FLIGHT SUMMARY REPORT

Flight Number: 99-097

Calendar/Julian Date: 28 August 1999 • 240

Sensor Package: Wild Heerbrugg RC-10
Airborne Visible and Infrared Imaging Spectrometer (AVIRIS)

Area(s) Covered: Mountain Pass; Table Mountain;
San Joaquin Valley; Mammoth Mountain, CA

Investigator(s): Green, JPL; Gat NASA SSC XA00;
Hausback, CSU Sacramento

Aircraft #: 809

SENSOR DATA

Accession #	05379	-----
Sensor ID #:	034	099
Sensor Type:	RC-10	AVIRIS
Focal Length:	12” 304.66mm	-----
Film Type:	Aerochrome IR SO-134	-----
Filtration:	Wratten 12	-----
Spectral Band:	510-900nm	-----
f Stop:	11	-----
Shutter Speed:	1/325	-----
# of Frames:	131	-----
% Overlap:	60	-----
Quality:	Excellent	-----
Remarks:	Subtract 4 seconds for correct UTC	

Airborne Science and Applications Program

The Airborne Science Branch at NASA's Dryden Flight Research Center, Edwards, California, operates two ER-2 high altitude aircraft in support of NASA earth science research. The ER-2s are used as readily deployable high altitude sensor platforms to collect remote sensing and in situ data on earth resources, celestial phenomena, atmospheric dynamics, and oceanic processes. Additionally, these aircraft are used for electronic sensor research and development and satellite investigative support.

The ER-2s are flown from various deployment sites in support of scientific research sponsored by NASA and other federal, state, university, and industry investigators. Data are collected from deployment sites in Kansas, Texas, Virginia, Florida, and Alaska. Cooperative international scientific projects have deployed the aircraft to sites in Great Britain, Australia, Chile, Fiji, New Zealand, and Norway.

Photographic and digital imaging sensors are flown aboard the ER-2s in support of research objectives defined by the sponsoring investigators. High resolution mapping cameras and digital multispectral imaging sensors are utilized in a variety of configurations in the ER-2s' four pressurized experiment compartments. The following provides a description of the digital multispectral sensor(s) and camera(s) used for data collection during this flight.

Airborne Visible and Infrared Imaging Spectrometer

The Airborne Visible and Infrared Imaging Spectrometer (AVIRIS) is the second in the series of imaging spectrometer instruments developed at the Jet Propulsion Laboratory (JPL) for earth remote sensing. This instrument uses scanning optics and four spectrometers to image a 614 pixel swath simultaneously in 224 contiguous spectral bands (0.4-2.4 mm).

AVIRIS parameters are as follows:

IFOV:	1 mrad
Ground Resolution:	66 feet (20 meters) at 65,000 feet
Total Scan Angle:	30°
Swath Width:	5.7 nmi (10.6 km) at 65,000 feet
Spectral Coverage:	0.41-2.45 mm
Pixels/Scan Line:	614
Number of Spectral Bands:	224
Digitization:	10-bits
Data Rate:	17 MBPS

Spectrometer	Wavelength Range	Number of Bands	Sampling Interval
1	0.41 - 0.70 mm	31	9.4 nm
2	0.68 - 1.27 mm	63	9.4 nm
3	1.25 - 1.86 mm	63	9.7 nm
4	1.84 - 2.45 mm	63	9.7 nm

All AVIRIS data is decommutated and archived at JPL and not currently available for public distribution. For further information contact Rob Green at Jet Propulsion Laboratory, 4800 Oak Grove Drive, Mail Stop 183-501, Pasadena, California 91109-8099.

Camera Systems

Various camera systems and films are used for photographic data collection. Film types include high definition color infrared, natural color, and black and white emulsions. Available photographic systems are as follows:

- Wild-Heerbrugg RC-10 metric mapping camera
  - 9 x 9 inch film format
  - 6 inch focal length lens provides area coverage of 16 x 16 nautical miles from 65,000 feet
  - 12 inch focal length lens provides area coverage of 8 x 8 nautical miles from 65,000 feet

- Hycon HR-732 large scale mapping camera
  - 9 x 18 inch film format
  - 24 inch focal length lens provides area coverage of 4 x 8 nautical miles from 65,000 feet

- IRIS II Panoramic camera
  - 4.5 x 34.7 inch film format
  - 24 inch focal length lens
  - 90 degree field of view provides area coverage of 2 x 21.4 nautical miles from 65,000 feet

Data Availability

The U.S. Geological Survey's EROS Data Center at Sioux Falls, South Dakota serves as the archive and product distribution facility for Airborne Science Program aircraft acquired photographic and digital imagery. The photographic archive consists of photography acquired by the program from 1971 to April 1996. For information regarding photography and digital data (including areas of coverage, products, and product costs) contact EROS Data Center, Customer Services, Sioux Falls, South Dakota 57198 (Telephone: 605-594-6151).

