TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. NTSB-AAR-77-8	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Aircraft Accident Report - Jet Avia, Ltd. Learjet, LR24B, N12MK, Palm Springs, California, January 6, 1977		5. Report Date October 6, 1977
		6. Performing Organization Code
7. Author(s)		8. Performing organization Report No.
9. Performing Organization Name and Address National Transportation Safety Board Bureau of Accident Investigation Washington, D.C. 20594		10. Work Unit No. 2184
		11. Contract or Grant No.
12. Sponsoring Agency Name and Address **NATIONAL TRANSPORTATION SAFETY BOARD Washington, D. C. 20594**		13. Type of Report and Period Covered Aircraft Accident Report January 6, 1977
		14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

At 1700 P.s.t., on January 6, 1977, a Gates Learjet LR24B, N12MB, crashed in the mountains about 22 miles northwest of Palm Springs, California, at an elevation of about 9,700 feet m.s.l. The aircraft had departed Palm Springs Municipal Airport about 5 minutes earlier and was en route to Las Vegas, Nevada. The flight was operating in instrument meteorological conditions when the accident occurred. The aircraft was on an IFR clearance from Palm Springs, direct Twenty-nine Palms, and thence via the flight plan route. After takeoff from runway 30 the pilot did not turn toward Twenty-nine Palms as cleared, but maintained runway heading until crashing into the mountainside.

The National Transportation Safety Board determines that the probable cause of the accident was the flightcrew's misinterpretation of the instrument flight rules clearance, and subsequent ATC instructions issued by the Palm Springs Departure Control. Contributing to the accident was the controller's failure to detect the aircraft's deviation from the route of flight contained in the ATC clearance and the flightcrew's failure to recognize their proximity to the high terrain.

17. Key Words	18. Distribution Statement
IFR flight; instrument meteorological conditions; maintain runway heading; IFR clearance; misinterpretation of clearance; noncompliance with clearance; failure to detect; deviation from route of flight.	This document is available to the public through the National Technical Information Service, Springfield, Virginia 22152

19. Security Classification (of this report)	20. Security Classification (of this page)	21. No. of Pages	22. Price
UNCLASSIFIED	**UNCLASSIFIED**	32	

NTSB Form 1765.2 (Rev. 9/74)

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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

AIRCRAFT ACCIDENT REPORT

Adopted: October 6, 1977

JET AVIA. LTD. LEARJET
LR24B, N12MK
PALM SPRINGS, CALIFORNIA
JANUARY 6, 1977

SYNOPSIS

At 1700 P.s.t. on January 6, 1977, a Gates Learjet, model 24B, N12MK, operated by Jet Avia as a passenger charter flight, crashed in the mountains 22 miles northwest of Palm Springs, California, at an elevation of about 9,700 feet m.s.l. The aircraft had departed the Palm Springs Municipal Airport about 5 minutes earlier and was en route to Las Vegas, Nevada. The flight was operating in instrument meteorological conditions when it crashed.

The National Transportation Safety Board determines that the probable cause of the accident was the flightcrew's misinterpretation of the instrument flight rules clearance, and subsequent ATC instructions issued by the Palm Springs Departure Control. Contributing to the accident was the controller's failure to detect the aircraft's deviation from the route of flight contained in the ATC clearance and the flightcrew's failure to recognize their proximity to the high terrain.

1. INVESTIGATION

1.1 History of Flight

At 1445 1/, on January 6, 1977, Jet Avia's Learjet LR24B, N12MK, departed Las Vegas, Nevada, on a round trip charter flight with an en route stop at Palm Springs Municipal Airport, California, to pick up passengers. The aircraft arrived at Palm Springs at 1605, and requested that their return IFR clearance be placed on request.

Two passengers boarded, and about 1630 the flight was cleared to taxi to runway 30. At 1635:20, the flightcrew informed the Palm Springs ground controller that they were ready to copy their clearance

1/ All times herein are Pacific standard time based on the 24-hour clock.

and they were cleared, "to the Las Vegas Airport, as filed, via Palm Springs, direct Twenty-nine Palms, climb and maintain one seven thousand, 2/ squawk five one one zero, departure control frequency one two six point seven." The clearance was read back, and the ground controller informed them that the readback was correct.

Shortly thereafter, the flight was informed that its departure would be delayed because of arriving traffic. They were given an estimated departure time of 1645, which was later changed to 1655.

About 1653, the ground controller cleared the flight to the tower frequency. The flight changed frequency and told the Palm Springs local controller they were ready to go. At 1654:10, the local controller cleared N12MK to maintain "niner thousand, cleared for takeoff." At 1655:25, after the aircraft was airborne, the flight was cleared to contact departure control.

The flight contacted Palm Springs departure control at 1655:30, the crew stated that they were "out of" 1,500 ft and climbing to 9,000 ft. The controller requested that they report reaching 9,000 ft. At 1656:00, the departure controller requested the flight to, "report crossing the zero five one radial one zero mile fix." The flight responded, "Okay." At 1656:10, the controller transmitted, "and that's the Palm Springs zero five one radial, sir." Again, the flight responded, "Okay."

At 1656:25, N12MK reported that they had "crossed the radial." Although the controller did not acknowledge this transmission, he entered a checkmark on his flight progress strip denoting that N12MK had reported crossing the 10 nmi fix.

During this time, the controller had been providing service to an inbound Learjet, N888DH, which was en route to Palm Springs from Twenty-nine Palms at 11,000 ft. At 1656:15, the controller requested N888DH to report, "crossing the Palm Springs zero five one radial one zero mile fix." The flight acknowledged the transmission.

At 1656:55, N12MK reported leaving 8,500 ft for 9,000 ft, and the controller cleared them to maintain 9,000 ft. The flight then queried "... are we cleared the zero five one to Twenty-nine Palms?" The controller responded, "affirmative, sir; I had a change of route there...maintain nine thousand, I'll keep you advised." The flight responded, "Okay, maintain nine straight ahead, right?" The controller responded, "Affirmative."

2/ All altitudes herein are mean sea level, unless otherwise indicated.

At 1658, the controller requested N12MK's distance from the Palm Springs VORTAC [3/] and the flight said that they were approaching 14 nmi.

At 1658:30, N12MK called the controller and stated, "We're maintaining nine on a heading of three one zero. What's our clearance from here?" The controller responded that they could expect a further clearance after crossing the 20 nmi DME fix. The flight responded, "Okay."

In a deposition, the controller stated that he believed he heard 030". However, at 1709:20, the ATC transcript disclosed that he told the Los Angeles Center's assistant chief, in part, "It was like he might have said heading maybe two three zero, or three three zero," and again at 1709:55, in part, "I thought he might have said the zero three zero see I'm not sure, but he, was cleared (via the) zero five one radial."

At 1659:25, N12MK reported that it was 20 nmi DME from Palm Springs. The controller asked N888DH to report its DME distance from Palm Springs and was told that N888DH was 10.5 nmi. The controller then cleared N12MK to climb to and maintain 17,000 ft and to contact the Los Angeles Air Route Traffic Control Center. At 1659:50 the flight responded that they were climbing to 17,000 ft. This was the last known transmission from N12MK.

At 1657:45, the Los Angeles Center's sector 11 controllers had been informed of N12MK's departure from Palm Springs and were awaiting the appearance of its radar return to the northeast of the Palm Springs VORTAC. They saw a radar return appear northwest of the Palm Springs VORTAC. When the return first appeared, the accompanying data block was incomplete; however, at 1658:36, the data block was completed, and the flight was identified. The Los Angeles Center sector 11 controllers were not in radio contact with the flight, and they did not have access to any frequency the flight would be using. Upon identification of the flight, the interphone controller contacted the Palm Springs tower at 1659:40 to try to find out what N12MK was doing. The radar controller notified the sector 19 controller into whose airspace N12MK was intruding in order to insure that it would be kept free of other traffic until the Los Angeles Center could contact N12MK. The aircraft crashed before coordination could be effected and the pilot contacted.

The aircraft's wreckage was found January 9, 1977, on the south slope of a mountain at an elevation of 9,700 ft. The approximate coordinates of the crash site were 34° 06'N, 116° 46'W. The crash site is about 22 nmi from the Palm Springs Municipal Airport on a bearing of 306° magnetic. The plane crashed at dusk.

3/ Collocated very high frequency OMNI range station and ultra-high frequency tactical air navigation aid (TACAN).

1.2 Injuries to Persons

Injuries	Crew	Passengers	Other
Fatal	2	2	0
Minor/Serious	0	0	0
None	0	0	0

1.3 Damage to Aircraft

The aircraft was destroyed.

1.4 Other Damage

None.

1.5 Personnel Information

The pilots were certificated and qualified for the flight in accordance with current regulations. (See Appendix **B.)** According to company personnel the pilot had flown to and from Palm Springs previously and six or seven flights had been made in a Learjet.

1.6 Aircraft Information

The aircraft was certificated and maintained in accordance with current regulations. The aircraft was not equipped with an emergency locator transmitter nor was it required equipment. (See Appendix C.)

1.7 Meteorological Information

About 1450 **on** January 6, the pilot received a route weather briefing from the Las Vegas Flight Service Station.

At 1650, the official surface weather observation for Palm Springs was:

> Ceiling estimated **3,000** ft, broken, **5,000** ft overcast, visibility--8 miles, light rain, **temperature--44° F,** wind calm, altimeter setting**--**30.12 in.

According to the pilot of N888DH, the inbound Learjet, there were layered clouds up **to** 25,000 ft in the Palm Springs area. The top of the lower deck began at 15,000 ft and was almost solid down to 5,000 ft. He stated that the turbulence was none to light with light icing in the clouds, and that light rain was falling when N888DH landed at Palm Springs. The flight had entered the Palm Springs area about **1700,** and had landed at **1720.** The copilot noted that night was approaching during their approach and landing.

