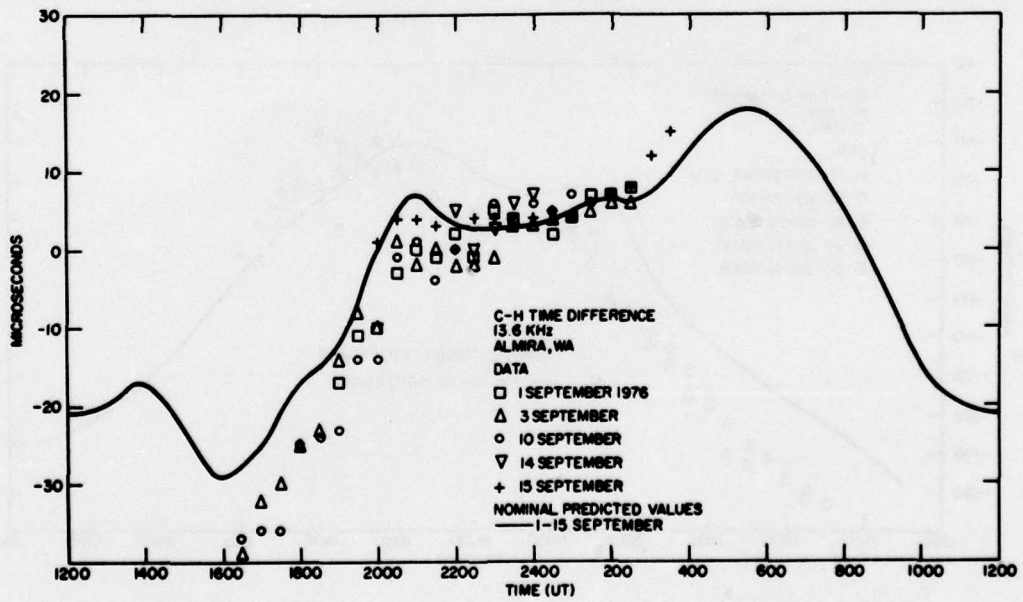


Figure 26. 13.6 kHz (C-H) Time Differences, Almira, 1-15 Sept

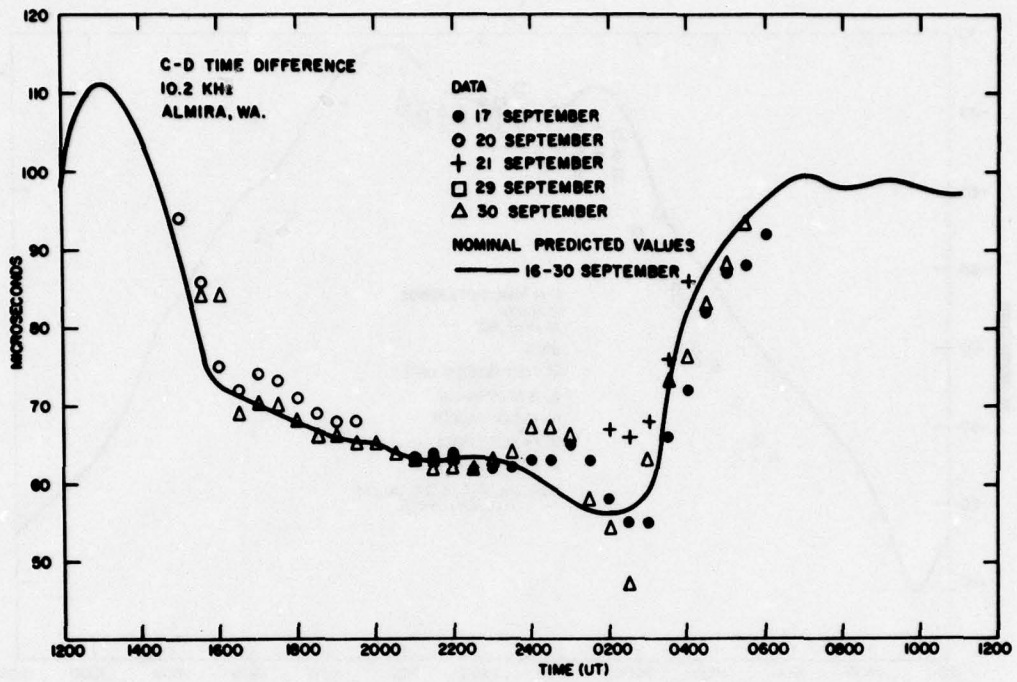


Figure 27. 10.2 kHz (C-D) Time Differences, Almira, 16-30 Sept

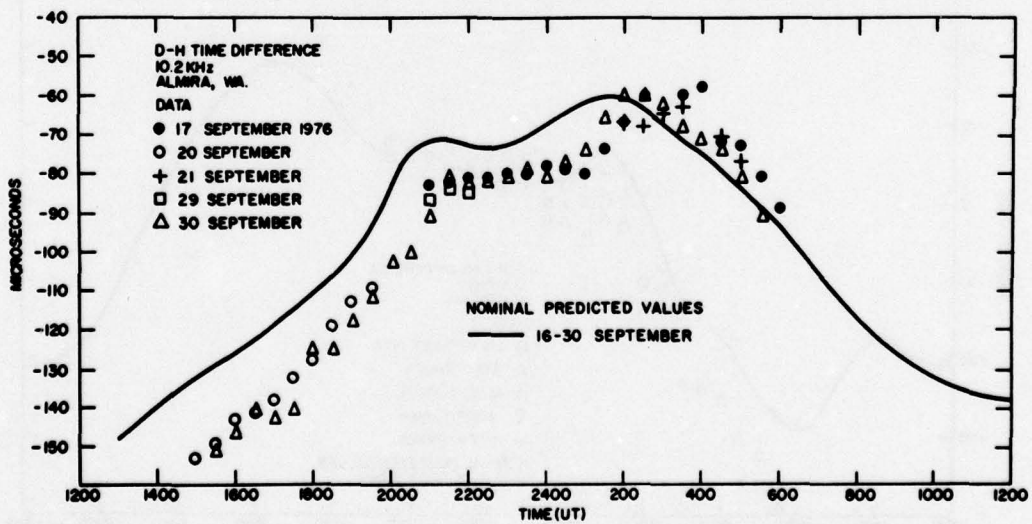


Figure 28. 10.2 kHz (D-H) Time Differences, Almira, 16-30 Sept

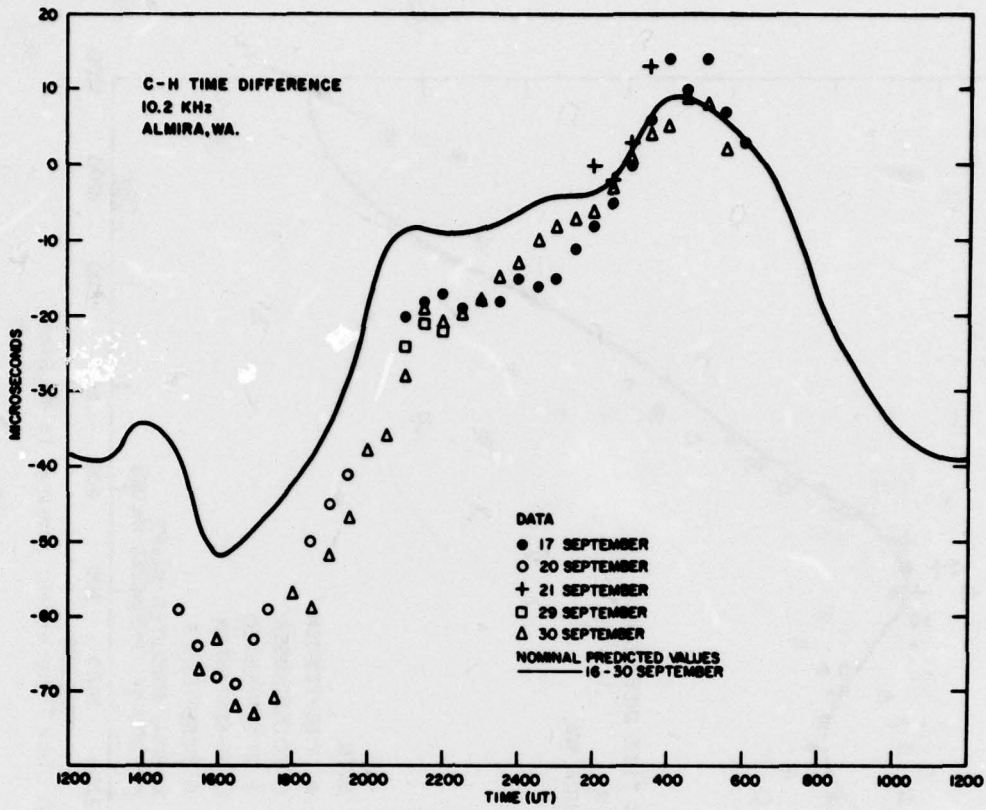


Figure 29. 10.2 kHz (C-H) Time Differences, Almira, 16-30 Sept

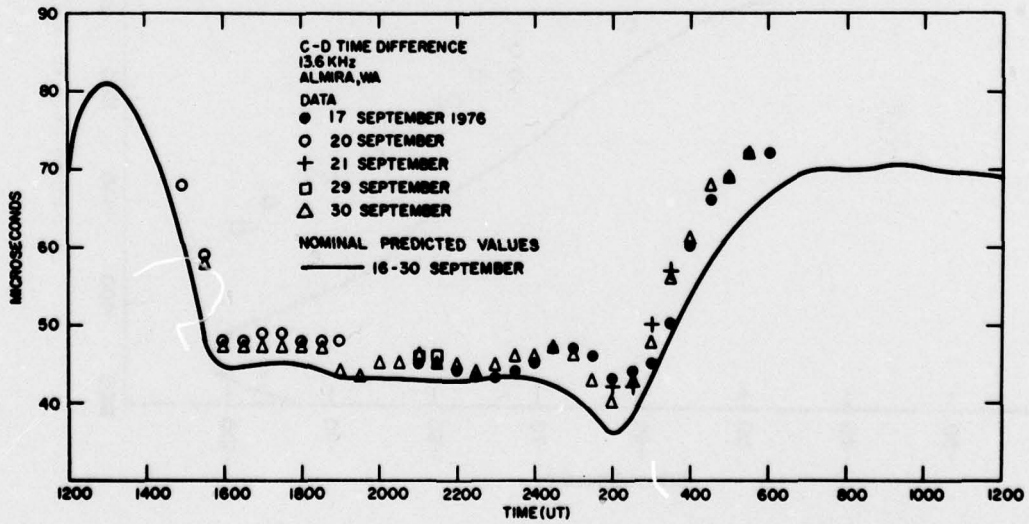


Figure 30. 13.6 kHz (C-D) Time Differences, Almira, 16-30 Sept

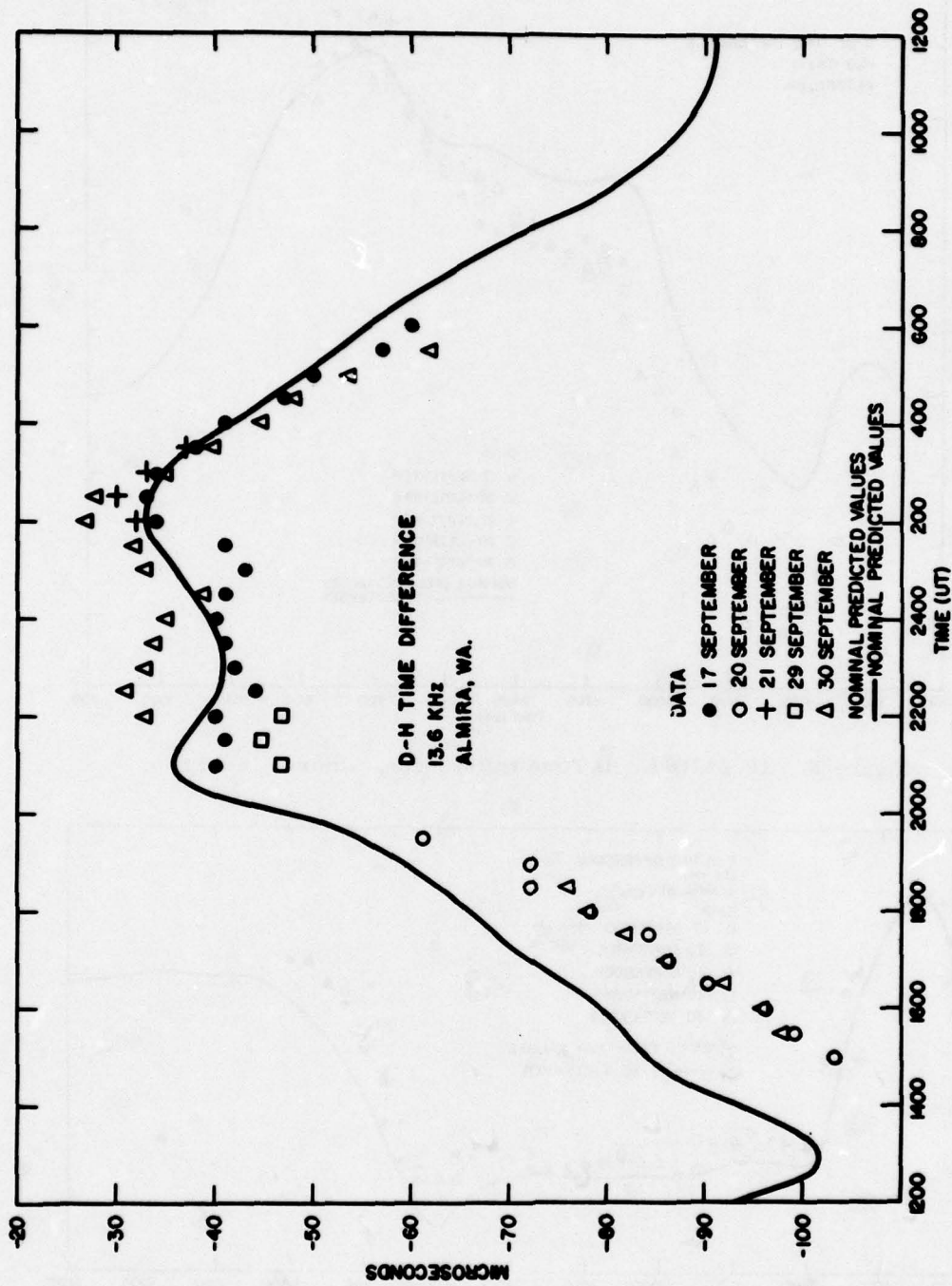


Figure 31. 13.6 kHz (D-H) Time Differences, Almirante, 16-30 Sept

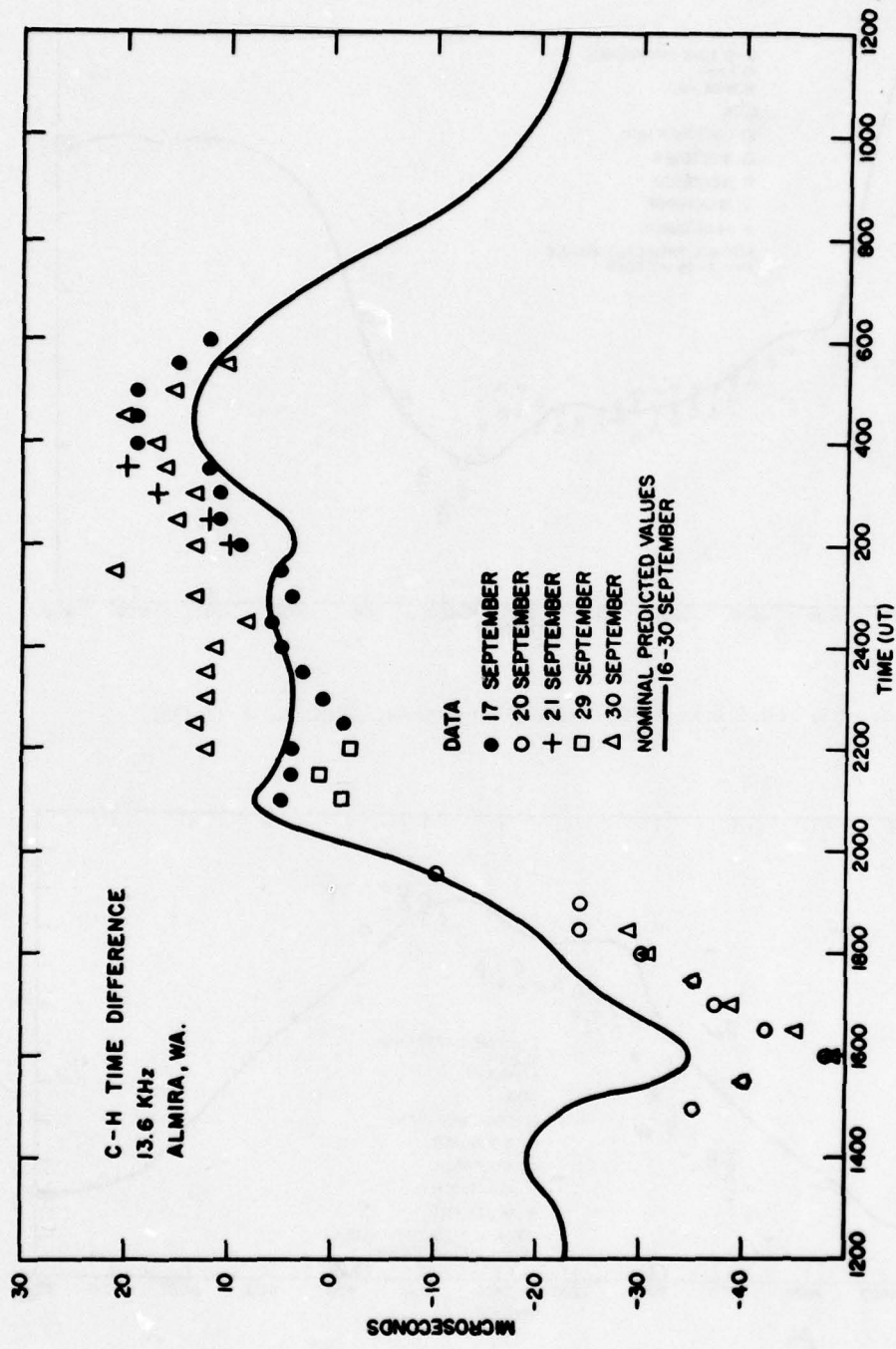


Figure 32. 13.6 kHz (C-H) Time Differences, Almiria, 16-30 Sept

