

APPLICATION FOR NEW OR MODIFIED RADIO STATION AUTHORIZATION UNDER PART 5
OF FCC RULES - EXPERIMENTAL RADIO SERVICE (OTHER THAN BROADCAST)

1. Applicant's Name and Post Office address (Street address, city, state, and ZIP Code. See Instruction No. 4) COUNTY OF LOS ANGELES 1110 NORTH EASTERN AVE LOS ANGELES, CA 90063-3297	File No. DO NOT WRITE IN THIS BLOCK
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2(a). Application for (check only one box)
☒ New station ☐ Modification of existing authorization

2(b). For Modification indicate below:
File No: _____ Call Sign: _____

3. Application for Modification: Check the box beside all particulars to be modified. Check either addition or replacement to indicate whether the change is an addition or a replacement of parameters in the current authorization.

☐ FREQUENCY - ☐ EMISSION - ☐ POWER - ☐ LOCATION -
☐ addition or ☐ replacement? ☐ addition or ☐ replacement? ☐ addition or ☐ replacement? ☐ addition or ☐ replacement?

☐ OTHER PARTICULARS - addition or replacement? Describe below or in attached EXHIBIT No. _____)

4. Particulars of Operation (see instruction below)

Frequency bands (whether MHz or MHz)	POWER			EMISSION	MODULATING SIGNAL	NECESSARY BANDWIDTH (kHz)
	(B)	(C)	(D)			
2402 to 2412 MHz	10 W	10 W	10 W	10M00F9F	+/-3.6 MHz	10 MHz
2414 to 2424 MHz	"	"	"	"	"	"
2426 to 2436 MHz	"	"	"	"	"	"
2438 to 2448 MHz	"	"	"	"	"	"

- (A) List each frequency or frequency band separately. (If more space is required, attach as EXHIBIT No. _____)
- (B) Insert maximum R.F. output power at the transmitter terminals. Specify units.
- (C) Insert maximum effective radiated power from the antenna (if pulsed emission, specify peak power). Specify units.
- (D) Insert "MEAN" or "PEAK" (See definitions in Part 5).
- (E) List each type of emission separately for each frequency. (See Section 2.201 of FCC Rules)
- (F) Insert as appropriate for the type of modulation:
(1) the maximum speed of keying in bauds;
(2) maximum audio modulating frequency;
(3) frequency deviation of carrier;
(4) pulse duration and repetition rate.
For complex emissions, describe in detail in the space provided below.
- (G) Describe how the necessary bandwidth was determined in space provided below.

5(d). Proposed location of transmitter and transmitting antenna (check only one box to indicate type of operation):
☐ FIXED/BASE ☒ MOBILE ☐ BASE AND MOBILE

5(e). If permanently located at a FIXED location, give below:
 State _____ County _____ City or Town _____
 Number and street (or other indication of location) _____

5(f). If mobile, describe the exact area of operation:
 Los Angeles County and Vicinity

5(g)(1). Enter geographical coordinates exact to the nearest second (see instruction 10):
 North Latitude (DD-MM-SS) _____ West Longitude (DD-MM-SS) _____

5(g)(2). Enter geographical coordinates of the approximate center of mobile operation (see instruction 10):
 North Latitude _____ West Longitude _____
 34° - 32' - 48" 118° - 13' - 00"

5(h). Datum (see instruction 10): ☒ NAD 27 ☐ NAD 83

6. Is a directional antenna (other than radar) used? ☒ YES ☐ NO
 If "YES", give the following information:
 (a) Width of beam in degrees at the half-power point 20° Horizontal & 30° Vertical
 (b) Orientation in horizontal plane 360° (c) Orientation in vertical plane 0°

7. Is this authorization to be used for fulfilling the requirement of a government contract with an agency of the United States Government? ☐ YES ☒ NO
 If "YES", attach as EXHIBIT No. _____ a narrative statement describing the government project, agency and contact number.