As of April 1996 the EROS Data Center no longer receives an archive copy of newly acquired Airborne Science Program photography. Original photography is archived with the Airborne Sensor Facility at Ames Research Center. A user copy of the photography is provided to the principal investigators for each flight. Principal investigators are cited on the first page of their respective flight summary reports. For information regarding photography acquired from April 1996 to the present contact the Airborne Sensor Facility as follows:

Flight Documentation and Data Archive Searches

The following is the web site for flight documentation as published by the Airborne Sensor Facility at NASA Ames Research Center:

http://asapdata.arc.nasa.gov/er-2fsr.html

Additional information regarding flight documentation to include data archive searches, data availability, sensor parameters, and areas of coverage may be obtained from the following:

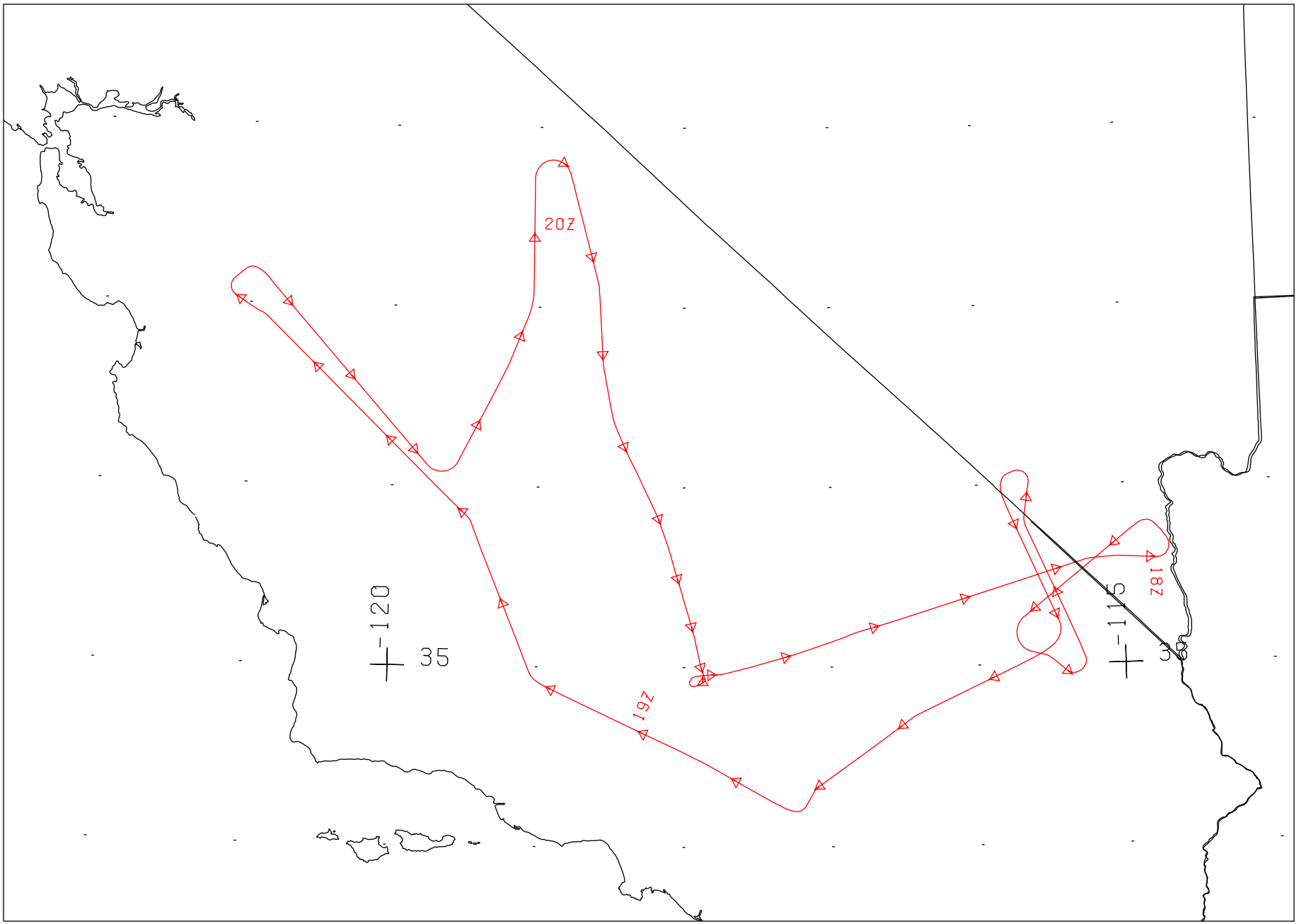
Airborne Sensor Facility
MS 240-6
NASA Ames Research Center
Moffett Field, CA 94035-1000
Telephone: (650)604-6252 (FAX 4987)