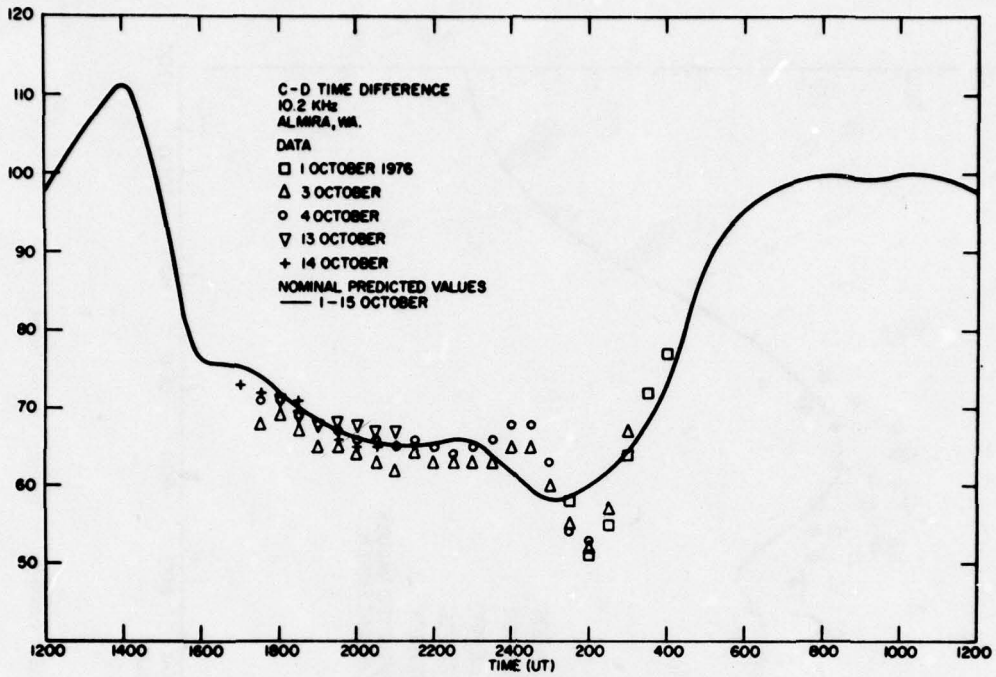


Figure 33. 10.2 kHz (C-D) Time Differences, Almira, 1-15 Oct

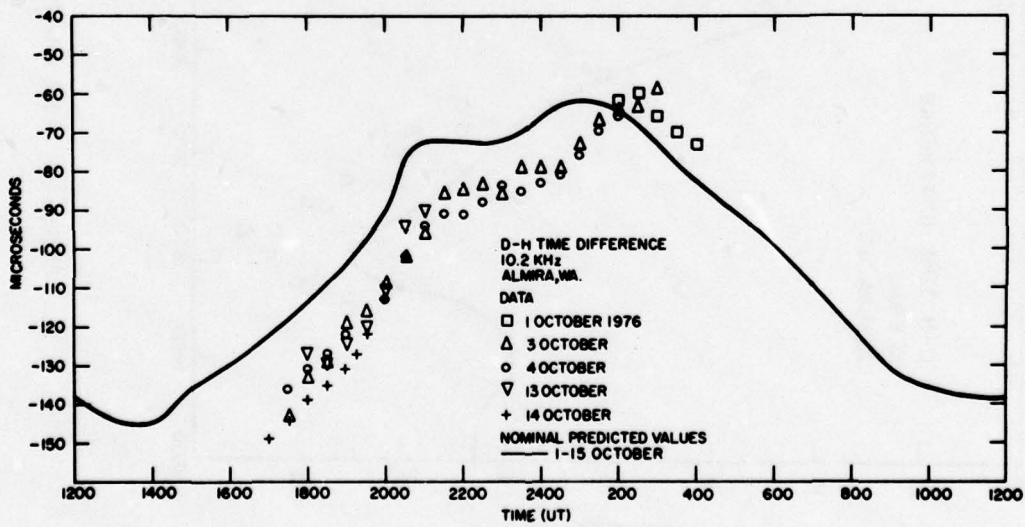


Figure 34. 10.2 kHz (D-H) Time Differences, Almira, 1-15 Oct

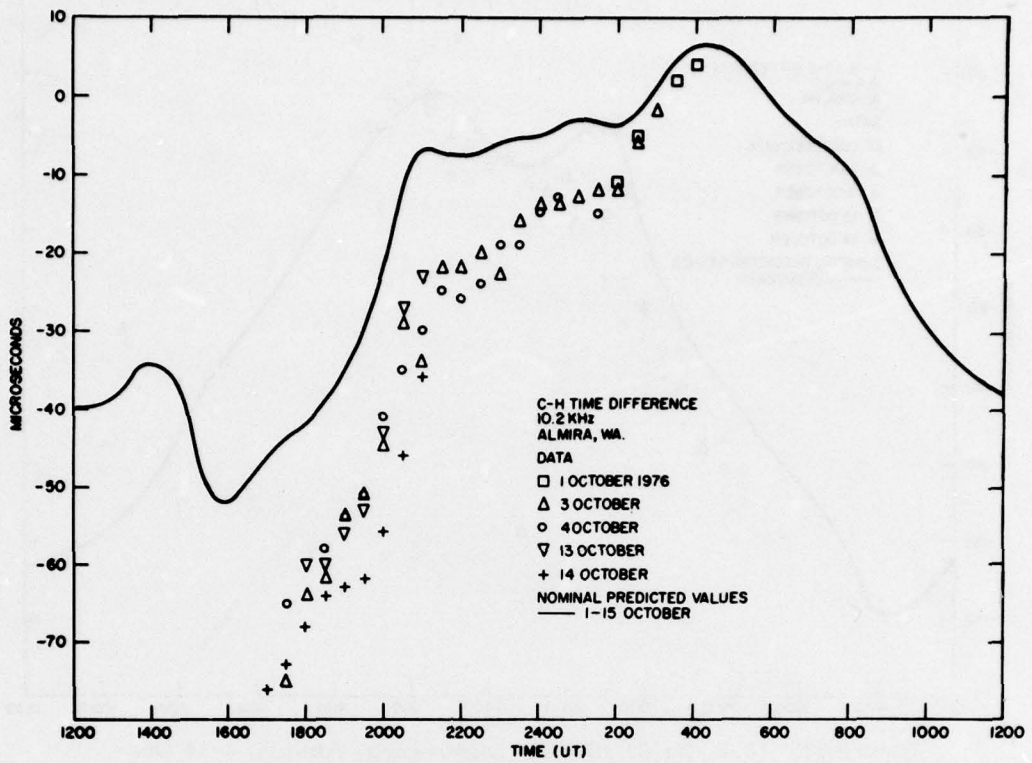


Figure 35. 10.2 kHz (C-H) Time Differences, Almira, 1-15 Oct

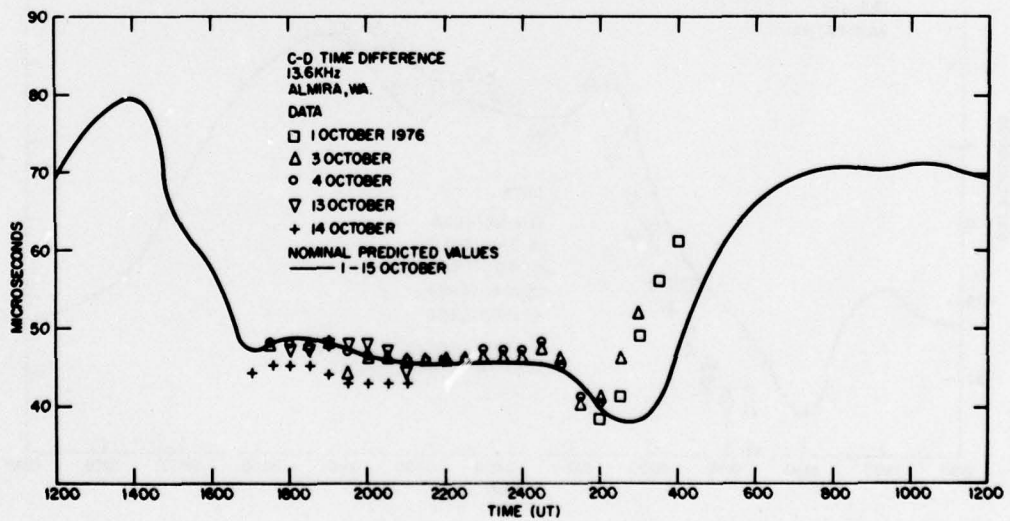


Figure 36. 13.6 kHz (C-D) Time Differences, Almira, 1-15 Oct

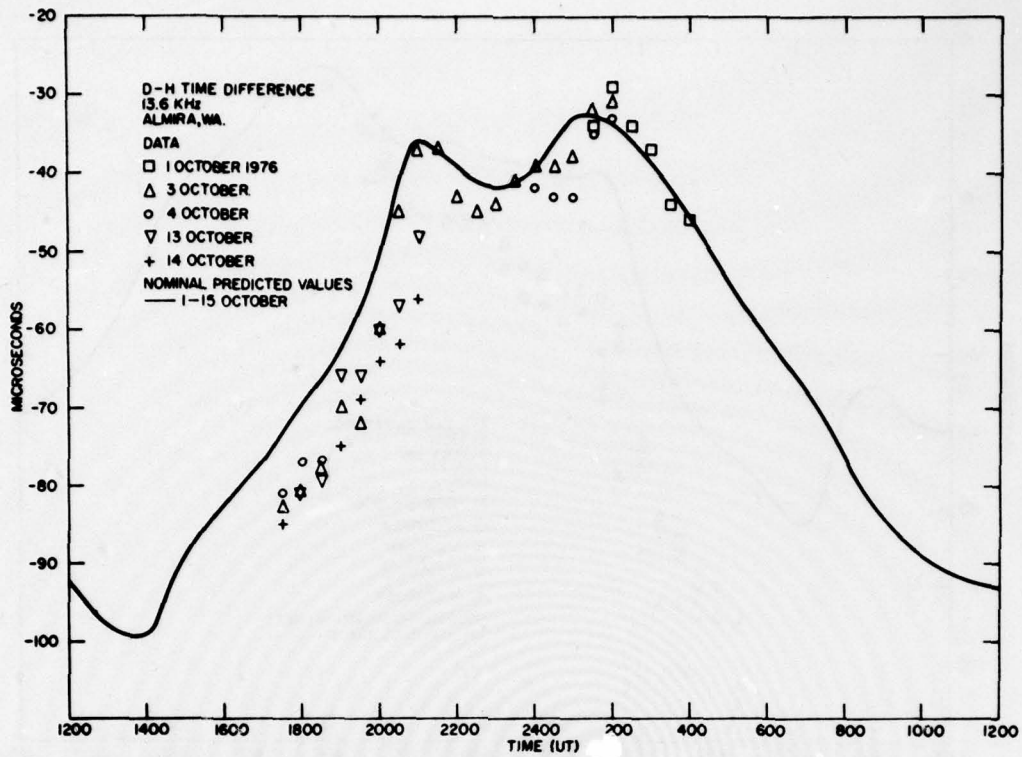


Figure 37. 13.6 kHz (D-H) Time Differences, Almira, 1-15 Oct

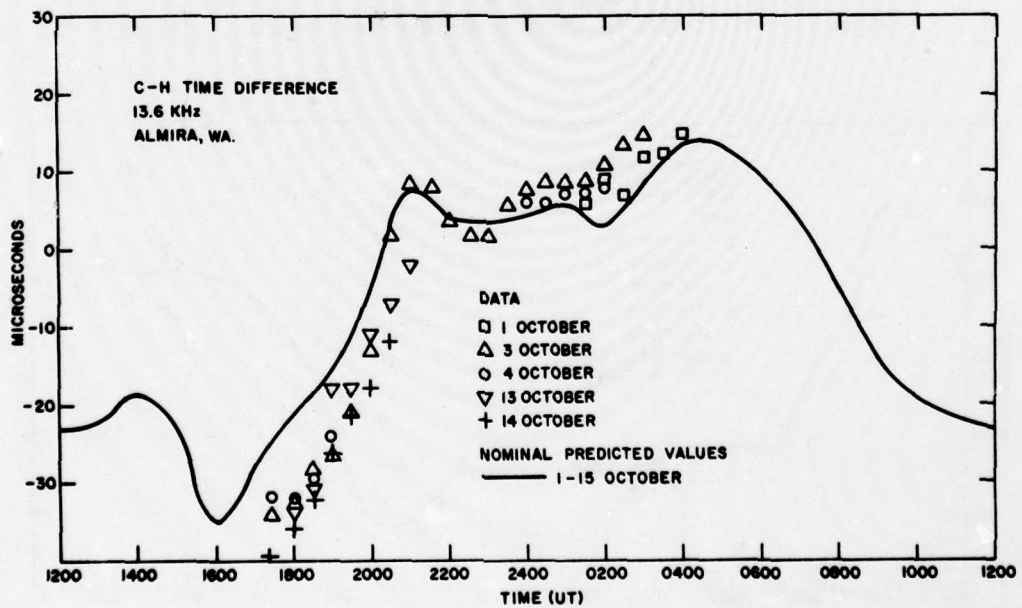


Figure 38. 13.6 kHz (C-H) Time Differences, Almira, 1-15 Oct

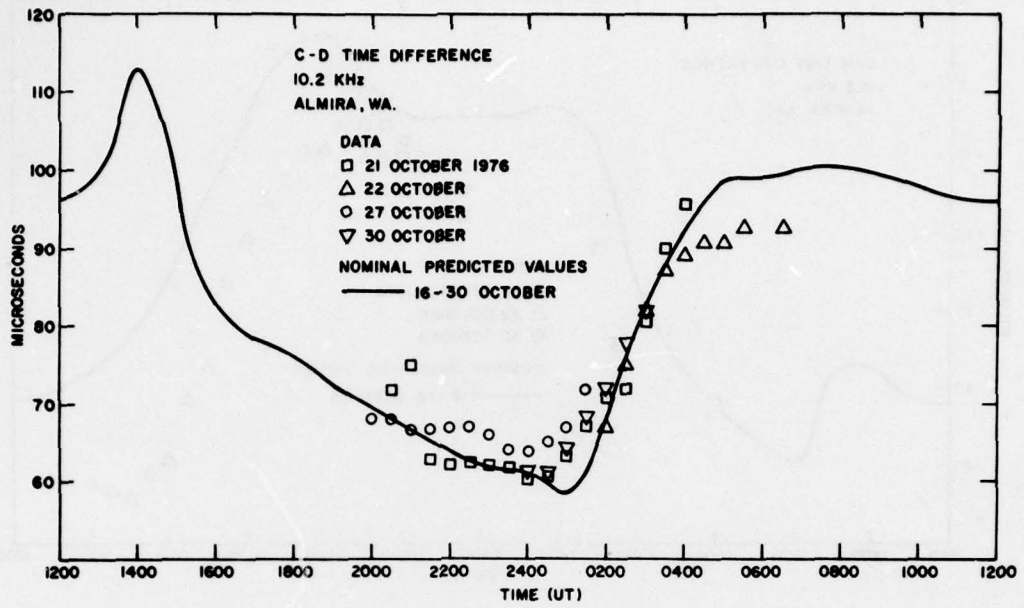


Figure 39. 10.2 kHz (C-D) Time Differences, Almira, 16-31 Oct

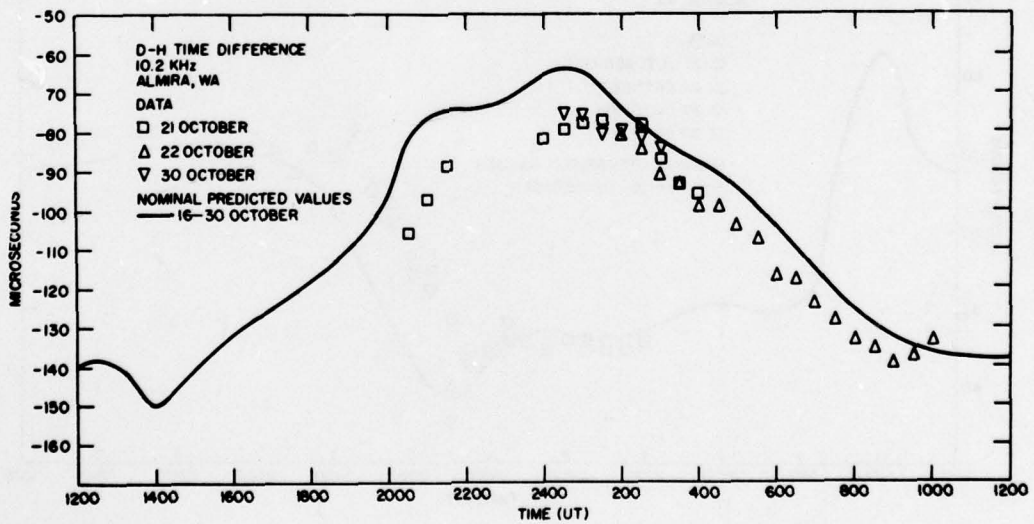