8. Is this authorization to be used for the exclusive purpose of developing radio equipment for export to be employed by stations under the jurisdiction of a foreign government? ☐ YES ☒ NO
 If "YES", attach as EXHIBIT No. _____ the following information: Provide the contract number and the name of the foreign government concerned.

9. Is this authorization to be used for providing communications essential to a research project? (The radio communication is not the objective of the research project) ☐ YES ☒ NO
 If "YES", attach as EXHIBIT No. _____ a narrative statement providing the following information:
 (a) A description of the nature of the research project being conducted.
 (b) A showing that the communications facilities requested are necessary for the research project involved.
 (c) A showing that existing communications facilities are inadequate.

10. If all the answers to Items 7, 8, and 9, are "NO", attach as EXHIBIT No. A a narrative statement describing in detail the following:
 (a) The complete program of research and experimentation proposed including description of equipment and theory of operation.
 (b) The specific objectives sought to be accomplished.
 (c) How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion, or utilization of the radio art, or is along line not already investigated.

11(a). Give an estimate of the length of time that will be required to complete the program of experimentation proposed in this application: SEE EXHIBIT A
 (b) If less than 2 years, give the length of time in months that the authorization requested in this application will be required: _____

12. Would a Commission grant of this application come within Section 11807 of the FCC Rules, such that it may have a significant environmental impact (see instruction 11)? ☐ YES ☒ NO
 If "YES", attach as EXHIBIT No. _____ an Environmental Assessment as required by Section 11801.

13. List below transmitting equipment to be installed (if experimental, so state):

MANUFACTURER	MODEL NUMBER	NO. OF UNITS
WESCAM	1) WESCAM 12	1 lot
	2) SKYPOD V SYSTEMS	1 lot
	3) FIVE STRATEGIC RECTIME SITE UECNLI-2C	5 ea
	4) TACTICAL IC RECEIVERS 18RC2GD	3 ea
	5) MASTER CONTROL SYSTEM TSL700PC	1 lot

12. Is the equipment listed in Item 18 capable of station identification pursuant to Section 5152? ☒ YES ☐ NO
11. Will the antenna extend more than 6 meters above the ground, or if mounted on an existing building, will it extend more than 6 meters above the building, or will the proposed antenna be mounted on an existing structure other than a building? ☐ YES ☒ NO
- If "YES", give the following (see instruction 9):
- (a) Overall height above ground to tip of antenna is _____ meters
- (b) Elevation of ground at antenna site above mean sea level is _____ meters
- (c) Distance to nearest aircraft landing area is _____ kilometers
- (d) List any natural formations of existing man-made structures (hills, trees, water tanks, towers, etc) which, in the opinion of the applicant, would tend to shield the antenna from aircraft and thereby minimize the aeronautical hazard of the antenna.
- (e) Submit as EXHIBIT No. _____ a vertical profile sketch of total structure including supporting building, if any, giving heights in meters above ground for all significant features. Clearly indicate existing portion, noting particulars of aviation obstruction lighting already available.
13. Applicant is (check only one box)
- ☐ INDIVIDUAL ☐ ASSOCIATION ☐ PARTNERSHIP ☐ CORPORATION
- ☒ OTHER (describe in space provided below)

Governmental Entity (County of Los Angeles)

17. Is applicant a foreign government or a representative of a foreign government? ☐ YES ☒ NO
18. Has applicant or any party to this application had any FCC station license or permit revoked or had any application for permit, license or renewal denied by this Commission? ☐ YES ☒ NO
- If "YES", attach as EXHIBIT No. _____ a statement giving full sign of license or permit revoked and relate circumstances.
15. Will applicant be owner and operator of the station? ☒ YES ☐ NO
14. Give name, title, and telephone number (include area code), and Internet e-mail address (if applicable) of person who can best handle inquiries pertaining to this application.