CAMERA FLIGHT LINE DATA
FLIGHT NO. 99-097

Accession # 05379

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec) START	Time (GMT-hr, min, sec) END	Altitude, MSL feet/meters	Cloud Cover/Remarks
A - B	2317-2330	18:04:28	18:10:33	66300/20208	Minor-10% cumulus (frames 2319-2322); static discharge (frame 2330)
C - D	2331-2344	18:17:06	18:23:20	65700/20225	Minor-10% cumulus (frames 2331-2332); static discharge (frames 2338-2344)
E - F	2345-2359	18:28:43	18:35:12	65700/20225	Clear
G - H	2360-2369	18:52:22	18:56:24	65700/20225	Clear
I - J	2370-2381	19:07:27	19:12:19	65700/20225	Clear; static discharge (frame 2381)
K - L	2382-2408	19:15:43	19:28:01	65700/20225	Clear
M - N	2409-2436	19:33:14	19:45:34	65700/20025	Clear; static discharge (frame 2435)
O - P	2437-2447	19:57:59	20:02:26	66100/20147	Clear



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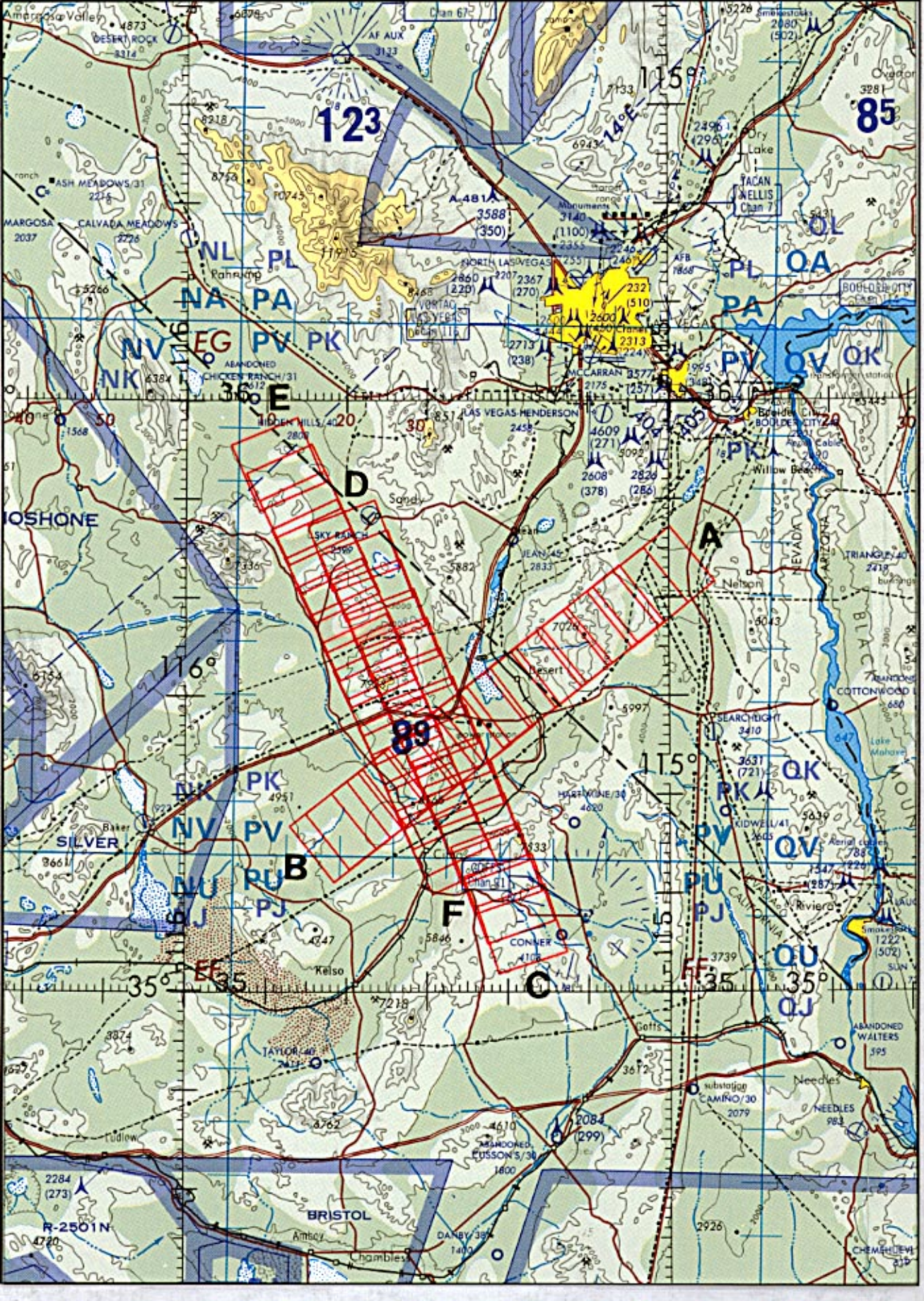