1.8 Aids to Navigation

The Palm Springs VORTAC is situated 4.5 nmi northeast of the Palm Springs Municipal Airport. There were **no** known discrepancies or malfunctions of the ground aids. The Palm Springs VORTAC was flight checked after the accident and **no** discrepancies were noted. There were **no** reports of discrepancies from flights utilizing the VORTAC. The ground facility maintenance records were examined and **no** discrepancies were noted.

The Palm Springs and Twenty-nine Palms VORTAC's are connected by **low** altitude airway V264S; its centerline is the 051° radial ***of*** Palm Springs and the 231° radial of Twenty-nine Palms. The distance between the two facilities is 36 nmi and the airway is the direct route.

1.9 Communications

There were **no** known discrepancies or malfunctions concerning communication facilities at Palm Springs at the time of the accident.

1.10 Aerodrome Information

The Palm Springs Municipal Airport, which has a field elevation of 448 ft, has one runway--12/30. The runway has a composite asphalt surface and is 7,004 ft long and 150 ft wide. The magnetic heading of runway 30 is 308°. The runway is equipped with high intensity edge lights, visual approach slope indicator (VASI) lights, and runway end identifier lights (REIL).

The airport is served by an air traffic control tower which operates from 0600 to 2200 daily. The facility provides approach and departure traffic control services. At the time of the accident, **no** radar facilities were available.

The minimum sector altitudes in the vicinity of the airport are as follows: From 355° to **085" - 6,900** ft; from 085° to 175° **- 9,800** ft; from 175" to 265" **- 12,000** ft; and from 265° to 355° - 13,000 ft. (See Appendix D).

1.11 Flight Recorders

No flight recorders were installed **on N12MK,** nor were they required.

1.12 Wreckage and Impact Information

The aircraft crashed in a remote, mountainous area. It struck the face of a 30° to 35° slope, and the wreckage path was generally parallel to the slope's face. The aircraft first hit a tree at an elevation of 9,700 ft. The aircraft was in a 12° climb at impact, and the wreckage was distributed along a magnetic bearing **of** 310° for one-half mile. The aircraft disintegrated **on** impact.

Examination of the wreckage failed to disclose any evidence of fire or fire damage. The aircraft breakup was so extensive that cockpit control settings and radio frequencies could not be determined.

1.13 Medical and Pathological Information

Autopsies of the pilot and copilot revealed no evidence of preimpact incapacitation.

1.14 Fire

There was no fire.

1.15 Survival Aspects

The accident was not survivable.

1.16 Tests and Research

Los Angeles Center has National Airspace System Stage-A Flight Data Processing equipment (NAS-A). N12MK's radar tracking data were extracted from the computer and its flightpath was reconstructed using the retrieved radar fixes. Fourteen fixes were retrieved and used for the reconstruction. The first radar fix was at 1657:00, the first full data block was at 1658:36, and the last radar fix occurred at 1659:36. (See Appendix E.)

The resultant flightpath was oriented in a northwesterly direction and generally paralleled the extended runway centerline. The last reliable radar fix was 1.74 nmi from the impact site. The straight line distance between the first and last radar fix is 12.29 nmi, and the aircraft's groundspeed between these points was 283.5 kns. The radar data disclosed that the aircraft reached 8,200 ft at 1657:00--2 minutes 50 seconds after it was cleared for takeoff.

At 1700 on January 15, a test flight was flown from the Palm Springs Airport in a Learjet LR-23, N400CS. The aircraft was flown in accordance with Jet Avia procedures, runway heading was maintained, and altitude readings plus DME distance and bearings were recorded every 30 seconds. Timing began when the aircraft was cleared for takeoff. (The following times are elapsed time in minutes and seconds from the receipt of takeoff clearance.) The clearance was acknowledged at 5 seconds, the end of the runway crossed at 1 minute, and at 1 minute 15 seconds, the aircraft had crossed the 235° radial of Palm Springs VORTAC at 700 ft. The aircraft reached 9,000 ft at 3.0 minutes. The test was ended at 5 minutes 15 seconds at a DME distance of 21 nmi from Palm Springs. The test aircraft was about 2.5 nmi southeast of the accident site. (See Appendix F.)

Correlation of the radar data of the flight of N12MK and the test flight data disclosed that N12MK reached 8,200 ft on the radar plot 2 minutes 48 seconds after the takeoff clearance, while the test aircraft reached 9,000 ft in 3.0 minutes. N12MK was 2.5 nmi from the impact site in 5 minutes 12 seconds, while the test aircraft required 5 minutes 15 seconds.

1.17 Additional Information

1.17.1 IFR Clearance and Flight Procedures

The IFR clearance as delivered to the flightcrew read, in part, as follows: "As filed, via Palm Springs, direct Twenty-nine Palms...." According to the departure controller handling N12MK and according to other personnel at the Palm Springs tower, the clearance required the pilot to overfly the Palm Springs VORTAC after takeoff and then proceed direct to Twenty-nine Palms.

The two Los Angeles Center sector 11 controllers were unclear on what the word "direct" contained in the clearance required of the pilot. They noted that Learjets departing Palm Springs with such a clearance were generally picked up on controller radar about 15 nmi northeast of Palm Springs and within 1 to 4 nmi north of the centerline of airway V264S.

Jet Avia's chief pilot stated that, if given the clearance, he would have made a right turn after takeoff and proceeded direct to Twenty-nine Palms. Following this procedure, the aircraft would be within 2 to 5 nmi north of the centerline of V264S. He also said that, if the clearance had been worded "via direct Palm Springs," he would have overflown the Palm Springs VORTAC before turning toward Twenty-nine Palms.

14 CFR 91.123(a)(b) sets forth the course to be flown under IFR. The paragraph states that, unless otherwise authorized, a pilot shall fly his aircraft along the centerline of a Federal airway, and on any other route, "along the direct course between navigational aids or fixes defining that route."

The Pilot/Controller Glossary in both the Airman's Information Manual (AIM), and Air Traffic Control Handbook 7110.65 defines "direct" as follows:

> Straight line flight between two navigational aids, fixes. points or any combination thereof. When used by pilots in describing off-airway routes, points defining direct route segments become compulsory reporting points unless the aircraft is under radar contact.

1.17.2 ATC Procedures

ATC Handbook 7110.65 prescribes air traffic control procedures and phraseology for use by controller personnel. The Handbook requires that controllers be familiar with its contents and to "exercise their best judgment if they encounter situations not covered by it." Pertinent portions of the manual are cited below:

ATC Handbook 7110.65, paragraphs 272 and 272a contain the criteria for separating aircraft traveling on opposite courses when a navaid or DME fix can be used. The controller will assign different altitudes consistent with the approved vertical separation until, "...both aircraft have reported passing the navaids or DME fixes indicating they have passed each other."

ATC Handbook 7110.65, paragraphs 59 and 59b(1) enumerate the type of fixes that can be used as reporting points. The paragraph authorizes the use of unpublished fixes formed by the en route radial and either a DME distance from the same navaid or an intersecting radial from an off route facility. Paragraph 59b(1) continues, "DME shall be used in lieu of off route radials whenever possible." Paragraph 102 sets forth the recommended terminology to describe a fix. Paragraph 102a notes that when an unnamed fix is used, the controller will state the name of the navaid, followed by the specified radial/localizer, and then followed by the distance in miles and the phrase "mile fix." The paragraph contains the example, "Appleton zero five zero radial three seven mile fix."

The Pilot/Controller Glossary in both the AIM and ATC 7110.65 define the DME fix as a geographic position based on range and azimuth information from a navaid. "It is defined by a specific distance in nautical miles and a radial or course (i.e., localizer) in degrees magnetic from that aid."

ATC Handbook 7110.65 does not contain examples of recommended terminology for the controller to use when he wants the pilot to report a DME fix.

ATC Handbook 7110.65, paragraph 191, sets forth controller procedures for amending routes or altitudes. Paragraph 191a states that,. when a route of flight in a previously issued clearance is amended, the controller should:

(1) "State which portion of the route is being amended and then state the amendment.

(2) "State the amendment to the route and then state that the rest of the route is unchanged."

Paragraph 191b states, "When route or altitude in a previously issued clearance is amended, restate all applicable altitude restrictions."

Federal Aviation Regulations do not require flightcrews to read back clearances.

ATC Handbook 7110.65, paragraph 350 notes:

> When considered necessary, controllers or pilots may initiate readback of a clearance. Some pilots may be required by company rule to do so.

The August 1976 and January 1977 editions of the AIM, Part I state:

> There is no requirement that an ATC clearance be read back as an unsolicited or spontaneous action. Controllers may request that a clearance be read back whenever the complexity of the clearance or other factors indicate a need. The pilot should read back the clearance if he feels the need for confirmation. He is also expected to request that the clearance be repeated or clarified if he does not understand it.

The AIM, Part I, beginning with the January 1977 issue, is printed semiannually. In the July 1977 AIM, Part I, the section pertaining to clearance readbacks was changed. The new section states, in part:

> Pilots of airborne aircraft should read back those parts of ATC clearances/instructions containing altitude assignments or vectors as a means of mutual verification. The readback of the numbers serves as a double check between pilots and controllers, and (as) such, it is an invaluable aid in reducing the kinds of communication errors that occur when a number is either misheard or is incorrect.

The Safety Board has recommended to the FAA that the contents of ATC Handbook 7110.65 be changed to require controllers to request a readback of the clearance if he does not receive one from the crew (Section *4).*

1.17.3 Jet Avia's Learjet Takeoff Procedures

The Company's airplane flight manual provides the standard operating procedures for takeoff and takeoff profile in written and pictorial formats. After takeoff the pilot will retract the gear, maintain a pitch attitude of 10°, accelerate to *200* kns indicated airspeed (KIAS) (takeoff flaps are retracted before reaching 193 KIAS), climb to *3,000* feet above the airport elevation or "clear of the designated noise sensitive area," before setting climb power or turning. The Palm Springs departure procedures state that after takeoff from runway 30, a right turn may be made after reaching 1,000 ft.