Gary Poon Telecommunications Engineer (323) 267-3004 gpoon@co.la.ca.us

13. APPLICANT ANTI-DRUG ABUSE CERTIFICATION:

By checking "YES", the individual applicant certifies that he or she is eligible for this license. This requires that he or she is not subject to a denial of federal benefits, including FCC benefits, as a result of a drug offense conviction pursuant to Section 882 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 882. A non-individual applicant, e.g., corporation, partnership or other unincorporated association, certifies that no party to the application is subject to a denial of federal benefits pursuant to that section. For definition of a "party" for these purposes, see 47 CFR 1.2002(b).

☒ YES ☐ NO

12. List below all exhibits in numerical sequence and the item number of form requiring the exhibit identified.

EXHIBIT NUMBER	ITEM NO. OF FORM	EXHIBIT NUMBER	ITEM NO. OF FORM	EXHIBIT NUMBER	ITEM NO. OF FORM
Exhibit A	# 10 #11				

23 CERTIFICATION:

Attention: Read this certification carefully before signing this application.

THE APPLICANT CERTIFIES THAT:

- (a) Copies of FCC Rule Parts 2 and 5 are on hand; and
- (b) Adequate financial appropriations have been made to carry on the program of experimentation which will be conducted by qualified personnel; and
- (c) All operations will be on an experimental basis in accordance with Part 5 and other applicable rules, and will be conducted in such a manner and at such a time as to preclude harmful interference to any authorized station; and
- (d) Grant of the authorization requested herein will not be construed as a finding on the part of the Commission:
 - (1) that the frequencies and other technical parameters specified in the authorization are the best suited for the proposed program of experimentation, and
 - (2) that the applicant will be authorized to operate on any basis other than experimental, and
 - (3) that the Commission is obligated by the results of the experimental program to make provision in its rules including its table of frequency allocations for applicant's type of operation on a regularly licensed basis.

APPLICANT CERTIFIES FURTHER THAT:

- (e) All the statements in the application and attached exhibits are true, complete and correct to the best of the applicant's knowledge; and
- (f) The applicant is willing to finance and conduct the experimental program with full knowledge and understanding of the above limitations; and
- (g) The applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the USA.

Signed and dated this 10th day of August, 19 99

Name of Applicant COUNTY OF LOS ANGELES

(must correspond with name given on page 1)

By GARY POON
(print)

[Signature]
(signature)

Title TELECOM. SYS. ENGR.

Check appropriate classification:

- ☐ Individual applicant ☐ Member of applicant partnership
- ☒ Authorized employee ☐ Office of applicant corporation or association

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

**NOTIFICATION TO INDIVIDUALS UNDER PRIVACY ACT OF 1974
AND THE PAPERWORK REDUCTION ACT OF 1980**

Information requested through this form is authorized by the Communications Act of 1934, as amended, and specified by Section 308 therein. The information will be used by Federal Communications Commission staff to determine eligibility for issuing authorizations in the use of the frequency spectrum and to effect the provisions of regulatory responsibilities rendered by the Commission by the Act. Information requested by this form will be available to the public unless otherwise requested pursuant to 47 CFR 0.459 of the FCC Rules and Regulations. Your response is required to obtain this authorization.

Public reporting burden for this collection of information is estimated to average four (4) hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden to the Federal Communications Commission, Records Management Branch, Paperwork Reduction Project (3060-0065), Washington, DC 20554. DO NOT send completed applications to this address. Individuals are not required to respond to this collection unless it displays a currently valid OMB control number.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-579, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(3), AND THE PAPERWORK REDUCTION ACT OF 1980, P.L. 96-511, DECEMBER 11, 1980, 44 U.S.C. 3607.