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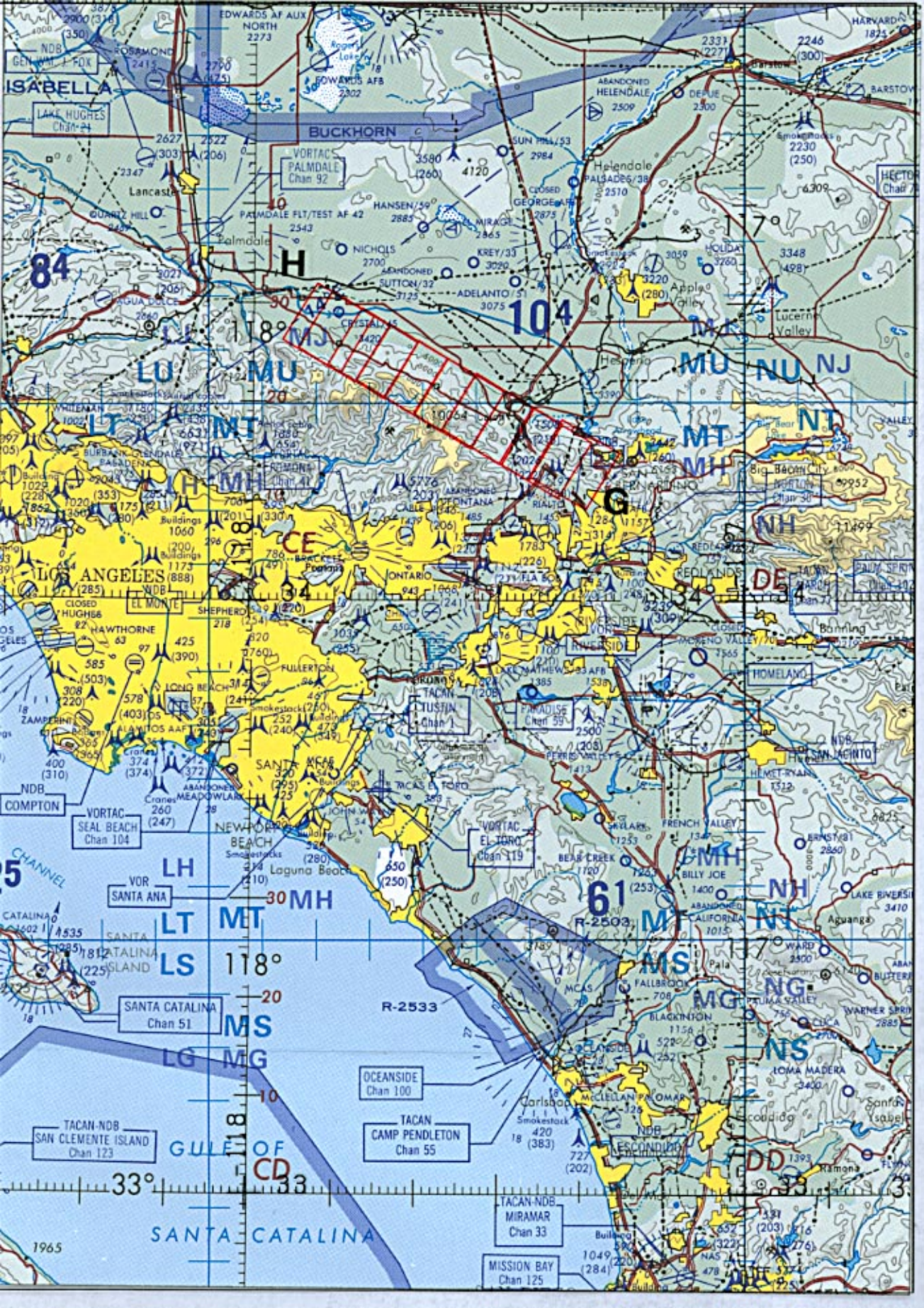
ISABELLA
BUCKHORN
VORTAC PALMDALE Chan 92
PALMDALE FLT/TEST AF 42
Palmdale
Lancaster
Helendale
Apple Valley
Lucerne Valley
Hesperia
ADELANTO
NICHOLS
SUTTON
HANSEN
KREY
MIRAGE
GEORGE AFB
EDWARDS AF AUX NORTH
EDWARDS AFB
ROSAMOND
LAKE HUGHES Chan 21
HARVARD
BARSTOW
ABANDONED HELENDALE
DEPUE
SUN HILL
HOLIDAY
LOS ANGELES
EL MONTE
HAWTHORNE
BURBANK GLENDALE PASADENA
FONTANA
ONTARIO
REDLANDS
RIVERSIDE
RIVERSIDE VOR
Banning
HOMELAND
SAN JACINTO
FULLERTON
LONG BEACH
SANTA ANA MCAS
TACAN TUSTIN Chan 1
MCAS EL TORO
VORTAC EL TORO Chan 119
NEWPORT BEACH
Laguna Beach
COMPTON
VORTAC SEAL BEACH Chan 104