The applicable standard instrument departure (SID) procedure from runway 30, and transition route to Twenty-nine Palms state, in part, "Turn right, climb direct Palm Springs VORTAC. Thence...climb via Palm Springs R-102 (102° radial) to Bermuda Int. Turn right to intercept and proceed inbound via Palm Springs R-122 to Palm Springs VORTAC. Thence...via Palm Springs R-051 and Twenty-nine Palms R-231 to Twenty-nine Palms VORTAC...." (See Appendix D.) The SID adds about 25 nmi to the flight distance to Twenty-nine Palms. The use of SID is not mandatory, and company spokesmen indicated that their pilots rarely requested or wanted the SID when departing Palm Springs for Las Vegas; the pilot of N12MK did not request SID.

2. ANALYSIS

The aircraft was certificated and maintained in accordance with applicable Federal regulations and company requirements. The flightcrew was qualified to operate the aircraft.

The elapsed time between the issuance of the takeoff clearance and the last radar fix was **5** minutes 12 seconds. Since the aircraft crashed *1.74* nmi beyond the last radar fix, N12MK was airborne about 5 to **6** minutes. N12MK's radar data and the test flight data corroborate each other, and the Safety Board concludes that the pilot maintained runway heading from takeoff to the accident site. The Board also concludes that the route actually flown by N12MK was not that delivered to the pilot in the ATC clearance.

At the time **of** the accident, Palm Springs Tower had no radar capability. Therefore, until the flight reached about 9,000 ft, at which time **Los** Angeles Center radar would acquire its transponder return, no radar data were available by which to monitor its progress. More important, the Palm Springs departure controller's knowledge of the flight's position could only have been based on the route for which he cleared the aircraft and the pilot's progress reports.

The Palm Springs controller cleared the flight, in part, to Las Vegas, "via Palm Springs, direct Twenty-nine Palms." Based on the provisions of *14* CFR 91.123, and the definition of "direct" as set forth in the **AIM** and ATC Handbook **7110.65,** the Safety Board concludes that the pilot was required to position his aircraft on the straight line course between Palm Springs and Twenty-nine Palms as soon as practical, and that the controller had good reason to believe that the pilot would do this and would either proceed toward Twenty-nine Palms on the 051° radial of Palm Springs or the 231° radial of Twenty-nine Palms. It **is** within the framework of this premise that the pilot's misunderstanding and the controller's failure to detect that misunderstanding must be examined.

There was inbound traffic from Twenty-nine Palms to Palm Springs which was descending to 11,000 ft when N12MK was cleared for takeoff. The controller decided to separate the aircraft vertically by using a DME fix. Since there was no published fix an unpublished fix was established. ATC Handbook 7110.65 authorizes the use of unpublished fixes formed by the en route radial and a DME distance. The en route radials between Palm Springs and Twenty-nine Palms were the Palm Springs 051° radial and the Twenty-nine Palms 231° radial. The controller opted to use the former.

Therefore, N12MK was issued a 9,000-ft altitude restriction before takeoff. At 1656, 1 minute 50 seconds after the flight was cleared for takeoff, the controller requested that the flight report crossing the 051° radial, 10-mile fix. The flight acknowledged the transmission. Ten seconds later, the controller informed the flight that it was the 051° radial of Palm Springs, and again the flight acknowledged the transmission.

At 1656:15 he requested N888DH to report "crossing" the Palm Springs 051" radial 10-mile fix, and the flight acknowledged the clearance. Thus, both flights were directed to the same radial and requested to report passing the same DME fix; the requirements of ATC Handbook 7110.65 had been met.

About 25 seconds after N12MK had been requested to report crossing the 051° radial 10-mile DME fix, the flight called "mike kilo's crossed the radial."

The flightcrew's report that they had crossed the radial was erroneous. The Palm Springs 051° radial exists in the northeast quadrant of the VORTAC, and the flight never entered that area. Apparently, they called crossing the Palm Springs 231° radial. When the controller received this report, he assumed that the crew had reported passing the Palm Springs 051' radial 10-nmi DME fix.

Despite the fact that they had been cleared for their flight plan route as requested, the flightcrew was now proceeding northwest on the runway heading and had interpreted the ATC radio transmissions subsequent to the receipt of their initial clearance to constitute a major change to their flight plan. They maintained runway heading and 9,000 ft until they crashed, despite the fact that this was below the applicable minimum sector altitude of 13,000 ft.

It is difficult to rationalize how the crew concluded that the runway heading was to be maintained. The use of the word "crossing" in the request to report the 051° radial 10-mile fix may have triggered a misconception that the 051' radial was to be crossed. Regardless, the

controller defined the point at which the aircraft was to cross correctly--the Palm Springs 051° radial 10-nmi DME fix. There was **no** way this fix could be reached by maintaining the runway heading, and **no** request was levied on the flightcrew to hold runway heading after takeoff.

There is perhaps one possible explanation for the crew's misconception. The flightcrew may not have been aware that they were operating in a nonradar environment and believed that they were under radar control. The company chief pilot stated that the only facility similar to Palm Springs that they serviced regularly was **Sun** Valley, Idaho, and that was "strictly a **VFR** (visual flight rules) operation."

The takeoff clearance issued to the flight contained a 9,000-ft altitude restriction. Quite often, in the radar environment, flights are cleared for takeoff and issued an altitude restriction or requirement to be met before turning from runway heading and instructed to contact departure control after takeoff. Despite the fact that no mention of runway heading was made, it is possible that, because of the altitude restriction and the instructions to contact departure control after takeoff, the pilot may have believed that runway heading was to be maintained until 9,000 ft, or until cleared to proceed on course by departure control.

The aircraft had no voice recorder; therefore, there was **no** way of ascertaining if the controller's request to report crossing the 10-mile fix was received completely. The clearance was not read back, and the crew never reported reaching that distance though they did report crossing the "radial" and reaching *9,000* ft. If the crew did not hear the distance fix, it could have further strengthened all their beliefs that runway heading was to be maintained until reaching 9,000 ft. **In** the absence of cockpit voice recorder information further speculation as to the reasons for the flightcrew's misconception would be meaningless.

During communications, there were two chances to alert the flightcrew of the misunderstanding. The first chance came at 1656:55, when N12MK reported that they were approaching *9,000* ft. After being cleared to maintain *9,000* ft they asked if they were cleared via the 051° radial to Twenty-nine Palms. The controller replied, "that's affirmative, sir, **I** had a change of route there. Maintain nine thousand, **I'll** keep **you** advised." The flight then asked if they were to maintain 9,000 ft "straight ahead, right?" and the controller said that they were.

Despite this exchange of information, the flightcrew was not alerted to their error. The conversation indicated that the crew believed that they were to be cleared to proceed to Twenty-nine Palms on the 051° radial. The controllers use **of "I** had a change of route there" confirmed their belief that their present heading was to be maintained until they received clearance to turn back toward Twenty-nine Palms and intercept the 051° radial.

The controller stated that he was only considering the altitude restriction when he said he would keep them advised. Since the controller was convinced that the flight was established outbound **on** the **051"** radial, the query about flying straight ahead merely meant continued flight toward Twenty-nine Palms **on** that radial. The flightcrew, during this exchange, did not apprise the controller of one vital piece of information---their heading **or** direction of flight.

The controller was questioned as to what he meant by his statement that he "...had a change of route there." He stated that the aircraft was cleared direct to Twenty-nine Palms from Palm Springs and that he expected the aircraft to be **on** the direct course between these two points; however, the flightcrew had the option to choose whether they wished to navigate **on** a Palm Springs **or** a Twenty-nine Palms radial. **In** order to meet the fix requirements of ATC Handbook 7110.65, paragraph 59, he placed the aircraft **on** an en route radial--the Palm Springs 051° radial--and this was the change of route to which he referred.

The second chance for the flightcrew and controller to communicate occurred at 1658:30 when the crew reported they were approaching ***14*** nmi DME from Palm Springs. The flight asked where they were going after this as they were maintaining **9,000** ft **on** a heading of "three one zero, what's our clearance from here." This was the first and only transmission from the flightcrew that gave the controller heading information and a chance to make a reasonably accurate estimate of the aircraft's position; however, the controller either did not note **or** did not recognize the significance of the 310" heading.

The evidence indicates that the controller's failure to note the aircraft's 310° heading may have been because of preoccupation with traffic separation. At the time of the transmission, he was most concerned with establishing a DME position for N888DH that would allow N888DH ***to*** descend and N12MK to climb. He was also trying to descend another aircraft from the Thermal VORTAC into Palm Springs and to insure that he was clear of the other two aircraft. Instrument meteorological conditions are not commonplace at Palm Springs. The controller described his workload as moderate, and under these conditions, for him, they may have been. The controller's primary responsibility was traffic separation, and the evidence indicated that his full attention was directed to the task of separating these three aircraft. The transmission of the 310" heading did not register with sufficient impact to overturn his conviction that N12MK was established **on** the 051° radial and proceeding toward Twenty-nine Palms.

The **Los** Angeles Center's sector 11 radar and interphone controllers became fully aware of N12MK's position just before impact when the flight's full data block appeared **on** their scope. However, there was not sufficient time to establish radio contact with the flight and vector it away from the mountain.