FCC FORM 442

FOR
FCC
USE
ONLY

APPLICATION FOR NEW OR MODIFIED RADIO STATION AUTHORIZATION UNDER PART 5
OF FCC RULES - EXPERIMENTAL RADIO SERVICE (OTHER THAN BROADCAST)

SECTION I

APPLICANT NAME (Last, first, middle initial)

COUNTY OF LOS ANGELES

MAILING ADDRESS (Line 1) (Maximum 85 characters - refer to instruction (2) on reverse of form)

1110 NORTH EASTERN AVE

MAILING ADDRESS (Line 2) (If required) (Maximum 85 characters)

CITY

LOS ANGELES

STATE OR COUNTRY (if foreign address)

CA

ZIP CODE

90063-3297

CALL SIGN OR FILE NUMBER

Enter in Column (A) the correct Fee Type Code for the service you are applying for. Fee Type Codes may be found in FCC Fee Filing Guides. Enter in Column (B) the Fee Multiple, if applicable. Enter in Column (C) the result obtained from multiplying the value of the Fee Type Code in Column (A) by the number entered in Column (B), if any.

(A)

(B)

(C)

FEE TYPE CODE

FEE MULTIPLE
(if required)

FEE DUE FOR FEE TYPE
CODE IN COLUMN (A)

FOR FCC USE ONLY

(1)

E A E

\$

SECTION II

— To be used only when you are requesting concurrent actions which result in a requirement to list more than one Fee Type Code.

(A)
FEE TYPE CODE

(B)
FEE MULTIPLE
(if required)

(C)
FEE DUE FOR FEE TYPE
CODE IN COLUMN (A)

FOR FCC USE ONLY

(2)

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(3)

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(4)

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\$

(5)

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\$

ADD ALL AMOUNTS SHOWN IN COLUMN C, LINES (1) THROUGH (5), AND ENTER THE TOTAL HERE. THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED REMITTANCE.

TOTAL AMOUNT REMITTED
WITH THIS APPLICATION
OR FILING

\$

FOR FCC USE ONLY



COUNTY OF LOS ANGELES
Internal Services Department
1100 Eastern Avenue
Los Angeles, California, 90063

LA
0227

JOAN OUDERKIRK
Interim Director

TELEPHONE: (323) 267-2101
FACSIMILE: (323) 264-7135

August 9, 1999

0217 EX PL 1999

To: Federal Communications Commission
Office of Engineering and Technology
Experimental Radio Service

From: Richard Granado, Division Manager
Radio Systems Division

R. Granado

Subject: **APPLICATION FOR AIRBORNE MICROWAVE DOWNLINK VIDEO
EXPERIMENTAL LICENSE**

The County of Los Angeles is submitting the attached application FCC Form 442 for an experimental radio license authorized under Part 5 of the FCC rules. The County will be testing downlink video for police and fire tactical operation in an underutilized 2402 to 2448 MHz band spectrum.

Enclosed along with the application is additional information furnished to satisfy items "10" and "11" on Form 442.

Exhibit A – A complete program description of experimentation, description of equipment and theory of operation, objective sought to accomplish and anticipated experiment schedule.

Attachment 1 - Diagram of Proposed System – County Airborne Video

Attachment 2 - Example of Existing Broadcast Network in Southern California

Attachment 3 - 2380 to 2450 MHz Spectrum Signal Radiation Report

Attachment 4 - Compliance Statement from Equipment Manufacturers

Should you have questions regarding this matter, please call Gary Poon of my engineering staff at (323) 267-3004.

EXHIBIT A

County of Los Angeles

**APPLICATION FOR AIRBORNE MICROWAVE DOWNLINK VIDEO EXPERIMENTAL
LICENSE**

August 9, 1999

Objective

The purpose of this experimental license is to demonstrate that public safety agencies in the Greater Los Angeles area, can use commercially available equipment in the underutilized 2402 to 2448 MHz spectrum to transmit microwave video images from airborne platforms to benefit ground tactical operations.

The specific objectives sought by this experimental license is to prove that public safety agencies in the Los Angeles area can share use of the underutilized 2402 to 2448 MHz spectrum without causing interference amongst themselves, or to existing entities.