VOR SANTA ANA
SANTA CATALINA ISLAND
SANTA CATALINA Chan 51
TACAN-NDB SAN CLEMENTE ISLAND Chan 123
OCEANSIDE Chan 100
TACAN CAMP PENDLETON Chan 55
TACAN-NDB MIRAMAR Chan 33
MISSION BAY Chan 125
ESCONDIDO
Carlsbad
MCCLELLAN PALOMAR
FALLBROOK
MCAS
PERRIS VALLEY
FRENCH VALLEY
BEAR CREEK
BILLY JOE
ABANDONED CALIFORNIA
LAKE RIVERSIDE
Aguanga
Pala
Pauma Valley
Warner Springs
Ramona
Santa Isabel
Escondido
Loma Madera
Blackinton
R-2503
R-2533
GULF OF
SANTA CATALINA
CHANNEL
1965
84
10
61
118°
33°
LH
LT
LS
LG
MH
MT
MS
MG
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RC-10
A/C 809
28 AUGUST 1999
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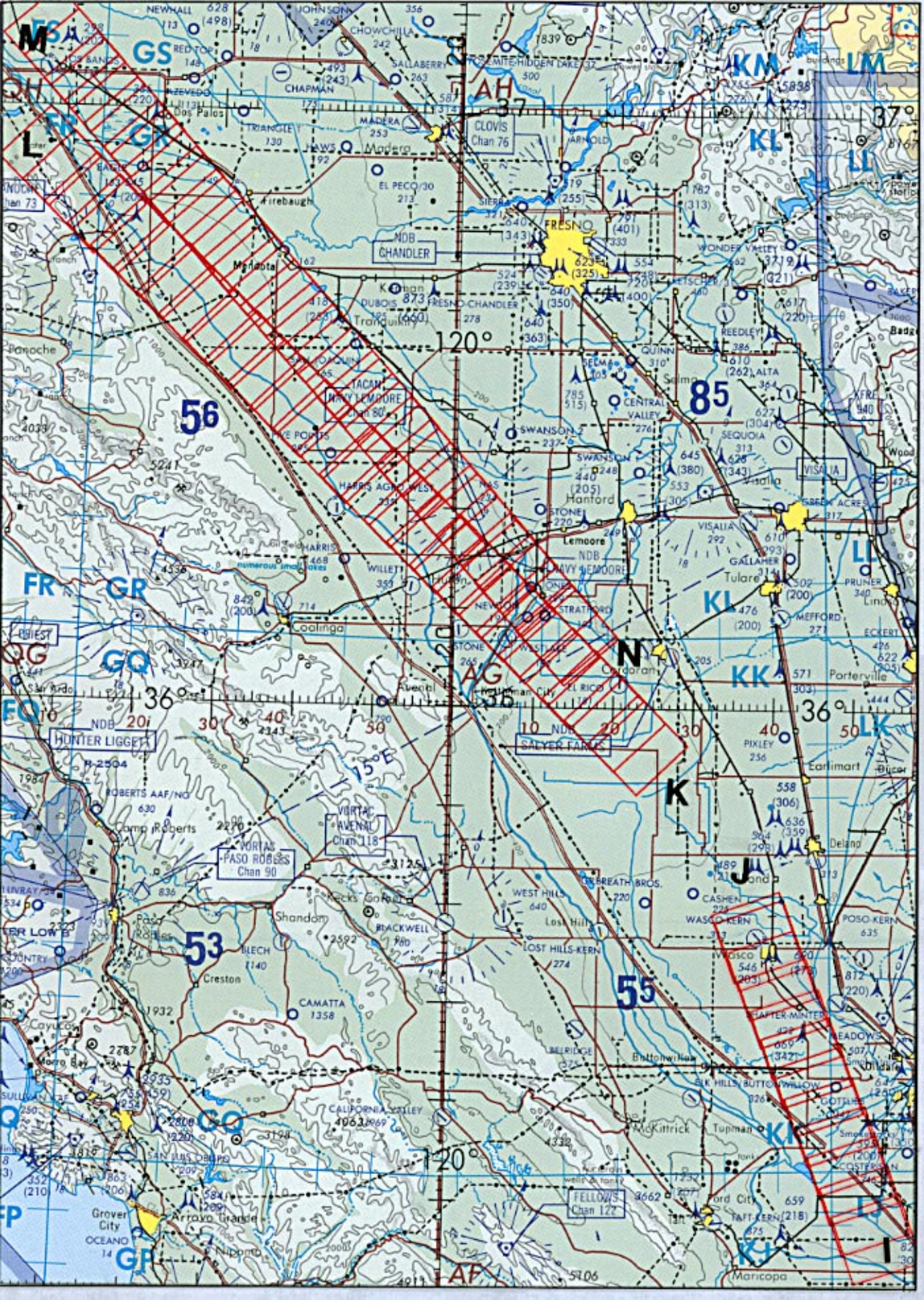