In retrospect, there are several areas which warrant further comment. ATC Handbook 7110.65 contains recommended terminology for a controller to use when amendments or changes to clearance routes are to be made, and this recommended terminology was not used when the controller requested that the flight report the Palm Springs 051" radial 10-mile fix. Since the controller believed that the aircraft, by virtue of its clearance, would be on a direct route between Palm Springs and Twenty-nine Palms, his request to report the Palm Springs 051" radial 10-nmi fix merely inserted a reporting point and did not change the route. However, the original clearance left the choice of navigation radials to the pilot's discretion; therefore--while perhaps a technicality--requiring the flightcrew to use the Palm Springs 051° radial constituted a route change and the recommended terminology for amending a route clearance should have been used.

The procedures and practices concerning the readback of clearance that were in effect at the time may have contributed to the accident. Two key transmissions to the flight designating an additional compulsory reporting point were only acknowledged by the flightcrew. Since the flightcrew did not readback the clearance, there was no way for the controller to assure himself that the flight had received the complete clearance. The use of the word "Okay" in the acknowledgments could only be interpreted by the controller to mean that the pilot received, understood, and was going to comply with the transmitted clearance. The ATC transcript did not exhibit any evidence of flightcrew confusion or other factors which would alert a controller to the need for requesting a readback for clarification, and a request to report passing a DME fix cannot be considered a clearance of sufficient complexity to require the controller to request a readback.

The Safety Board is concerned with the breakdown in communications between the pilot and controller which occurred in this accident, and has occurred in other mishaps and accidents. Failure of controllers and pilots to communicate to each other clearances, compliance with clearances, requests and other instructions correctly have produced situations which have resulted in fatal accidents, near collisions, and other type air traffic control mishaps. In virtually all of these instances, we have noted not only areas of weakness in existing procedures, but noncompliance by pilots and controllers with recommended phraseology contained in applicable publications. The Safety Board believes that responsible organizations, companies, and supervisors must take corrective action to establish recommended phraseology for use by pilots and controllers, and then take measures to insure these procedures and phraseology are accepted and followed.

14 CFR 91.3 states that the pilot-in-command of an aircraft is directly responsible for, "and is the final authority as to the operation of that aircraft" and empowers him "in an emergency requiring immediate action" to deviate from any rule "of this subpart, or of subpart B to

the extent required to meet that emergency." Final authority and responsibility for aircraft safety is vested with the pilot-in-command, and there are no provisions for divesting himself of this responsibility. Situations may arise in the area of traffic control where the pilot is unable to exercise this authority because he has no knowledge of the existing hazard, such as other traffic operating in instrument meteorological conditions. However, this does not apply to knowledge of the terrain surrounding an airport from which he is operating, particularly, in this case, when the pilot was familiar with the Palm Springs Airport and its surroundings.

Several aircraft accidents have indicated that, since the advent of radar control and its capability to vector traffic, there has been a derogation of pilot knowledge of terrain over which they fly. The Safety Board believes that proper exercise of responsibility and authority during descents and takeoffs can only be based on knowledge of terrain hazards. In this accident, the Safety Board cannot explain the pilot's acceptance of a heading that aimed his aircraft toward the highest mountain in the area, at an altitude more than 2,000 feet below the highest terrain, and 4,000 feet below the minimum sector altitude.

The pilot's final questioning of the clearance and his informing the controller of his heading and altitude should have alerted the controller to the criticality of the situation. When it did not, the pilot was placed in the position where only his own awareness of his proximity to high terrain could have prompted him to exercise his emergency authority and either climb or change heading, or both. Since he did neither, one must assume that he was as unaware of the danger as was the controller. His concern over his direction of flight appears, therefore, to be predicated upon the fact that he was required to await further clearance and was being delayed, rather than imperiled.

3. CONCLUSIONS

3.1 Findings

1. The aircraft was certificated and maintained properly. The flightcrew was qualified to operate the aircraft.

2. The flight was operating in a nonradar environment.

3. The clearance delivered to, and read back by, the flightcrew required them to make a right turn after takeoff and to establish their aircraft on the straight line course between Palm Springs and Twenty-nine Palms. The clearance permitted the crew to navigate on a radial off either the Palm Springs or Twenty-nine Palms VORTAC.

4. SAFETY RECOMMENDATIONS

Deficiencies in existing communications procedures identified in this investigation had been noted in a previous incident involving a near midair collision between two air carrier aircraft and in other accidents. As a result of these investigations, the Safety Board, on July 25, 1977, recommended that the Federal Aviation Administration:

1. Amend the language of ATC Handbook 7110.65 to specify that a controller who issues an altitude assignment and/or a vector heading assignment to an aircraft in flight he required to request readback of the clearance if he does not receive one from the crew. Pilot acknowledgement alone should not be accepted by the controller. (A-77-52)

2. Instruct FAA Air Carrier District Office Chiefs and General Aviation District Office Chiefs to alert their personnel to the circumstances surrounding this incident; and require those facilities to take all appropriate action to assure that pilots are made aware of communications procedural requirements and understand why strict adherence to recommended procedures is essential to safe flight. (A-77-53)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ KAY BAILN
Acting Chairman

/s/ FRANCIS H. McADAMS (see page 18 for concurring statement.)
Member

/s/ PHILIP A. HOGUE
Member

/s/ WILLIAM R. HALEY
Member

October 6, 1977

Member McAdams, concurring:

I concur with the Board's probable cause and findings herein. However, because of the nature of the accident I am constrained to add additional comments.

The analysis of the accident does not fully answer the critical question of why an experienced pilot who had operated into and out of the Palm Springs Airport for several years would have maintained runway heading for approximately 5 minutes until impact with high terrain.

The explanation may be the pilot was confused by ATC clearances and transmissions made subsequent to the original clearance, and believed that these transmissions constituted a major change or amended the original clearance. The language used by the controller was not standard and was subject to misunderstanding. Similarly, the transmissions of the pilot were lacking in clarity and could have misled the controller into believing the aircraft was adhering to its clearance.

The original clearance was clear and not subject to misinterpretation: "Cleared to the Las Vegas Airport as filed, via Palm Springs, direct Twenty-nine Palms, climb and maintain seventeen thousand.. ." With this clearance, the flight could have climbed to approximately 1.000 feet and thereafter at the pilot's discretion turned right to a northeast heading and flown inbound to Twenty-nine Palms on any of the navigational radials.

Immediately prior to the takeoff at 1654:10, the original clearance was amended by inserting an altitude restriction: "Lear one two mike kilo maintain niner thousand, cleared for takeoff." Although only an altitude restriction, it still constitutes an amendment to the original clearance. The controller should have stated, "I have an amendment. You are cleared as filed, maintain niner thousand, cleared for takeoff, right turn out." If the controller had used this language, it would not have been subject to misunderstanding.

At 1656:00 the original clearance was again amended and nonstandard terminology was used. The clearance was: "Lear one two mike kilo, report crossing the zero five one radial one zero mile fix." We assume the controller expected the flight to proceed via the 051 radial and report crossing the 10-mile fix. However, the flight did not

do this; instead, it maintained runway heading. The latter clearance was an amendment to the original clearance since the original clearance left the choice of navigation radials to the pilot's discretion, whereas this one instructed the pilot to use the Palm Springs 051 radial and it constituted a route change. The controller should have amended the clearance as follows: "I have an amendment; you are now cleared via the Palm Springs zero five one radial to Twenty-nine Palms. Report crossing the zero five one radial one zero mile fix." Again, if the correct terminology had been used, the clearance could not have been misunderstood.

The pilot, however, could have interpreted the controller's amended language as it was stated, i.e., that he was to cross the 051 radial. Obviously this is the way the pilot interpreted it, because at 1656:25 the flight reported, "Mike kilo's crossed the radial." Significantly, he did not report the 10-mile fix. The flight's position report was not acknowledged by the controller. In fact, the 051 radial could not have been crossed on runway heading; it was the 231 radial that was crossed. The pilot misled the controller by this transmission.

At 1656:55 mike kilo requested, "Okay, are we cleared zero five one to Twenty-nine Palms?" The pilot, well aware that he is maintaining runway heading, is now waiting for a further clearance to the 051 radial. The controller responded, "That's affirmative, sir; I had a change of route there, maintain nine thousand, I'll keep you advised." The flight responded, "Okay, maintain nine thousand straight ahead, right?" The controller replied, "Affirmative." The language of the controller, "I had a change of route there" is confusing since the pilot probably thought it referred to the routing via the 051 radial, and the transmission, "I'll keep you advised" could have led the pilot to believe that there would be a further change or amendment to the clearance. The pilot's language was equally unclear: "Okay, maintain nine thousand straight ahead, right?" The pilot at this point should have reported his heading and this would have alerted the controller that the pilot was confused. The controller also should have requested the flight's heading at this point.

The transmission at 1658:30 was critical. "Where is mike kilo going after this? We're maintaining nine on a heading of three one zero, what's our clearance from here?" The controller responded, "Yes, sir, you can expect further clearance crossing the two zero DME fix." The pilot replied, "Okay." It is obvious that the pilot is still waiting for a clearance from a northwest heading to a northeast heading, and for the first time states his heading. The controller's "...you can expect further clearance" led the pilot to believe he was still to maintain a

heading of 310. At this point, if the controller had been alert, he should have known that on a heading of 310, 14 miles from the Palm Springs Airport, the flight was below the terrain. The controller testified that, although he heard the transmission, he misunderstood the heading and thought it was either 230°, 320° or 030°. Not understanding the heading report, the controller should have immediately requested clarification from the flight and, having done so, could have immediately advised the flight to turn to a safe heading. At the same time the pilot, even though not receiving any advice from the controller, should have known that he was below the terrain at this time and should have taken action.

This accident occurred, in my opinion, because of nonstandard and nonprofessional clearances and transmissions on the part of both the controller and the pilot. If the proper language had been used, the accident most likely would not have occurred.