If successful, this experiment will help alleviate a critical need that exists in the Greater Los Angeles area for additional microwave frequencies. By working in conjunction with equipment manufacturers and broadcasting entities, public safety agencies intend to maximize the use of the spectrum by using state-of-the-art equipment to minimize bandwidth and signal deviation.

Description of Experimentation

Law enforcement agencies, fire departments, disaster relief agencies and other public safety services have a growing operational need for airborne video communications systems. Such operations allow live video to be transmitted from helicopters and other aircraft to command and control centers on the ground, greatly facilitating emergency response activities. Providing such a "birds eye view" can be invaluable in coordinating response to crimes in progress, directing police officers in pursuit situations, battling building and forest fires, controlling civil disturbances, responding to hostage and barricade situations.

This capability is particularly important in expansive, densely populated areas in Southern California. The County of Los Angeles encompasses approximately 4,083 square miles and has a population of over 9.6 million people. To better serve the growing needs of the citizens of this the most populous and third largest county in the State of California, a new countywide airborne downlink video system will be implemented within the

next few months. The County of Los Angeles is anticipating to begin video downlink experimentation within six months of the Federal Communications Commission's granting of experimental license.

The video downlink system will consist of five remote receive sites strategically located throughout the County of Los Angeles. Each of these remote sites will have the ability to automatically track an airborne unit while in flight. The received real time video will be relayed to a central receive site located in the Los Angeles basin. The video images will then be routed via a communications network (microwave, fiber optics, etc.) to the County's Emergency Operations Center (CEOC), and to agencies belonging to the Los Angeles County Sheriff's Department and County Fire Department.

In addition, the County will have the ability to deploy mobile command units capable of receiving the video images transmitted from the airborne units during those events that require the need for emergency tactical operations. The County of Los Angeles will eventually have a total of three Sheriff's Department helicopters and one Fire Department airborne unit equipped with microwave video equipment. A diagram depicting the County's proposed countywide airborne downlink video system is provided in the Attachment 1. Other public safety agencies in Southern California such as the City of Los Angeles, Long Beach, Glendale, and Burbank will also be deploying similar airborne units.

Present Situation

Law enforcement agencies, fire departments, disaster relief agencies, and other public safety services have a growing operational need for airborne video communications especially during events that require the immediate coordination of limited and crucial public resources. Presently, public safety agencies in the Los Angeles area must coordinate the use of their microwave video frequencies with existing television broadcast entities, making it extremely difficult during events that require the immediate attention, response, and coordination of public resources.

Los Angeles County is presently licensed to operate on 2460.9375 MHz for microwave video operations. This frequency is an offset of microwave channels extensively used by television broadcasters in the Los Angeles basin. Even with coordination with these entities, the County encountered many operational conflicts involving the broadcasters.

Frequency Interference exists due many of the extensive networks in operation by the broadcast companies in Southern California. An example of such network for KNBC is shown on Attachment 2. An alternative to geographically separate transmitters to reduce RF interference is to identify spectrum away from existing broadcast offset frequencies.

Findings

Los Angeles County has identified the spectrum between 2402 MHz and 2448 MHz as underutilized in the Greater Los Angeles area. These frequencies are primarily licensed for use for radio astronomy research, amateur radio, and for industrial/medical instrumentation use. The County has conducted extensive monitoring and data collection of this spectrum to confirm the under-utilization of this spectrum and support data is furnished in an Attachment 3. As shown on the attached data sheet, there are minimal activities detected during our sample interval. RF Signals are at -90 dBm (a level approximating the ambient noise level). RF signal measurements are taken from two of primary radio coverage sites in the County - Oat Mountain and Rio Hondo Hills at different dates and times.

Through experimentation and evaluation, the County intends to prove that the underutilized 2402 to 2448 MHz spectrum can co-exist for public safety agencies and the incumbent users without causing mutual interference to each other, thus avoiding potential confrontational disputes over the use of this very in valuable communications resource.