Figure 40. 10.2 kHz (D-H) Time Differences, Almira, 16-31 Oct

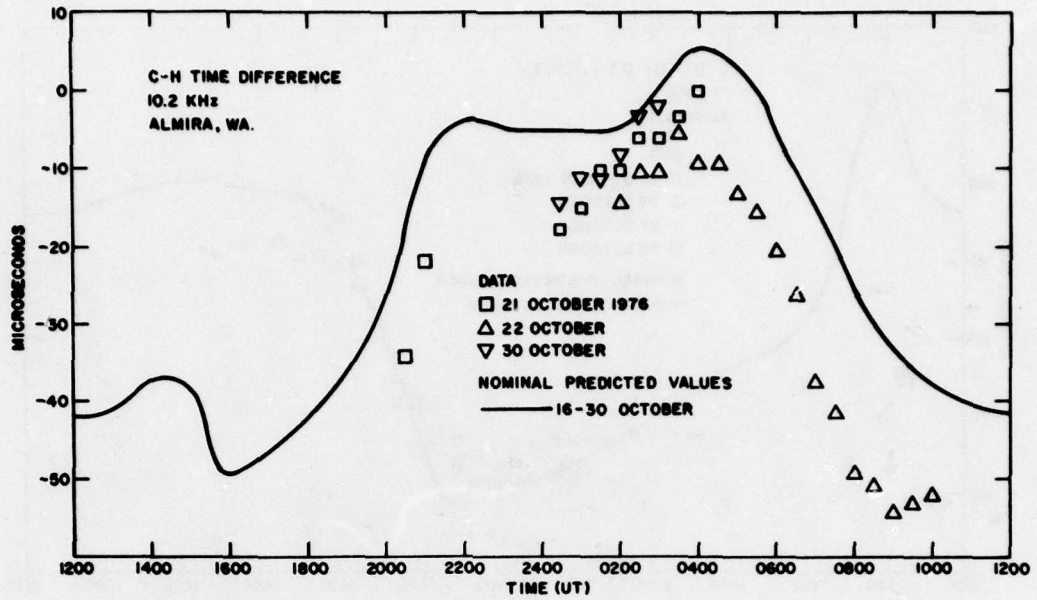


Figure 41. 10.2 kHz (C-H) Time Differences, Almira, 16-31 Oct

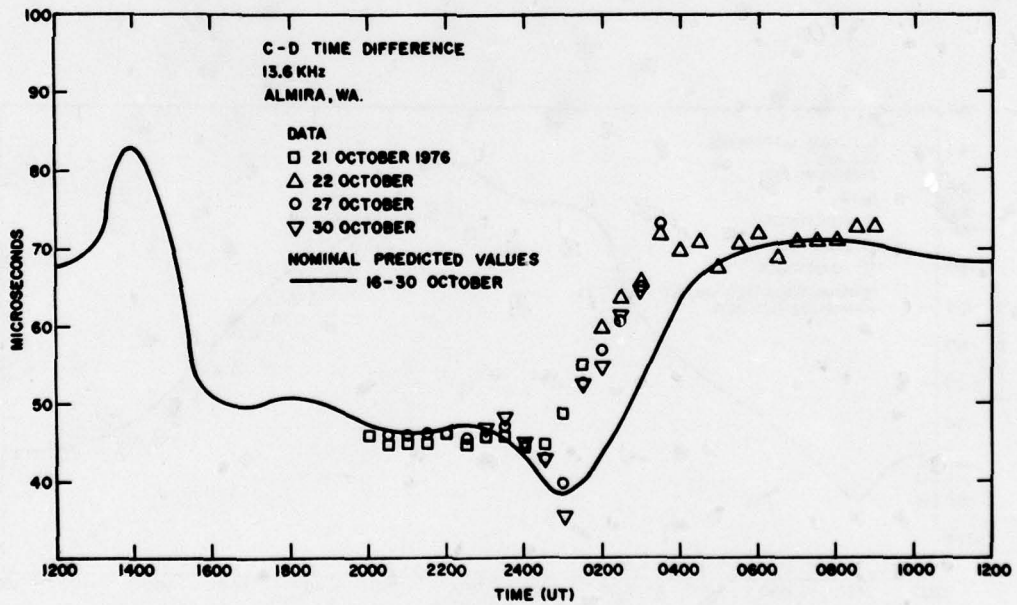


Figure 42. 13.6 kHz (C-D) Time Differences, Almira, 16-31 Oct

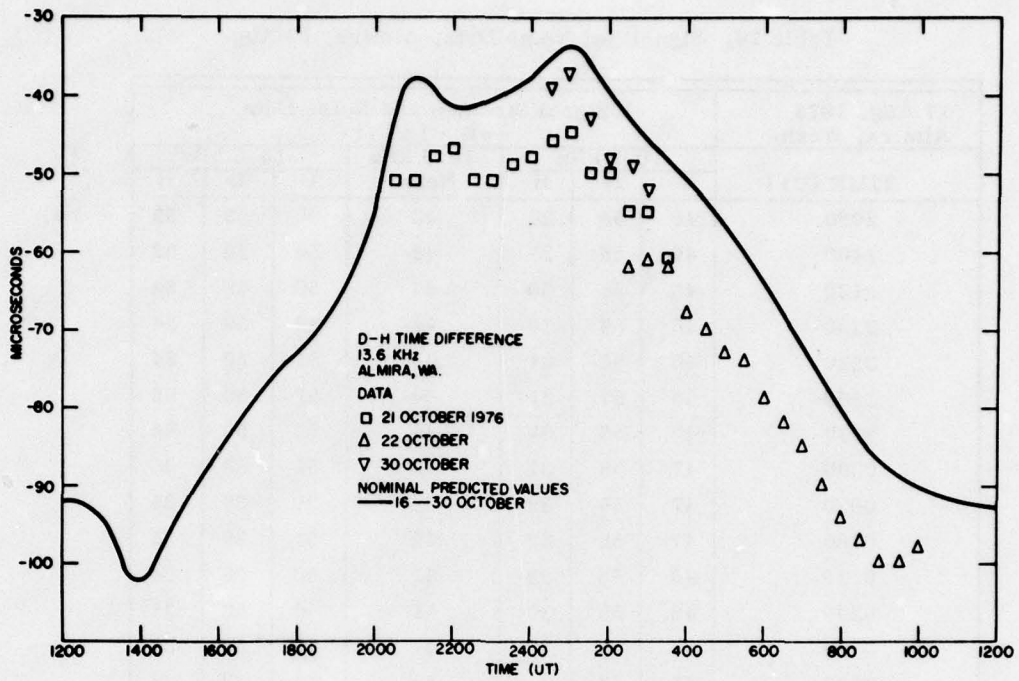


Figure 43. 13.6 kHz (D-H) Time Differences, Almira, 16-31 Oct

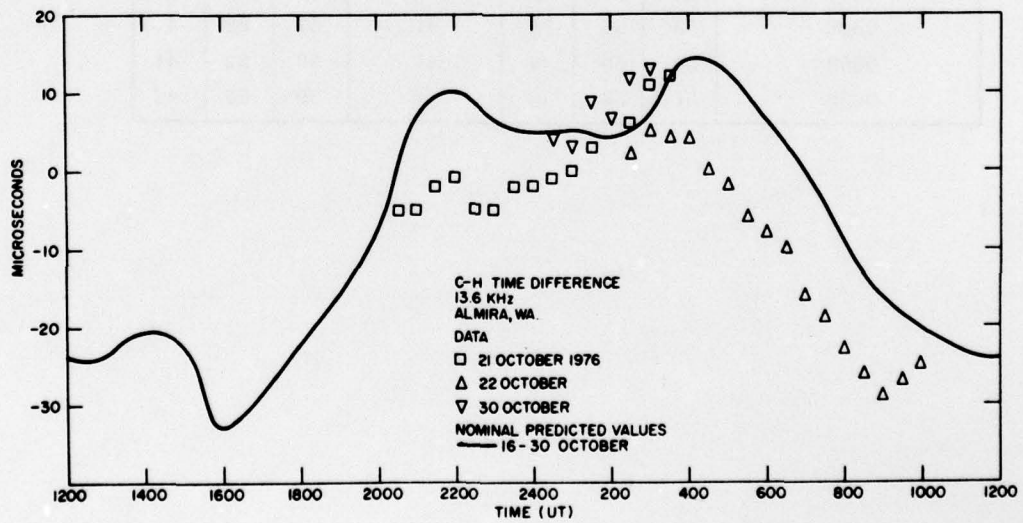


Figure 44. 13.6 kHz (C-H) Time Differences, Almira, 16-31 Oct

Table 10. Signal and Noise Data, Almira, 17 Aug.

| 17 Aug. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| TIME (UT) | | | | | | | |
| 2030 | 46 | 56 | 28 | 43 | 50 | 59 | 32 |
| 2100 | 46 | 56 | 27 | 43 | 50 | 59 | 32 |
| 2130 | 46 | 56 | 30 | 44 | 50 | 59 | 34 |
| 2200 | 46 | 56 | 30 | 44 | 50 | 59 | 34 |