Francis H. McAdams

APPENDIX A

Investigation And Deposition

1. Investigation

At 2030 P.s.t. on January 6, 1977, the National Transportation Safety Board's Los Angeles, California, Field Office was notified of the accident by the Federal Aviation Administration. Parties to the accident included the Federal Aviation Administration, Professional Air Traffic Controllers Organization, Jet Avia Ltd., and Gates Learjet Co.

2. Depositions

The National Transportation Safety Board deposed the controllers at the Palm Springs Tower and the Los Angeles ARTCC, and the chief pilot of Jet Avia Ltd. Parties present during these depositions included the Federal Aviation Administration, the Professional Air Traffic Controllers Organization, and Jet Avia Ltd.

APPENDIX B

Airman Information

Pilot

The pilot, Donald J. Weier, aged 36, was hired by Jet Avia Ltd. on April 15, 1976. He had an Airline Transport Pilot Certificate (ATP) No. 1681401, with aircraft multiengine land (AMEL) and aircraft single engine land (ASEL) ratings. He was type rated in the Lear Jet aircraft. The pilot had a First Class Medical Certificate dated September 10, 1976, with no waivers or limitations. He has 4,150 flight hours of which 532 hours were Learjet time, and had flown 188 hours instrument time. He had flown 112 hours during the last 90 days, 57 hours during the last 30 days, and had not flown during the previous 24 hours. He had been off duty in excess of 24 hours before reporting for this flight. At the time of the accident, he had been on duty about 3 hours of which about 45 minutes was flight time.

According to company personnel the pilot had flown into and out of Palm Springs for several years, however, only six or seven flights had been made in a Learjet.

The pilot had passed his last proficiency check October 21, 1976, and his ground training records were current.

Copilot

The copilot, Jerold W. Foley, aged 33, was hired by Jet Avia Ltd August 17, 1976. He had an ATP No. 2208063 with an AMEL rating and a Learjet type rating. He also had commercial priviliges in ASEL. He had a First Class Medical Certificate dated June 7, 1976, with no waivers or limitations. The copilot's first class medical certificate was more than 6 months old.

The copilot had 4,756 flight hours of which 231 hours were in the Learjet, and had flown 935 hours instrument time. He had flown 149 hours during the last 90 days, 85 hours during the last 30 days, and had not flown during the last 24 hours. He had been off duty over 24 hours before reporting for this flight. At the time of the accident he had been on duty 3 hours of which about 45 minutes were flying time.

The copilot's last flight check was taken August 27, [illegible] and his ground training records were current.

Pursuant to 14 CFR 61.23(a)(1)(2), and 14 CFR [illegible] copilot's medical certificate allowed him to exercise [illegible] privileges under his ATP license.

Controllers

Julie A. Ziegler, aged 25, was employed by the FAA March 17, 1975, and assigned to the Palm Springs facility on the same date. Ms. Ziegler holds a Limited Air Weather Reporting Certificate (LAWRS) and is a Developmental Controller. She received her rating on the Flight Data and Ground Control Position on November 22, 1975. At the time of the accident Ms. Ziegler was working the local controller position in the tower under the supervision of a training officer.

Leonard E. Sutton, aged 30, was employed by the FAA October 14, 1971. He holds a LAWRS Certificate, and a Control Tower Operator Certificate No. 447440347. He was checked out as a Facility Rated Journeyman Controller at PSP April 13, 1975. Mr. Sutton was working the approach control positions at the time of the accident and was holding both arriving and departing traffic.

John W. Cook, Jr., aged 33, was employed by the FAA June 30, 1972. Mr. Cook was assigned to the Palm Springs facility in June 1974, and received his facility rating June 5, 1975. He has a Control Tower Operator Certificate No. 2218264, and a LAWRS Certificate. At the time of the accident he was working the ground control position.

APPENDIX C

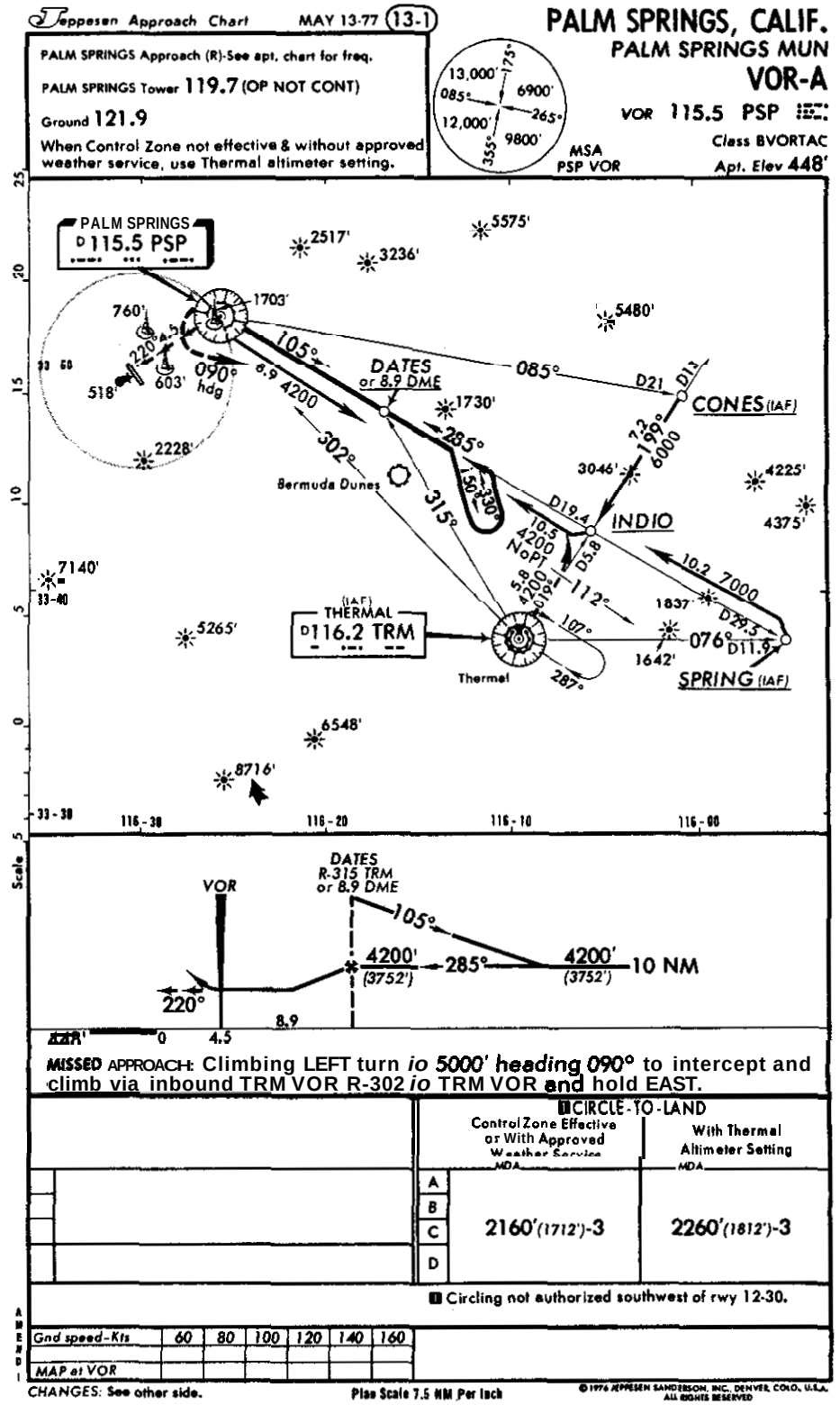
AIRCRAFT INFORMATION

The aircraft was a Learjet 24B, N12MK. The Airworthiness Certificate was issued May 6, 1969. The aircraft was owned by Mr. Marvin Kratter, 2901 Augusta Drive, Las Vegas, Nevada. It was leased to and operated by Jet Avia Ltd., 310 E. Lewis Avenue, Las Vegas, Nevada, pursuant to its Air Taxi/Commercial Operator Certificate, Operations Specifications and applicable parts of the Federal Aviation Regulations.

N12MK was refueled at Los Angeles before the flight. According to the mechanic the tanks were full when it departed the ramp at Los Angeles, and the crew did not plan to refuel at Palm Springs. The estimated fuel burn off between Los Angeles and Palm Springs according to company personnel would have been about 1,100 to 1,300 pounds.

The weight and balance were computed for the takeoff at Palm Springs using an estimated takeoff weight of 11,300 pounds. The computed center of gravity was 25 percent MAC, and both the center of gravity and takeoff weight were within the aircraft's permissible limits.

APPENDIX D1



"ILLUSTRATION ONLY - NOT TO BE USED FOR NAVIGATIONAL PURPOSES"

PALM SPRINGS, CALIF.

PALM SPRINGS MUN APT.