Theory of Operation

The County intends to demonstrate that equipment presently available in the market place can be programmed to operate on frequencies between 2402

MHz and 2448 MHz using less bandwidth (10 MHz) and deviation (3 MHz) and produce a video image that is useful for public safety agencies. Other users of microwave video equipment, such as broadcasters, use technical parameters that are greater than those proposed by the County. By reducing the operational bandwidth, more channels can be incorporated into the same spectrum thus making more efficient use of this very limited and invaluable spectrum. In this particular case, it is expected that the experimental license will demonstrate that at least four channels of 10 MHz each can be obtained from the proposed spectrum. The experimental license will also help alleviate the critical need for additional spectrum for microwave video communications in the Greater Los Angeles area, thus allowing a better co-existence between public safety agencies and broadcasters in the Los Angeles area. Statements from equipment manufacturers are provided in Attachment 4 to confirm that their products will function with the operational parameters proposed by the County.

Equipment Description

Airborne Transmitters

The airborne downlink video transmitters selected for Sheriff's and Fire Departments helicopters will consist of frequency agile transmitters with high-gain directional antenna driven by GPS and compass to track the ground receive sites. They will also include a trackable omni-directional antenna with a switchable in-line attenuator that will allow variable power output selection by the operator via remote control, and a fixed down-looking transmit antenna with minimum coverage of at least a 60-degree wide cone under the aircraft. This antenna will be used to downlink with the mobile receiver sites.

The airborne video transmitters and antennas will be type accepted by the Federal Communications Commission to operate from 1.7 GHz to 2.5 GHz frequency band. They will also be capable of transmitting with both right hand and left hand circular polarization signal and be switchable by remote from inside the helicopter.

All transmitters will also include at least one audio sub-carrier for the transmission of GPS location data from the helicopter to the ground-base receiving antennas. The sub-carrier frequency will be on 4.830 MHz.

Ground Receiver Systems

Five permanent ground based systems will be capable of receiving airborne downlink video transmission in the 1.7 GHz to 2.5 GHz microwave band including at least one audio sub-carrier. All necessary antenna control functions will be remotely controllable from the Central Receive Site (CRS). The CRS location will serve as the video control center to monitor and distribute the video images to designated County facilities via fiber optics and digital microwave.

Portable/Mobile Receiver Site Systems

The mobile systems will be ruggedized, self-contained, portable receiver stations, which will operate on either AC or DC powers and be capable of being vehicle mounted. Each unit will include a video monitor and signal metering system for best reception tuning.