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A/C 809
RC-10
ONC G-18
FRESNO
CLOVIS
Chan 76
NDB
CHANDLER
HANFORD
Lemoore
NDB
NAVY LEMOORE
VISALIA
Tulare
Porterville
Earlimart
Delano
Shafter-Minter
Bakersfield
Arvin
Edison
Maricopa
Taft
McKittrick
Buttonwillow
Lost Hills
West Hills
Wasco-Kern
Posa-Kern
Meadows
Pixley
Mefford
Eckert
Pruner
Gallaher
Sequoia
Alta
Reedley
Quinn
Seelma
Central Valley
Swanson
Stone
Willett
Harris
Harris Ag West
Stratford
Westlake
Cardoran
Avenal
Kettleman City
El Rico
Salyer Farms
NDB
HUNTER LIGGETT
VORTAC
AVENAL
Chan 118
VORTAC
PASO ROBLES
Chan 90
Roberts AAF/NO
Camp Roberts
Paso Robles
Shandon
Creston
Camatta
Blech
Blackwell
Breath Bros.
Fellows
Chan 122
Arroyo Grande
Grover City
Oceano
Nipomo
San Luis Obispo
Morro Bay
Cayucos
Los Banos
Dos Palos
Firebaugh
Madera
Mendota
Tranquillity
Kerman
Fresno-Chandler
Dubois
Tacan
Harry Lemoore
Chan 80
Jacalitos
Triangle
Chowchilla
Sallaberry
Johnson
Newhall
Red Top
Chapman
Azevedo
Jaws
El Peco/30
Sierra
Arnold
Yosemite-Hidden Lake
Wonder Valley
Fletcher
Xfre
Badger
Wood
Lind
Delano
Camp Roberts
Roberts AAF/NO
Numerous Small Lakes
Numerous Small Lakes
120°
120°
36°
36°
37°
15°E
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FR
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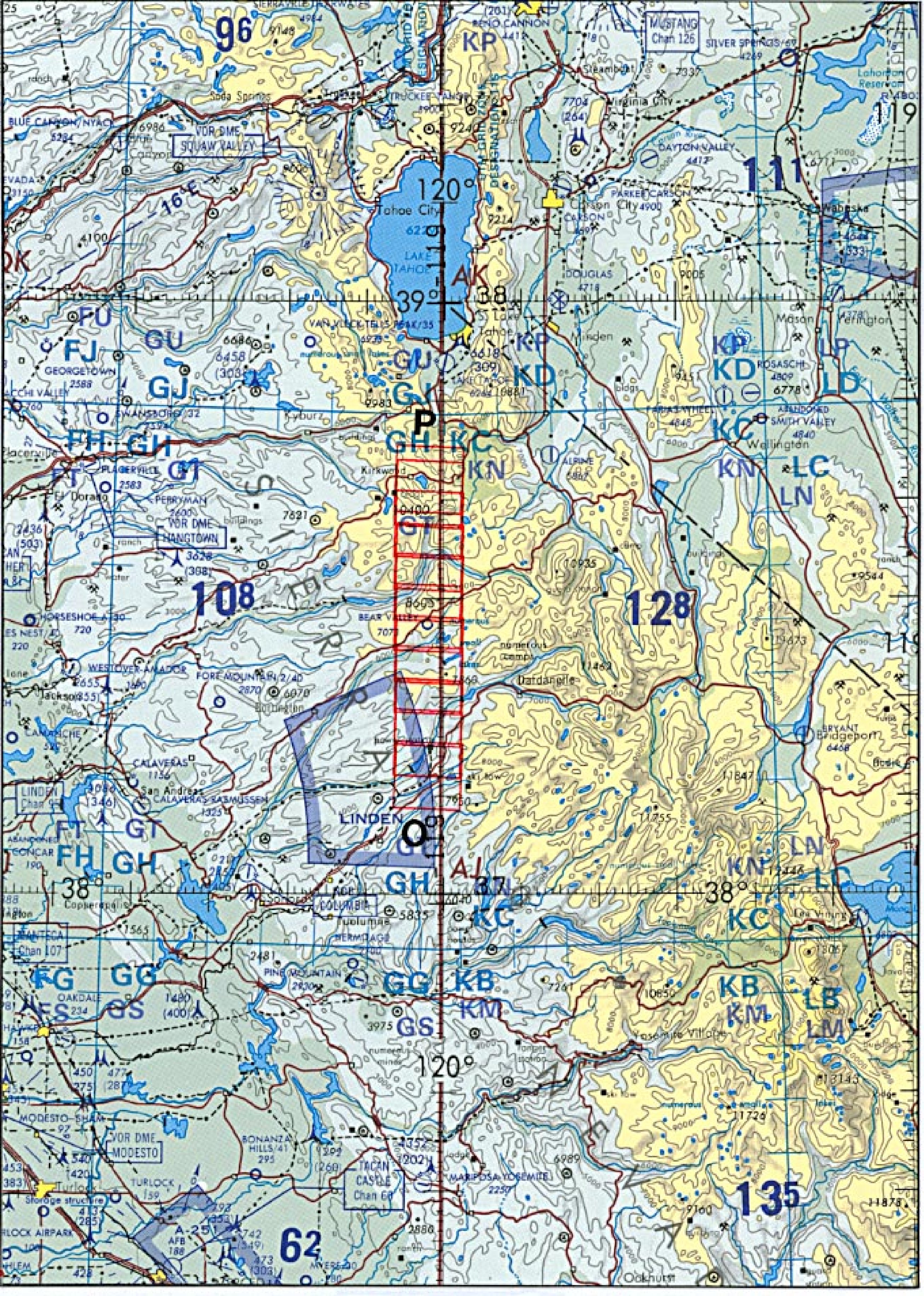

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