Elev 448' N33 49.6 W116 30.3

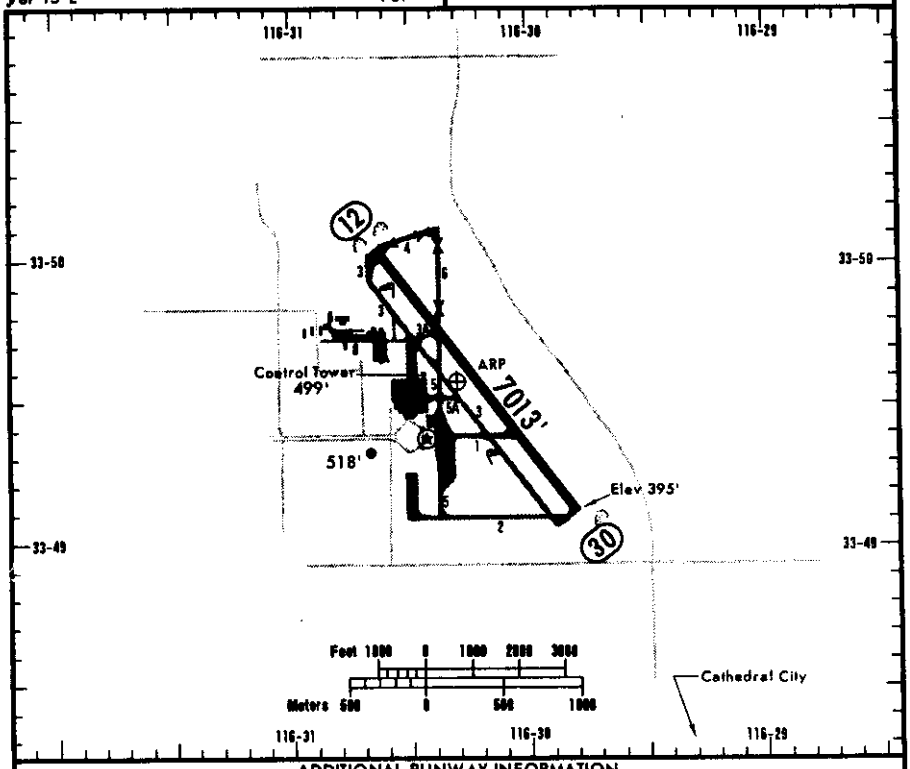
Var 15°E PSP

(13-1) MAY 13-77 Jeppesen Approach Chart

PALM SPRINGS Ground 121.9

PALM SPRINGS Approach (R) 126.7 (OP NOT CONT)

Departure (R) 118.85



ADDITIONAL RUNWAY INFORMATION

RWY		USABLE LENGTHS: LANDING BEYOND Threshold	LANDING BEYOND Glide Slope	TAKE-OFF	WIDTH
12 30	HIRL REIL ❶VASI (3 bar)-L				150'

❶ VASI available 0600-2200 hrs on request thru ATCT. Stays on 15 min. Upwind angle 3.25°, downwind angle 3.00°. Rwy 30 VASI not to be used beyond 3 NM or Cathedral City due to high terrain.

❶TAKE-OFF	Rwy 12	Rwy 30
1 & 2 Eng	1800 ceiling-3	400 ceiling-1
3 & 4 Eng		

FOR FILING AS ALTERNATE
Authorized Only When Control Zone Effective or With Approved Weather Service

A B C D	2000-5

❶Departures off either rwy require a minimum climb rate of 325' per NM to 3000'. IFR departure procedure: Comply with published Palm Springs SID's or; rwy 12 turn left; rwy 30 climb on rwy heading to 1000', turn right, climb on heading 090° to intercept and proceed inbound on TRM VOR R-302 to TRM VOR. If not at MCA for direction of flight at TRM VOR, climb in the holding pattern southeast on R-107, right turns to MCA.

CHANGES: Communications.

"ILLUSTRATION ONLY - NOT TO BE USED FOR NAVIGATIONAL PURPOSES"

Jeppesen AUG 29-75 (10-3) SID

Standard Instrument Departure (SID)

MEETS FAA REQUIREMENTS FOR AERONAUTICAL CHARTS

PALM SPRINGS, CALIF.
PALM SPRINGS MUNI

CATHEDRAL TWO DEPARTURE (CATH2·PSP)

NOT TO SCALE

This SID requires a minimum climb rate of 325' per mile to 3000'

TAKE-OFF

Rwy 12: Turn LEFT, climb via 040° heading to intercept the Palm Springs R-102. Thence

Rwy 30: Turn RIGHT, climb direct Palm Springs VORTAC. Thence

DEPARTURE

Climb via Palm Springs R-102 to Bermuda Int. Turn RIGHT to intercept and proceed inbound via Palm Springs R-122 to Palm Springs VORTAC. Thence via (transition) or (assigned route). If not at minimum crossing altitude at Palm Springs VORTAC, climb in the holding pattern southeast of Palm Springs VORTAC on the R-122, RIGHT turns, to the minimum crossing altitude for direction of flight.

TRANSITIONS

Beaumont (CATH2·ONT): Via Palm Springs R-258 and Ontario R-078 to Ontario VORTAC. Cross Palm Springs VORTAC at or above 9500'.

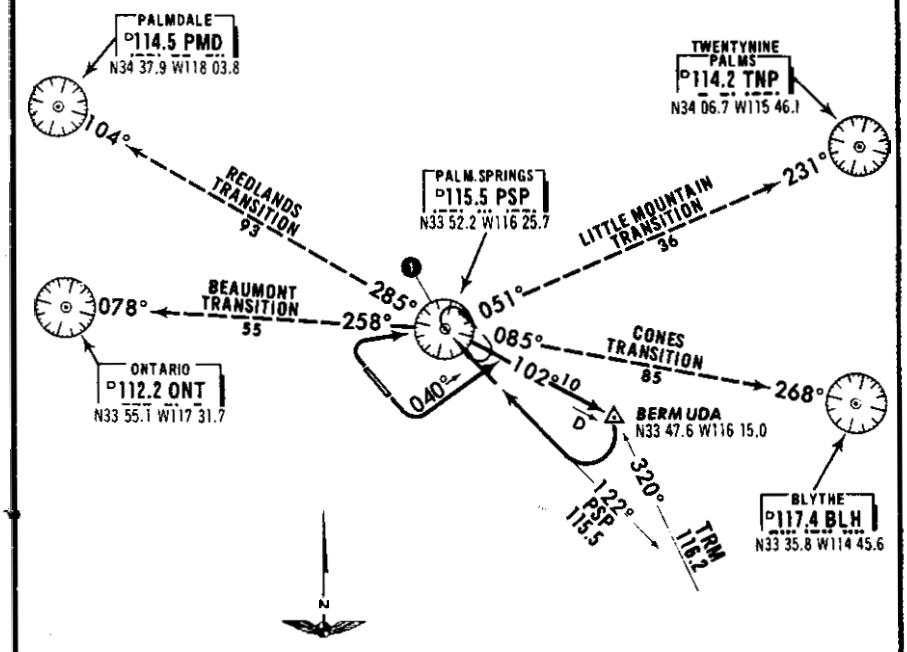
Cones (CATH2·BLH): Via Palm Springs R-085 and Blythe R-268 to Blythe VORTAC. Cross Palm Springs VORTAC at or above 3200'.

Little Mountain (CATH2·TNP): Via Palm Springs R-061 and Twentynine Palms R-231 to Twentynine Palms VORTAC. Cross Palm Springs VORTAC at or above 4400'.

Redlands (CATH2·PMD): Via Palm Springs R-285 and Palmdale R-104 to Palmdale VORTAC. Cross Palm Springs VORTAC at or above 9500'.

MINIMUM CROSSING ALTITUDE

❶ Palm Springs VOR..	R 061.....	4400 ..NE
	R-085.....	3200 ....E
	R-258.....	9500 ... W
	R-285.....	9500 . NW



CHANGES: Graphic clarified.

SID

10-3 AUG 29-75

Jeppesen

LM SPRINGS, CALIF.
LM SPRINGS MUN

Standard Instrument Departure (SID)

MEETS FAA REQUIREMENTS FOR AERONAUTICAL CHARTS

THERMAL TWO DEPARTURE (TRM2 · TRM)

NOT TO SCALE

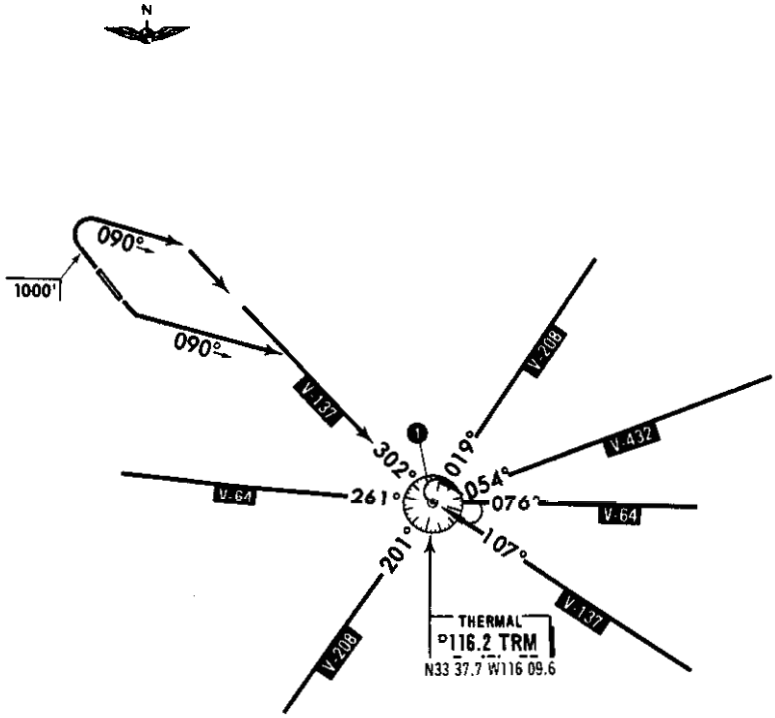
This SID requires a minimum climb rate of 325' per mile to 3000'.

TAKE-OFF
Rwy 12: Turn LEFT. Thence
Rwy 30: Climb via runway heading to 1000', turn RIGHT. Thence

DEPARTURE
Climb via 090° heading to intercept and proceed via Thermal R-302 to Thermal VORTAC. If not at the minimum crossing altitude at the Thermal VORTAC, climb in the holding pattern southeast of Thermal VORTAC on the R-107, RIGHT turns, to the minimum crossing altitude for direction of flight. Thence via assigned route.