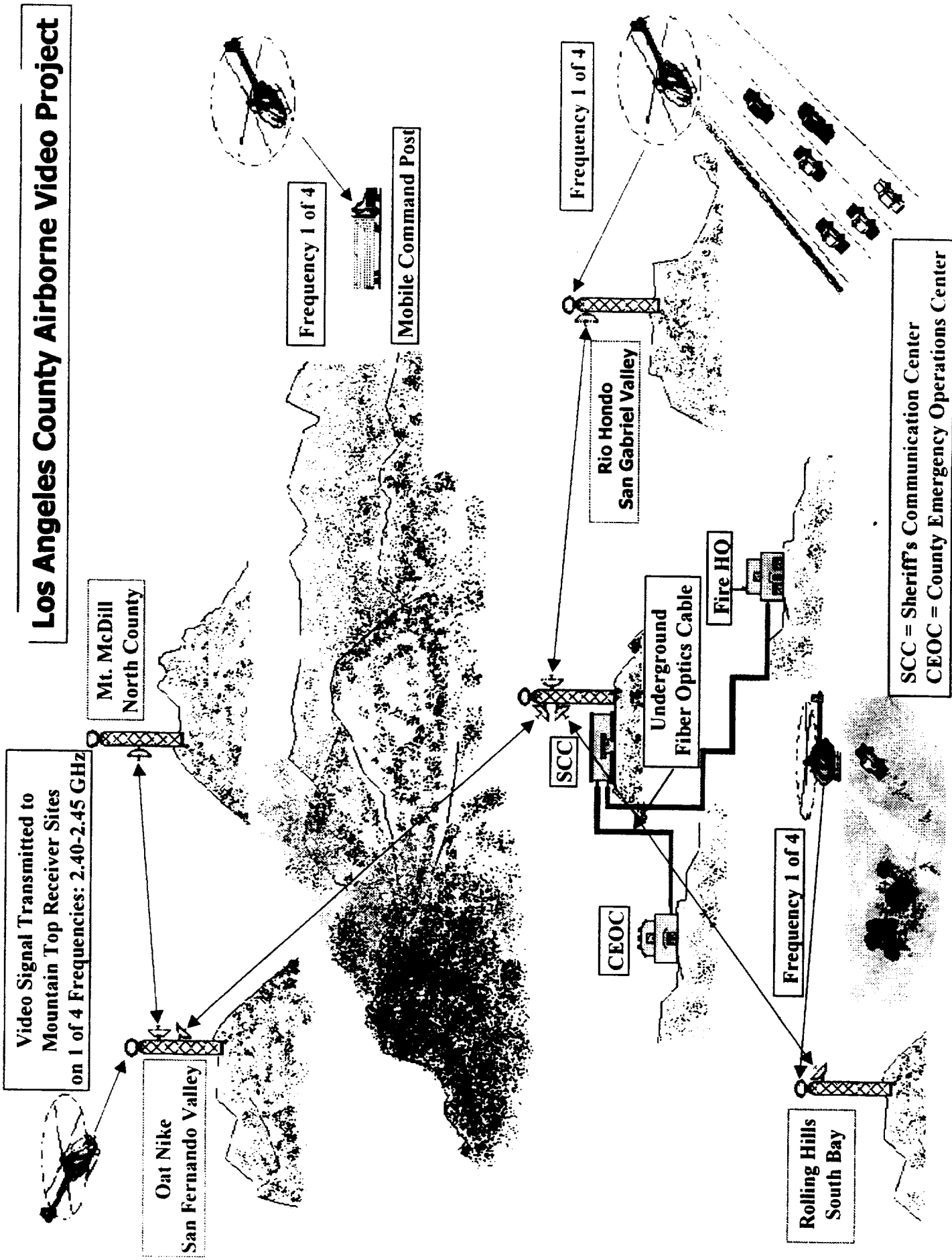
Summary

The County of Los Angeles is applying for a FCC Experimental Radio License for airborne microwave video. With joint efforts of public safety and equipment manufacturers in Southern California, we will be conducting tests on potential application of airborne downlink video using underutilized spectrum in 2402 to 2448 MHz bands. Through careful coordination and testing, the County intends to demonstrate that public safety agencies in the Los Angeles area can share use of the precious spectrum resources without causing harmful interference amongst themselves, or to existing entities.