| 2230 | 46 | 56 | 31 | 44 | 51 | 59 | 34 |
| 2300 | 46 | 57 | 31 | 44 | 51 | 59 | 35 |
| 2330 | 47 | 56 | 31 | 44 | 51 | 59 | 35 |
| 0000 | 47 | 56 | 31 | 43 | 51 | 59 | 35 |
| 0030 | 47 | 56 | 32 | 44 | 51 | 59 | 35 |
| 0100 | 47 | 56 | 32 | 42 | 51 | 59 | 35 |
| 0130 | 46 | 55 | 32 | 41 | 50 | 58 | 34 |
| 0200 | 46 | 55 | 30 | 41 | 50 | 58 | 35 |
| 0230 | 46 | 56 | 30 | 41 | 49 | 58 | 35 |
| 0300 | 45 | 57 | 31 | 41 | 48 | 58 | 35 |
| 0330 | 45 | 57 | 31 | 41 | 48 | 60 | 36 |
| 0400 | 45 | 57 | 33 | 40 | 47 | 61 | 38 |
| 0430 | 45 | 56 | 33 | 40 | 48 | 60 | 39 |
| 0500 | 49 | 56 | 33 | 40 | 50 | 61 | 41 |
| 0530 | 52 | 56 | 35 | 41 | 50 | 62 | 41 |
| 0600 | 50 | 59 | 36 | 41 | 50 | 62 | 41 |
| 0630 | 51 | 58 | 35 | 40 | 50 | 62 | 42 |

Table 11. Signal and Noise Data, Almira, 20 Aug.

| 20 Aug. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|-------------------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz Noise | 13.6 kHz | | |
| | C | D | H | | C | D | H |
| 0200 | 46 | 54 | 29 | 42 | 50 | 57 | 35 |
| 0230 | 45 | 54 | 29 | 42 | 50 | 58 | 35 |
| 0300 | 45 | 56 | 31 | 43 | 48 | 57 | 35 |
| 0330 | 44 | 56 | 31 | 43 | 47 | 58 | 35 |
| 0400 | 44 | 56 | 29 | 43 | 45 | 59 | 38 |
| 0430 | 45 | 56 | 33 | 44 | 47 | 60 | 40 |
| 0500 | 48 | 58 | 36 | 43 | 50 | 62 | 42 |
| 0530 | 50 | 56 | 34 | 45 | 50 | 62 | 42 |
| 0600 | 50 | 55 | 36 | 43 | 50 | 61 | 43 |
| 0630 | 49 | 56 | 37 | 45 | 51 | 62 | 44 |
| 0700 | 50 | 58 | 37 | 46 | 53 | 61 | 44 |

Table 12. Signal and Noise Data, Almira, 21 Aug.