MINIMUM CROSSING ALTITUDE

❶ Thermal VOR	V-64	on course	E
		6800	W
	V-137	on course	SE & NW
	V-208	3500	N
		5500	S
	V-432	on course	NE



CHANGES: None.

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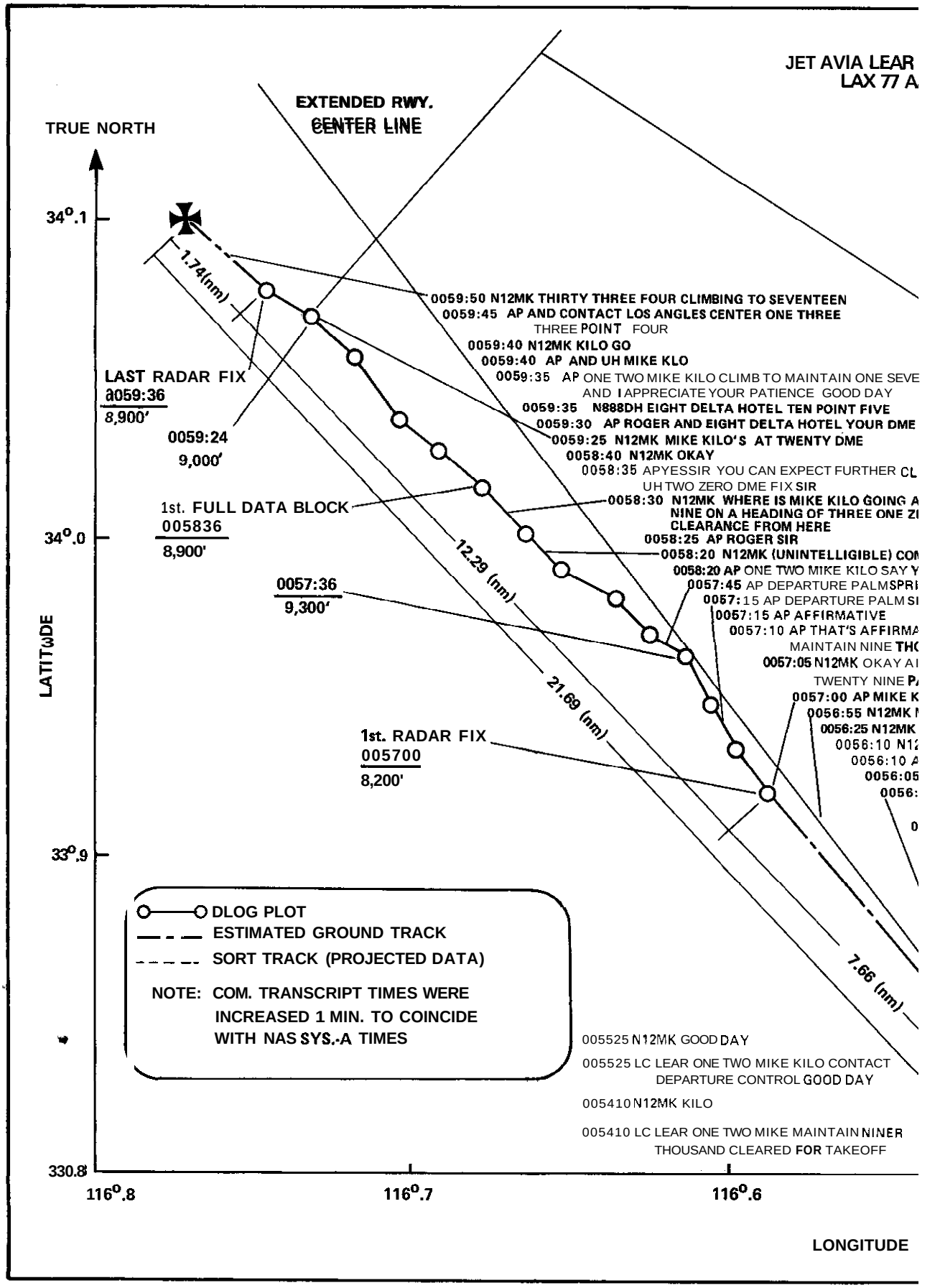
★U.S. GOVERNMENT PRINTING OFFICE: 1977—261-264:504


JET AVIA LEAR
LAX 77 A
EXTENDED RWY. CENTER LINE
CENTER LINE
TRUE NORTH
34°.1
34°.0
33°.9
330.8
LATITUDE
116°.8
116°.7
116°.6
LONGITUDE
1.74(nm)
12.29 (nm)
21.69 (nm)
7.66 (nm)
LAST RADAR FIX
0059:36
8,900'
0059:24
9,000'
1st. FULL DATA BLOCK
005836
8,900'
0057:36
9,300'
1st. RADAR FIX
005700
8,200'
0059:50 N12MK THIRTY THREE FOUR CLIMBING TO SEVENTEEN
0059:45 AP AND CONTACT LOS ANGLES CENTER ONE THREE
THREE POINT FOUR
0059:40 N12MK KILO GO
0059:40 AP AND UH MIKE KLO
0059:35 AP ONE TWO MIKE KILO CLIMB TO MAINTAIN ONE SEVE
AND I APPRECIATE YOUR PATIENCE GOOD DAY
0059:35 N888DH EIGHT DELTA HOTEL TEN POINT FIVE
0059:30 AP ROGER AND EIGHT DELTA HOTEL YOUR DME
0059:25 N12MK MIKE KILO'S AT TWENTY DME
0058:40 N12MK OKAY
0058:35 APYESSIR YOU CAN EXPECT FURTHER CL
UH TWO ZERO DME FIX SIR
0058:30 N12MK WHERE IS MIKE KILO GOING A
NINE ON A HEADING OF THREE ONE ZI
CLEARANCE FROM HERE
0058:25 AP ROGER SIR
0058:20 N12MK (UNINTELLIGIBLE) COM
0058:20 AP ONE TWO MIKE KILO SAY Y
0057:45 AP DEPARTURE PALMSPRI
0057:15 AP DEPARTURE PALM SI
0057:15 AP AFFIRMATIVE
0057:10 AP THAT'S AFFIRMA
MAINTAIN NINE THO
0057:05 N12MK OKAY AI
TWENTY NINE P
0057:00 AP MIKE K
0056:55 N12MK
0056:25 N12MK
0056:10 N1
0056:10 A
0056:05
0056:
0
DLOG PLOT
ESTIMATED GROUND TRACK
SORT TRACK (PROJECTED DATA)
NOTE: COM. TRANSCRIPT TIMES WERE INCREASED 1 MIN. TO COINCIDE WITH NAS SYS.-A TIMES
005525 N12MK GOOD DAY
005525 LC LEAR ONE TWO MIKE KILO CONTACT DEPARTURE CONTROL GOOD DAY
005410 N12MK KILO
005410 LC LEAR ONE TWO MIKE MAINTAIN NINER THOUSAND CLEARED FOR TAKEOFF