Attachment 1

Diagram of Proposed System – County Airborne Video

Los Angeles County Airborne Video Project



Attachment 2

Example of Existing Broadcast Network in Southern California

D

C

B

A

D

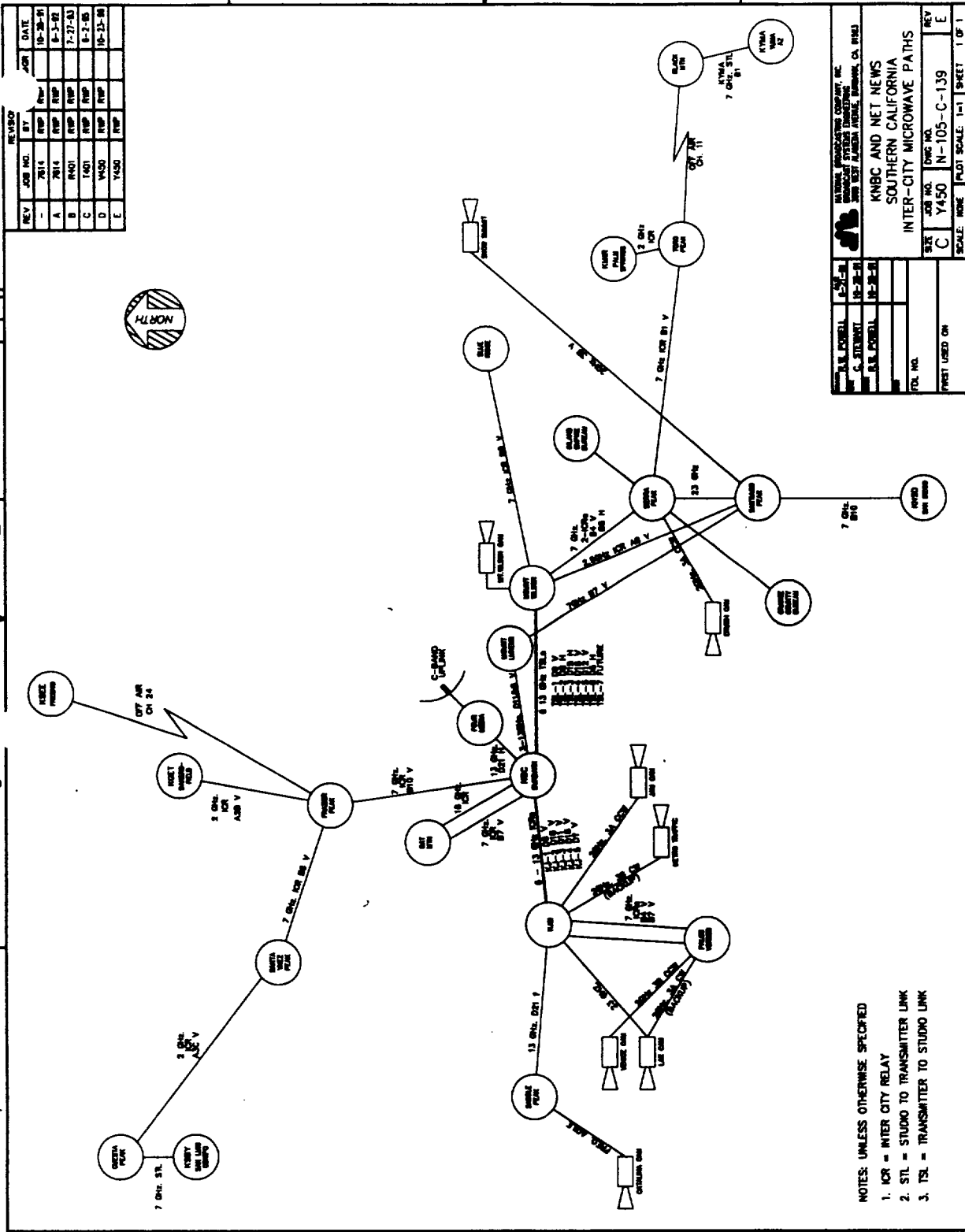
C

B

A



REV	JOB NO.	BY	DATE
1	7811	RP	10-28-91
2	7811	RP	8-1-92
3	7811	RP	7-27-93
4	7811	RP	8-2-95
5	7811	RP	10-23-96



- NOTES: UNLESS OTHERWISE SPECIFIED
1. KCR = INTER CITY RELAY
 2. STL = STUDIO TO TRANSMITTER LINK
 3. TSL = TRANSMITTER TO STUDIO LINK

NATIONAL BROADCASTING COMPANY, INC.	
MANUFACTURING DIVISION	
3000 WEST ALAMOGA AVENUE, BIRMINGHAM, AL 35201	
KNBC AND NET NEWS	
SOUTHERN CALIFORNIA	
INTER-CITY MICROWAVE PATHS	
FILE NO.	REV
C	E
JOB NO.	DATE
Y450	N-105-C-139
SCALE: NONE	PLOT SCALE: 1"=1
SHEET 1 OF 1	

FILE NAME: UNITS/MPA/139-ONE

2

3

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