| 21 Aug. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|-------------------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz Noise | 13.6 kHz | | |
| | C | D | H | | C | D | H |
| 0000 | 46 | 56 | 31 | 39 | 50 | 58 | 35 |
| 0030 | 46 | 56 | 32 | 39 | 50 | 58 | 35 |
| 0100 | 46 | 56 | 31 | 37 | 50 | 58 | 35 |
| 0130 | 46 | 56 | 31 | 38 | 50 | 58 | 35 |
| 0200 | 46 | 55 | 33 | 39 | 50 | 58 | 35 |
| 0230 | 45 | 54 | 30 | 39 | 50 | 57 | 35 |
| 0300 | 45 | 57 | 31 | 39 | 50 | 57 | 35 |
| 0330 | 44 | 57 | 33 | 40 | 48 | 60 | 35 |
| 0400 | 44 | 58 | 31 | 39 | 45 | 61 | 38 |
| 0430 | 46 | 58 | 32 | 40 | 48 | 62 | 40 |
| 0500 | 49 | 58 | 33 | 39 | 50 | 61 | 42 |
| 0530 | 51 | 57 | 35 | 39 | 50 | 60 | 42 |
| 0600 | 49 | 54 | 36 | 39 | 51 | 60 | 42 |

Table 13. Signal and Noise Data, Almira, 27 Aug.

| 27 Aug. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|-------------------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz Noise | 13.6 kHz | | |
| | C | D | H | | C | D | H |
| 0100 | 47 | 55 | 26 | 38 | 49 | 57 | 25 |
| 0130 | 48 | 55 | 25 | 37 | 49 | 57 | 28 |
| 0200 | 47 | 55 | 26 | 38 | 48 | 57 | 27 |
| 0230 | 47 | 56 | 26 | 38 | 48 | 57 | 26 |
| 0300 | 46 | 57 | 26 | 38 | 48 | 57 | 26 |
| 0330 | 45 | 57 | 30 | 37 | 47 | 56 | 33 |

Table 14. Signal and Noise Data, Almira, 1 Sept.

| 1 Sept. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|-------------------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz Noise | 13.6 kHz | | |
| | C | D | H | | C | D | H |
| 1900 | 47 | 56 | 30 | 40 | 50 | 57 | 30 |
| 1930 | 47 | 56 | 30 | 39 | 50 | 58 | 32 |
| 2000 | 47 | 56 | 29 | 39 | 50 | 57 | 30 |
| 2030 | 47 | 55 | 27 | 39 | 50 | 57 | 28 |
| 2100 | 47 | 55 | 28 | 39 | 50 | 57 | 30 |
| 2130 | 47 | 55 | 28 | 38 | 50 | 57 | 30 |
| 2200 | 47 | 55 | 30 | 38 | 51 | 57 | 31 |
| 2230 | 47 | 55 | 30 | 39 | 50 | 57 | 31 |
| 2300 | 47 | 55 | 32 | 39 | 51 | 57 | 35 |
| 2330 | 46 | 55 | 31 | 38 | 50 | 58 | 33 |
| 0000 | 47 | 55 | 31 | 38 | 50 | 57 | 33 |
| 0030 | 47 | 55 | 30 | 38 | 49 | 57 | 33 |
| 0100 | 47 | 55 | 30 | 39 | 49 | 57 | 33 |
| 0130 | 47 | 55 | 30 | 38 | 49 | 57 | 33 |
| 0200 | 48 | 55 | 31 | 39 | 50 | 57 | 35 |
| 0230 | 47 | 56 | 30 | 40 | 49 | 56 | 35 |

Table 15. Signal and Noise Data, Almira, 3 Sept.

| 3 Sept. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 1630 | 45 | 55 | 33 | 33 | 46 | 57 | 36 |
| 1700 | 45 | 56 | 33 | 32 | 47 | 57 | 33 |
| 1730 | 46 | 56 | 35 | 32 | 48 | 57 | 32 |
| 1800 | 47 | 56 | 30 | 32 | 48 | 57 | 32 |
| 1830 | 47 | 55 | 30 | 33 | 49 | 57 | 30 |
| 1900 | 47 | 55 | 27 | 34 | 50 | 57 | 25 |
| 1930 | 47 | 55 | 27 | 36 | 50 | 57 | 27 |
| 2000 | 47 | 55 | 26 | 36 | 50 | 57 | 27 |
| 2030 | 47 | 55 | 23 | 37 | 50 | 57 | 22 |
| 2100 | 47 | 55 | 27 | 37 | 50 | 57 | 29 |
| 2130 | 47 | 56 | 28 | 37 | 50 | 57 | 29 |
| 2200 | 47 | 56 | 30 | 37 | 50 | 57 | 31 |
| 2230 | 47 | 55 | 30 | 38 | 50 | 57 | 33 |
| 2300 | 48 | 55 | 31 | 37 | 50 | 57 | 32 |
| 2330 | 47 | 55 | 30 | 36 | 50 | 57 | 32 |
| 0000 | 47 | 55 | 31 | 36 | 50 | 57 | 33 |
| 0030 | 47 | 55 | 32 | 36 | 49 | 57 | 33 |
| 0100 | 46 | 55 | 30 | 36 | 49 | 57 | 33 |
| 0130 | 46 | 55 | 30 | 34 | 49 | 57 | 33 |
| 0200 | 46 | 55 | 30 | 35 | 48 | 57 | 34 |
| 0230 | 46 | 56 | 31 | 36 | 48 | 56 | 35 |

Table 16. Signal and Noise Data, Almira, 10 Sept.

| 10 Sept. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | | |
|--------------------------------|--|----------|----|----|----------|----------|----|---|
| | TIME (UT) | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | | C | D | H | Noise | C | D | H |
| 1630 | 45 | 55 | 25 | 37 | 45 | 57 | 30 | |
| 1700 | 45 | 55 | 25 | 37 | 46 | 57 | 29 | |
| 1730 | 46 | 55 | 25 | 37 | 47 | 57 | 20 | |
| 1800 | 47 | 55 | 23 | 37 | 48 | 57 | 17 | |
| 1830 | 47 | 55 | 22 | 35 | 49 | 57 | 18 | |
| 1900 | 47 | 55 | 20 | 34 | 49 | 58 | 17 | |
| 1930 | 47 | 55 | 16 | 33 | 49 | 57 | 17 | |
| 2000 | 47 | 55 | 10 | 33 | 49 | 57 | 17 | |
| 2030 | 47 | 55 | 7 | 32 | 49 | 57 | 17 | |
| 2100 | 47 | 55 | 7 | 32 | 49 | 57 | 17 | |
| 2130 | 47 | 54 | 13 | 32 | 49 | 57 | 17 | |
| 2200 | 47 | 54 | 17 | 31 | 49 | 57 | 17 | |
| 2230 | 47 | 54 | 16 | 31 | 50 | 57 | 17 | |
| 2300 | 47 | 54 | 17 | 33 | 50 | 57 | 17 | |
| 2330 | 48 | 54 | 18 | 32 | 50 | 57 | 17 | |
| 0000 | 47 | 54 | 16 | 31 | 50 | 57 | 17 | |
| 0030 | 47 | 54 | 17 | 31 | 50 | 57 | 17 | |
| 0100 | 46 | 53 | 15 | 31 | 49 | 57 | 17 | |
| 0130 | 46 | 53 | 14 | 32 | 49 | 56 | 17 | |

Table 17. Signal and Noise Data, Almira, 14 Sept.

| 14 Sept. 1976 Almira, Wash. | Signal Strength and Noise Data db > 1 μ V/m | | | | | | | |
|--------------------------------|--|----------|----|----|----------|----------|----|---|
| | TIME (UT) | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | | C | D | H | Noise | C | D | H |
| 2200 | 48 | 54 | 27 | 41 | 50 | 58 | 30 | |
| 2230 | 48 | 54 | 29 | 41 | 50 | 57 | 31 | |
| 2300 | 48 | 54 | 28 | 41 | 49 | 57 | 32 | |
| 2330 | 48 | 54 | 26 | 41 | 50 | 57 | 32 | |
| 0000 | 48 | 54 | 28 | 41 | 50 | 57 | 30 | |

Table 18. Signal and Noise Data, Almira, 15 Sept.

| 15 Sept. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|--------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 2030 | 47 | 55 | 25 | 38 | 49 | 57 | 26 |
| 2100 | 47 | 55 | 28 | 39 | 49 | 57 | 30 |
| 2130 | 47 | 55 | 27 | 39 | 50 | 57 | 30 |
| 2200 | 47 | 54 | 29 | 40 | 50 | 57 | 30 |
| 2230 | 47 | 54 | 27 | 42 | 50 | 57 | 32 |
| 2300 | 47 | 54 | 30 | 41 | 50 | 57 | 33 |
| 2330 | 47 | 54 | 31 | 40 | 50 | 57 | 33 |
| 0000 | 47 | 54 | 30 | 40 | 50 | 57 | 32 |
| 0030 | 47 | 54 | 31 | 42 | 49 | 57 | 33 |
| 0100 | 47 | 54 | 30 | 42 | 49 | 57 | 33 |
| 0130 | 47 | 54 | 29 | 40 | 49 | 56 | 33 |
| 0200 | 46 | 54 | 31 | 40 | 49 | 56 | 35 |
| 0230 | 45 | 56 | 29 | 41 | 48 | 57 | 34 |
| 0300 | 44 | 56 | 30 | 41 | 47 | 59 | 36 |
| 0330 | 46 | 56 | 32 | 40 | 47 | 60 | 39 |

Table 19. Signal and Noise Data, Almira, 17 Sept.