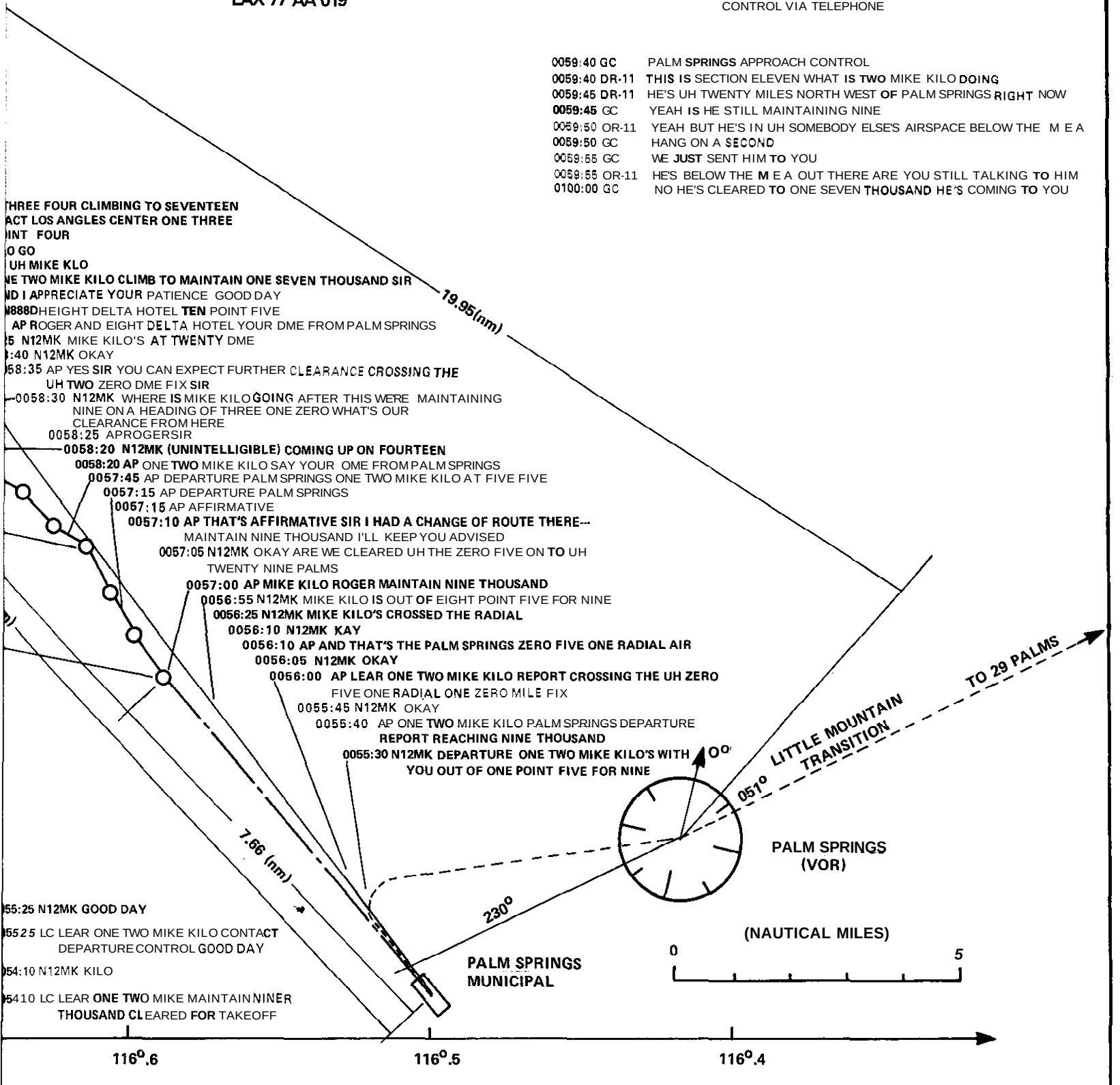
JET AVIA LEAR 24 N12 MK
LAX 77 AA 019

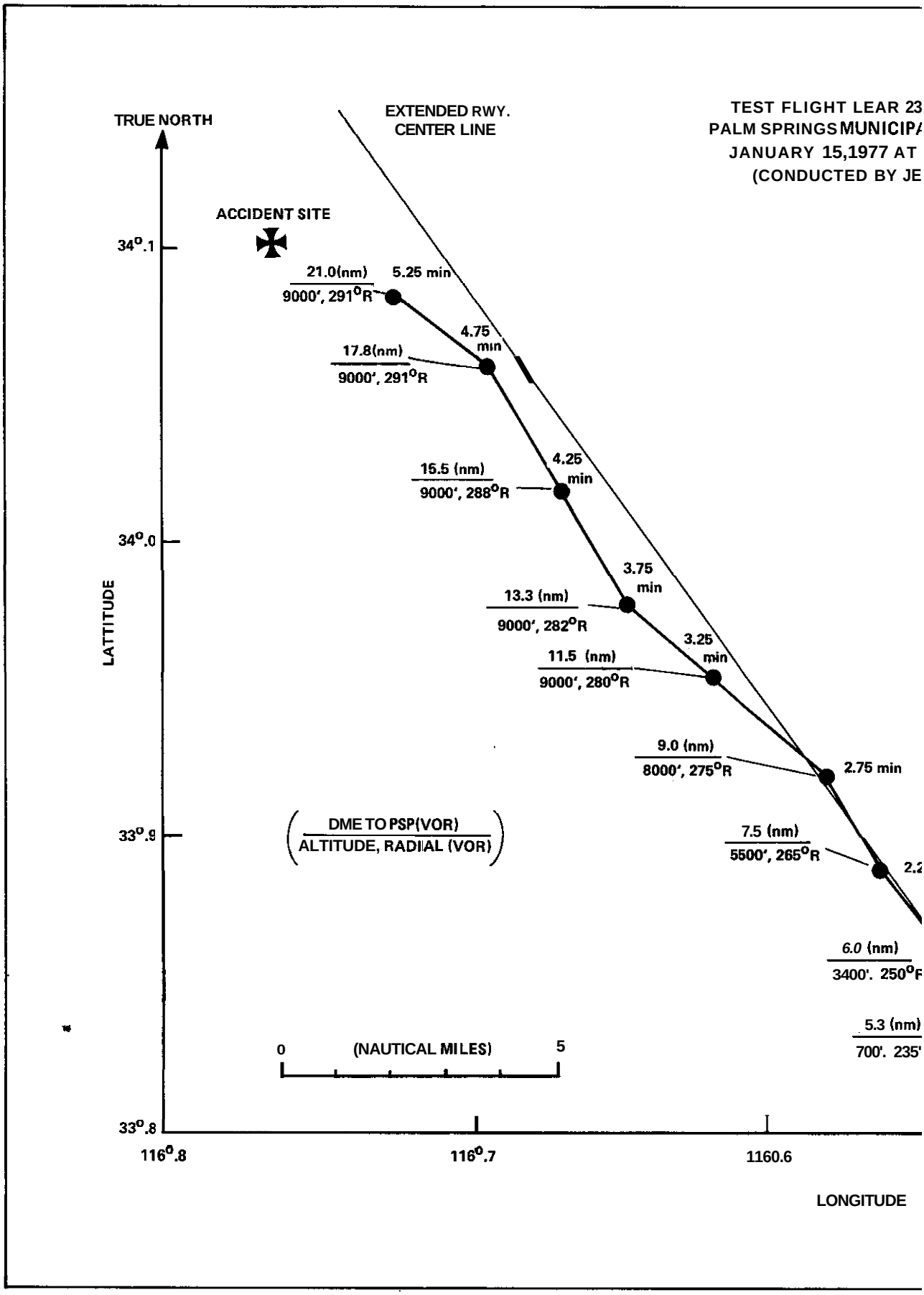
LOS ANGLES (ARTCC) TO PALM SPRINGS GROUND CONTROL VIA TELEPHONE

0059:40 GC PALM SPRINGS APPROACH CONTROL
0059:40 DR-11 THIS IS SECTION ELEVEN WHAT IS TWO MIKE KILO DOING
0059:45 DR-11 HE'S UH TWENTY MILES NORTH WEST OF PALM SPRINGS RIGHT NOW
0059:45 GC YEAH IS HE STILL MAINTAINING NINE
0059:50 OR-11 YEAH BUT HE'S IN UH SOMEBODY ELSE'S AIRSPACE BELOW THE M E A
0059:50 GC HANG ON A SECOND
0059:55 GC WE JUST SENT HIM TO YOU
0059:55 OR-11 HE'S BELOW THE M E A OUT THERE ARE YOU STILL TALKING TO HIM
0100:00 GC NO HE'S CLEARED TO ONE SEVEN THOUSAND HE'S COMING TO YOU

THREE FOUR CLIMBING TO SEVENTEEN
ACT LOS ANGLES CENTER ONE THREE
INT FOUR
O GO
UH MIKE KLO
NE TWO MIKE KILO CLIMB TO MAINTAIN ONE SEVEN THOUSAND SIR
ND I APPRECIATE YOUR PATIENCE GOOD DAY
N888D HEIGHT DELTA HOTEL TEN POINT FIVE
AP ROGER AND EIGHT DELTA HOTEL YOUR DME FROM PALM SPRINGS
5 N12MK MIKE KILO'S AT TWENTY DME
:40 N12MK OKAY
58:35 AP YES SIR YOU CAN EXPECT FURTHER CLEARANCE CROSSING THE UH TWO ZERO DME FIX SIR
0058:30 N12MK WHERE IS MIKE KILO GOING AFTER THIS WERE MAINTAINING NINE ON A HEADING OF THREE ONE ZERO WHAT'S OUR CLEARANCE FROM HERE
0058:25 APROGERSIR
0058:20 N12MK (UNINTELLIGIBLE) COMING UP ON FOURTEEN
0058:20 AP ONE TWO MIKE KILO SAY YOUR OME FROM PALM SPRINGS
0057:45 AP DEPARTURE PALM SPRINGS ONE TWO MIKE KILO AT FIVE FIVE
0057:15 AP DEPARTURE PALM SPRINGS
0057:15 AP AFFIRMATIVE
0057:10 AP THAT'S AFFIRMATIVE SIR I HAD A CHANGE OF ROUTE THERE--- MAINTAIN NINE THOUSAND I'LL KEEP YOU ADVISED
0057:05 N12MK OKAY ARE WE CLEARED UH THE ZERO FIVE ON TO UH TWENTY NINE PALMS
0057:00 AP MIKE KILO ROGER MAINTAIN NINE THOUSAND
0056:55 N12MK MIKE KILO IS OUT OF EIGHT POINT FIVE FOR NINE
0056:25 N12MK MIKE KILO'S CROSSED THE RADIAL
0056:10 N12MK KAY
0056:10 AP AND THAT'S THE PALM SPRINGS ZERO FIVE ONE RADIAL AIR
0056:05 N12MK OKAY
0056:00 AP LEAR ONE TWO MIKE KILO REPORT CROSSING THE UH ZERO FIVE ONE RADIAL ONE ZERO MILE FIX
0055:45 N12MK OKAY
0055:40 AP ONE TWO MIKE KILO PALM SPRINGS DEPARTURE REPORT REACHING NINE THOUSAND
0055:30 N12MK DEPARTURE ONE TWO MIKE KILO'S WITH YOU OUT OF ONE POINT FIVE FOR NINE

55:25 N12MK GOOD DAY
5525 LC LEAR ONE TWO MIKE KILO CONTACT DEPARTURE CONTROL GOOD DAY
54:10 N12MK KILO
5410 LC LEAR ONE TWO MIKE MAINTAIN NINER THOUSAND CLEARED FOR TAKEOFF





TEST FLIGHT LEAR 23
PALM SPRINGS MUNICIP/
JANUARY 15,1977 AT
(CONDUCTED BY JE

TEST FLIGHT LEAR 23 N400CS
PALM SPRINGS MUNICIPAL AIRPORT
JANUARY 15,1977 AT 1700 (PST)
(CONDUCTED BY JET AVIA)

TIME (min)	PALM SPRINGS (VOR) RADIAL	DME	ALTITUDE (feet)
0.08	ACKNOWLEDGED CLEARANCE		
1.00	CROSSED END OF RUNWAY		
1.25	235°	5.3	700'
1.75	250°	6.0	3400'
2.25	265°	7.5	5500'
2.75	275°	9.0	8000'
3.0	LEVEL AT 9000'		
3.25	280'	11.5	9000'
3.75	282°	13.3	
4.25	288°	15.5	
4.75	291°	17.8	
5.25	291°	21.0