| 17 Sept. 1976 Almira, Wash. | Signal Strength and Noise Data db > 1 μ V/m | | | | | | | |
|--------------------------------|--|----------|----|----|-------------------|----------|----|---|
| | TIME (UT) | 10.2 kHz | | | 10.6 kHz Noise | 13.6 kHz | | |
| | | C | D | H | | C | D | H |
| 2100 | 48 | 55 | 30 | 40 | 49 | 58 | 29 | |
| 2130 | 48 | 55 | 30 | 40 | 49 | 57 | 30 | |
| 2200 | 48 | 55 | 29 | 42 | 49 | 58 | 30 | |
| 2230 | 48 | 55 | 30 | 42 | 49 | 58 | 32 | |
| 2300 | 48 | 55 | 31 | 42 | 49 | 57 | 31 | |
| 2330 | 47 | 55 | 31 | 42 | 49 | 57 | 34 | |
| 0000 | 47 | 55 | 31 | 42 | 49 | 57 | 35 | |
| 0030 | 47 | 54 | 32 | 42 | 49 | 57 | 35 | |
| 0100 | 47 | 54 | 30 | 42 | 49 | 57 | 32 | |
| 0130 | 47 | 54 | 31 | 42 | 49 | 56 | 33 | |
| 0200 | 47 | 55 | 33 | 41 | 49 | 56 | 33 | |
| 0230 | 46 | 56 | 31 | 42 | 48 | 56 | 35 | |
| 0300 | 45 | 55 | 30 | 42 | 47 | 58 | 37 | |
| 0330 | 45 | 55 | 30 | 42 | 47 | 60 | 40 | |
| 0400 | 47 | 56 | 32 | 43 | 48 | 60 | 40 | |
| 0430 | 50 | 55 | 34 | 42 | 49 | 60 | 40 | |
| 0500 | 50 | 55 | 36 | 42 | 49 | 60 | 41 | |
| 0530 | 49 | 55 | 38 | 39 | 50 | 60 | 41 | |
| 0600 | 49 | 52 | 37 | 40 | 51 | 59 | 41 | |

Table 20. Signal and Noise Data, Almira, 20 Sept.

| 20 Sept. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | | |
|--------------------------------|--|----------|----|----|----------|----------|----|---|
| | TIME (UT) | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | | C | D | H | Noise | C | D | H |
| 1400 | 51 | 55 | 39 | 31 | 50 | 57 | 39 | |
| 1430 | 50 | 55 | 39 | 32 | 52 | 57 | 39 | |
| 1500 | 47 | 54 | 37 | 33 | 47 | 57 | 36 | |
| 1530 | 45 | 54 | 36 | 32 | 48 | 57 | 37 | |
| 1600 | 42 | 55 | 35 | 32 | 45 | 57 | 37 | |
| 1630 | 44 | 55 | 34 | 31 | 47 | 57 | 33 | |
| 1700 | 46 | 55 | 32 | 32 | 48 | 57 | 34 | |
| 1730 | 45 | 55 | 31 | 32 | 48 | 57 | 33 | |
| 1800 | 47 | 55 | 31 | 33 | 49 | 57 | 30 | |
| 1830 | 46 | 55 | 30 | 33 | 49 | 57 | 32 | |
| 1900 | 47 | 55 | 29 | 33 | 49 | 58 | 30 | |
| 1930 | 48 | 55 | 29 | 33 | 49 | 58 | 18 | |

Table 21. Signal and Noise Data, Almira, 21 Sept.

| 21 Sept. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | | |
|--------------------------------|--|----------|----|----|----------|----------|----|---|
| | TIME (UT) | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | | C | D | H | Noise | C | D | H |
| 0200 | 47 | 55 | 30 | 40 | 48 | 58 | 31 | |
| 0230 | 47 | 55 | 33 | 40 | 48 | 57 | 31 | |
| 0300 | 46 | 57 | 33 | 40 | 47 | 55 | 38 | |
| 0330 | 47 | 58 | 33 | 41 | 46 | 56 | 40 | |
| 0400 | 49 | 58 | 33 | 41 | 47 | 54 | 38 | |
| 0430 | 52 | 58 | 32 | 41 | 49 | 56 | 41 | |
| 0500 | 52 | 58 | 32 | 40 | 49 | 55 | 40 | |

Table 22. Signal and Noise Data, Almira, 29 Sept.

| 29 Sept. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | | |
|--------------------------------|--|----------|----|----|----------|----------|----|---|
| | TIME (UT) | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | | C | D | H | Noise | C | D | H |
| 2100 | 46 | 55 | -- | 32 | 45 | 54 | -- | |
| 2130 | 46 | 56 | 23 | 32 | 45 | 53 | -- | |
| 2200 | 46 | 56 | 24 | 33 | 44 | 53 | -- | |

Table 23. Signal and Noise Data, Almira, 30 Sept.

| 30 Sept. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|--------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 1530 | 44 | 54 | 9 | 31 | 43 | 52 | 33 |
| 1600 | 41 | 54 | 9 | 31 | 39 | 53 | 33 |
| 1630 | 43 | 55 | 9 | 31 | 42 | 53 | 33 |
| 1700 | 44 | 55 | 9 | 31 | 42 | 53 | 31 |
| 1730 | 45 | 55 | 9 | 32 | 42 | 53 | 31 |
| 1800 | 46 | 56 | 9 | 33 | 43 | 53 | 29 |
| 1830 | 46 | 56 | 9 | 33 | 43 | 53 | 21 |
| 1900 | 47 | 55 | 9 | 32 | 43 | 53 | 24 |
| 1930 | 47 | 55 | 9 | 32 | 44 | 53 | -- |
| 2000 | 47 | 55 | 9 | 33 | 44 | 53 | -- |
| 2030 | 47 | 55 | 9 | 32 | 44 | 53 | -- |
| 2100 | 47 | 55 | 9 | 32 | 44 | 53 | -- |
| 2130 | 47 | 55 | 9 | 32 | 44 | 53 | -- |
| 2200 | 46 | 55 | 9 | 31 | 44 | 53 | -- |
| 2230 | 46 | 54 | 9 | 32 | 44 | 52 | 24 |
| 2300 | 46 | 54 | 9 | 33 | 44 | 52 | 24 |
| 2330 | 46 | 54 | 10 | 33 | 44 | 52 | 27 |
| 0000 | 46 | 54 | 10 | 32 | 44 | 52 | 27 |
| 0030 | 46 | 53 | 10 | 31 | 44 | 52 | 26 |
| 0100 | 45 | 53 | 9 | 32 | 44 | 52 | 26 |
| 0130 | 44 | 55 | 9 | 33 | 43 | 51 | 28 |
| 0200 | 44 | 56 | 9 | 35 | 42 | 53 | 27 |
| 0230 | 44 | 56 | 9 | 35 | 40 | 54 | 29 |
| 0300 | 45 | 57 | 11 | 36 | 42 | 54 | 31 |
| 0330 | 47 | 56 | 10 | 36 | 43 | 55 | 31 |
| 0400 | 49 | 55 | 10 | 37 | 46 | 56 | 33 |
| 0430 | 51 | 54 | 10 | 36 | 46 | 56 | 34 |
| 0500 | 50 | 55 | 9 | 35 | 44 | 54 | 34 |
| 0530 | 49 | 56 | 9 | 36 | 45 | 55 | 35 |

Table 24. Signal and Noise Data, Almira, 1 Oct.

| 1 Oct. 1976 Almira, Wash. | Signal Strength and Noise Data db > 1 μ V/m | | | | | | |
|------------------------------|--|----|----|-------------------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz Noise | 13.6 kHz | | |
| | C | D | H | | C | D | H |
| 0130 | 46 | 56 | 27 | 38 | 43 | 52 | 25 |
| 0200 | 44 | 56 | 12 | 39 | 42 | 54 | 25 |
| 0230 | 43 | 55 | 17 | 36 | 40 | 54 | 27 |
| 0300 | 45 | 55 | 14 | 36 | 42 | 54 | 31 |
| 0330 | 47 | 56 | 12 | 36 | 43 | 54 | 33 |
| 0400 | 48 | 55 | 9 | 37 | 44 | 55 | 33 |

Table 25. Signal and Noise Data, Almira, 3 Oct.

| 3 Oct. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|------------------------------|--|----|----|-------------------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz Noise | 13.6 kHz | | |
| | C | D | H | | C | D | H |
| 1730 | 46 | 55 | 10 | 32 | 41 | 53 | 27 |
| 1800 | 46 | 55 | 9 | 31 | 42 | 53 | 27 |
| 1830 | 46 | 55 | 9 | 30 | 43 | 53 | 17 |
| 1900 | 47 | 55 | 9 | 31 | 43 | 53 | 16 |
| 1930 | 47 | 55 | 9 | 32 | 44 | 53 | 16 |
| 2000 | 47 | 55 | 9 | 31 | 44 | 53 | 16 |
| 2030 | 47 | 55 | 9 | 32 | 44 | 53 | 16 |
| 2100 | 47 | 55 | 9 | 31 | 44 | 53 | 16 |
| 2130 | 47 | 55 | 9 | 31 | 44 | 53 | 16 |
| 2200 | 43 | 55 | 9 | 31 | 41 | 53 | 16 |
| 2230 | 47 | 55 | 9 | 31 | 44 | 53 | 16 |
| 2300 | 47 | 55 | 9 | 31 | 44 | 53 | 16 |
| 2330 | 47 | 54 | 9 | 31 | 44 | 53 | 17 |
| 0000 | 47 | 54 | 9 | 31 | 44 | 52 | 28 |
| 0030 | 46 | 53 | 9 | 32 | 43 | 52 | 28 |
| 0100 | 46 | 53 | 9 | 32 | 43 | 52 | 27 |
| 0130 | 45 | 55 | 9 | 33 | 43 | 51 | 26 |
| 0200 | 43 | 57 | 9 | 35 | 41 | 54 | 28 |
| 0230 | 44 | 57 | 11 | 35 | 40 | 54 | 31 |
| 0300 | 45 | 55 | 11 | 36 | 41 | 55 | 33 |

Table 26. Signal and Noise Data, Almira, 4 Oct.

| 4 Oct. 1976 Almira, Wash. | Signal Strength and Noise Data db > 1 μ V/m | | | | | | |
|------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 1730 | 44 | 55 | 9 | 30 | 41 | 53 | 26 |
| 1800 | 46 | 55 | 9 | 30 | 42 | 53 | 26 |
| 1830 | 47 | 55 | 9 | 33 | 43 | 53 | 27 |
| 1900 | 47 | 55 | 9 | 33 | 44 | 53 | 19 |
| 1930 | 47 | 55 | 9 | 33 | 44 | 53 | 17 |
| 2000 | 47 | 55 | 9 | 33 | 44 | 53 | 16 |
| 2030 | 47 | 55 | 9 | 33 | 44 | 53 | 16 |
| 2100 | 47 | 55 | 10 | 34 | 44 | 53 | 16 |
| 2130 | 46 | 55 | 9 | 33 | 44 | 53 | 16 |
| 2200 | 47 | 55 | 10 | 33 | 44 | 53 | 16 |
| 2230 | 47 | 55 | 11 | 35 | 44 | 53 | 16 |
| 2300 | 47 | 55 | 9 | 35 | 44 | 53 | 17 |
| 2330 | 46 | 54 | 9 | 34 | 44 | 53 | 21 |
| 0000 | 46 | 54 | 9 | 34 | 44 | 52 | 27 |
| 0030 | 46 | 54 | 9 | 34 | 44 | 52 | 25 |
| 0100 | 46 | 53 | 9 | 36 | 44 | 51 | 26 |
| 0130 | 45 | 56 | 10 | 37 | 43 | 52 | 26 |
| 0200 | 44 | 57 | 9 | 39 | 41 | 54 | 26 |

Table 27. Signal and Noise Data, Almira, 13 Oct.

| 13 Oct. 1976 Almira, Wash. | Signal Strength and Noise Data db > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 1800 | 43 | 57 | 30 | 30 | 47 | 56 | 35 |
| 1830 | 43 | 57 | 29 | 30 | 47 | 56 | 33 |
| 1900 | 43 | 57 | 24 | 30 | 47 | 57 | 33 |
| 1930 | 43 | 58 | 24 | 30 | 47 | 57 | 33 |
| 2000 | 43 | 58 | 20 | 30 | 47 | 56 | 33 |
| 2030 | 43 | 56 | 15 | 30 | 47 | 56 | 34 |
| 2100 | 43 | 56 | 14 | 30 | 47 | 56 | 33 |

Table 28. Signal and Noise Data, Almira, 14 Oct.

| 14 Oct. 1976 Almira, Wash. | Signal Strength and Noise Data db > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|-------------------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz Noise | 13.6 kHz | | |
| | C | D | H | | C | D | H |
| TIME (UT) | | | | | | | |
| 1700 | 41 | 56 | 32 | 32 | 42 | 57 | 34 |
| 1730 | 43 | 56 | 30 | 30 | 44 | 57 | 33 |
| 1800 | 43 | 57 | 29 | 30 | 45 | 57 | 33 |
| 1830 | 44 | 57 | 29 | 30 | 46 | 57 | 33 |
| 1900 | 43 | 57 | 24 | 30 | 47 | 57 | 33 |
| 1930 | 43 | 57 | -- | 30 | 47 | 57 | 33 |
| 2000 | 43 | 57 | -- | 30 | 47 | 57 | 33 |
| 2030 | 43 | 56 | -- | 30 | 47 | 57 | 33 |
| 2100 | 44 | 56 | -- | 30 | 47 | 57 | 33 |

Table 29. Signal and Noise Data, Almira, 21 Oct.

| 21 Oct. 1976 Almira, Wash. | Signal Strength and Noise Data db > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|-------------------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz Noise | 13.6 kHz | | |
| | C | D | H | | C | D | H |
| TIME (UT) | | | | | | | |
| 2030 | 28 | 57 | 25 | 36 | 52 | 58 | 27 |
| 2100 | 28 | 56 | 22 | 36 | 52 | 58 | 27 |
| 2130 | 28 | 56 | 23 | 36 | 52 | 57 | 27 |
| 2200 | 47 | 56 | 23 | 36 | 52 | 57 | 27 |
| 2230 | 46 | 55 | 25 | 36 | 52 | 56 | 27 |
| 2300 | 46 | 55 | 26 | 36 | 51 | 56 | 32 |
| 2330 | 46 | 55 | 28 | 36 | 51 | 56 | 35 |
| 0000 | 46 | 55 | 28 | 36 | 51 | 55 | 35 |
| 0030 | 46 | 58 | 27 | 36 | 50 | 56 | 35 |
| 0100 | 45 | 60 | 26 | 36 | 50 | 56 | 36 |
| 0130 | 45 | 61 | 27 | 36 | 49 | 58 | 36 |
| 0200 | 46 | 60 | 29 | 36 | 50 | 59 | 37 |
| 0230 | 47 | 59 | 30 | 36 | 50 | 59 | 38 |
| 0300 | 47 | 59 | 31 | 36 | 51 | 58 | 39 |
| 0330 | 49 | 60 | 32 | 36 | 52 | 56 | 40 |
| 0400 | 51 | 60 | 33 | 36 | -- | -- | -- |

Table 30. Signal and Noise Data, Almira, 22 Oct.

| 22 Oct. 1976 Almira, Wash. | Signal Strength and Noise Data db > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 0200 | 45 | 61 | 27 | 36 | 43 | 62 | 27 |
| 0230 | 46 | 61 | 27 | 36 | 45 | 60 | 27 |
| 0300 | 48 | 60 | 29 | 37 | 52 | 59 | 37 |
| 0330 | 50 | 59 | 30 | 37 | 52 | 59 | 39 |
| 0400 | 51 | 58 | 30 | 37 | 53 | 61 | 38 |
| 0430 | 52 | 58 | 26 | 36 | 52 | 62 | 36 |
| 0500 | 50 | 58 | 28 | 36 | 52 | 62 | 37 |
| 0530 | 51 | 57 | 30 | 36 | 51 | 60 | 38 |
| 0600 | 52 | 58 | 33 | 36 | 49 | 59 | 40 |
| 0630 | 52 | 56 | 34 | 36 | 47 | 60 | 40 |
| 0700 | 50 | 56 | 33 | 36 | 47 | 60 | 40 |
| 0730 | 50 | 55 | 33 | 36 | 51 | 61 | 41 |
| 0800 | 49 | 55 | 35 | 36 | 52 | 60 | 42 |
| 0830 | 49 | 57 | 34 | 36 | 52 | 61 | 43 |
| 0900 | 48 | 56 | 33 | 36 | 51 | 60 | 42 |
| 0930 | 48 | 59 | 33 | 37 | 41 | 61 | 42 |
| 1000 | 49 | 59 | 33 | 37 | 41 | 61 | 40 |

Table 31. Signal and Noise Data, Almira, 27 Oct.

| 27 Oct. 1976 Almira, Wash. | Signal Strength and Noise Data db > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 2000 | 47 | 57 | -- | 24 | 54 | 58 | -- |
| 2030 | 47 | 57 | -- | 26 | 53 | 58 | -- |
| 2100 | 47 | 56 | -- | 30 | 54 | 58 | -- |
| 2130 | 46 | 56 | -- | 30 | 54 | 57 | -- |
| 2200 | 46 | 56 | -- | 29 | 54 | 56 | -- |
| 2230 | 46 | 56 | -- | 29 | 53 | 56 | -- |
| 2300 | 46 | 56 | -- | 26 | 53 | 55 | -- |
| 2330 | 46 | 55 | -- | 26 | 53 | 54 | -- |
| 0000 | 46 | 57 | -- | 29 | 53 | 54 | -- |
| 0030 | 46 | 59 | -- | 26 | 52 | 55 | -- |
| 0100 | 45 | 60 | -- | 26 | 52 | 55 | -- |
| 0130 | 46 | 60 | -- | 26 | 52 | 57 | -- |

Table 32. Signal and Noise Data, Almira, 30 Oct.

| 30 Oct. 1976 Almira, Wash. | Signal Strength and Noise Data dB > 1 μ V/m | | | | | | |
|-------------------------------|--|----|----|----------|----------|----|----|
| | 10.2 kHz | | | 10.6 kHz | 13.6 kHz | | |
| | C | D | H | Noise | C | D | H |
| 2330 | 45 | 55 | 29 | -- | 53 | 55 | 26 |
| 0000 | 45 | 55 | 27 | -- | 53 | 54 | 27 |
| 0030 | 44 | 59 | 28 | -- | 53 | 55 | 33 |
| 0100 | 44 | 59 | 28 | -- | 52 | 54 | 33 |
| 0130 | 44 | 61 | 29 | -- | 51 | 53 | 35 |
| 0200 | 45 | 61 | 29 | -- | 52 | 57 | 36 |
| 0230 | 45 | 61 | 31 | -- | 52 | 57 | 38 |
| 0300 | 46 | 59 | 32 | -- | 53 | 58 | 39 |