

SECTION 5

SPECTRUM USAGE

INTRODUCTION

This section provides information on current Government and non-Government spectrum usage in the bands 216-225 MHz, 400.15-406 MHz and 420-450 MHz in the U.S. Spectrum usage is developed from frequency assignments in the Government Master File (GMF), the FCC database, systems listed in the Systems Review File (SRV), agency interviews and available documents. In addition, various Government agencies were contacted to verify major systems, as well as to provide additional parameters on selected systems. The information is used to compile tables of agency/service distribution and identify typical and major systems. Data is also provided on equipment nomenclatures and types, functional uses and deployment. Experimental assignments are not discussed in detail. Spectrum usage in other countries is not considered.

BAND I: 216-225 MHz

General

In this frequency range, the study is broken into two bands: 216-220 MHz and 220-225 MHz. The effects of recent allocation changes, adopted by both the FCC and NTIA, on spectrum usage are discussed. A statistical characterization of present band usage is provided. TABLES 5-1, 5-2, and 5-3 show the agency/service distribution in the bands 216-220, 220-222 and 222-225 MHz, respectively. The tables are discussed in the following paragraphs under government and non-government usage. In a few cases where an assignment has more than one service, the assignment is counted for each service the system operates. The service category "NO SPECIFIC" applies to the experimental assignments and other assignments without a designated service. Figures 5-1 and 5-2 are maps of the distribution of GMF assignments with geographical coordinates in the bands 216-220 MHz and 220-225 MHz. Experimental assignments are excluded from the maps.

216-220 MHz Band

**TABLE 5-1
AGENCY/SERVICE DISTRIBUTION OF
FREQUENCY ASSIGNMENTS IN THE 216-220 MHz BAND**

	A	AF	AR	C	CG	DOE	HHS	I	J	N	NASA	NG	NSF	TRAN	TOTAL/SERVICE	PERCENT
AERONAUTICAL MOBILE			2								3				5	0.5%
FIXED			8			65		68				33			174	17.6%
LAND MOBILE						12	1					24			37	3.7%
MOBILE	2	19	4	1		20		2	5	6	10	567	6	3	645	65.3%
RADIOLOCATION					1	20				6					27	2.8%
NO SPECIFIC	2	6								12		80			100	10.1%
TOTAL/AGENCY	4	25	14	1	1	117	1	70	5	24	13	704	6	3	988	100.0%
PERCENT	0.4%	2.5%	1.4%	0.1%	0.1%	11.9%	0.1%	7.1%	0.5%	2.4%	1.3%	71.3%	0.6%	0.3%		100.0%

**TABLE 5-2
AGENCY/SERVICE DISTRIBUTION OF
FREQUENCY ASSIGNMENTS IN THE 220-222 MHz BAND**

	AF	AR	NG	TOTALS/SERVICE	PERCENT
FIXED		42		42	61.8%
NO SPECIFIC	1		25	26	38.2%
TOTALS/AGENCY	1	42	25	68	100.0%
PERCENT	1.4%	61.8%	36.8%		100.0%

**TABLE 5-3
AGENCY/SERVICE DISTRIBUTION OF
FREQUENCY ASSIGNMENTS IN THE 222-225 MHz BAND**

	AR	NASA	TOTAL/SERVICE	PERCENT
FIXED	63		63	98.4%
NO SPECIFIC		1	1	1.6%
TOTAL/AGENCY	63	1	64	100.0%
PERCENT	98.4%	1.6%		100.0%

Government Usage

In the 216-220 MHz band there is a total of 988 assignments. TABLE 5-1 shows that the majority of the assignments are for systems in the mobile services. This is followed by experimental, fixed, and radiolocation assignments. Many of the fixed and mobile assignments are for land telemetering as limited by footnote US274.

Government usage of the band 216-220 MHz is sparse. According to the GMF there are no maritime mobile operations in the band and very little aeronautical mobile use. The predominant Government users in the band are the Departments of Energy and Interior with assignments primarily for telemetry systems in the fixed and mobile service for seismology. Many of the systems are used intermittently as required by the experiment being conducted. These assignments are located throughout the U.S. The only major radar in this band is the Navy SPASUR. The SPASUR operates on the frequency 216.98 MHz (± 1 Hz). The Navy has

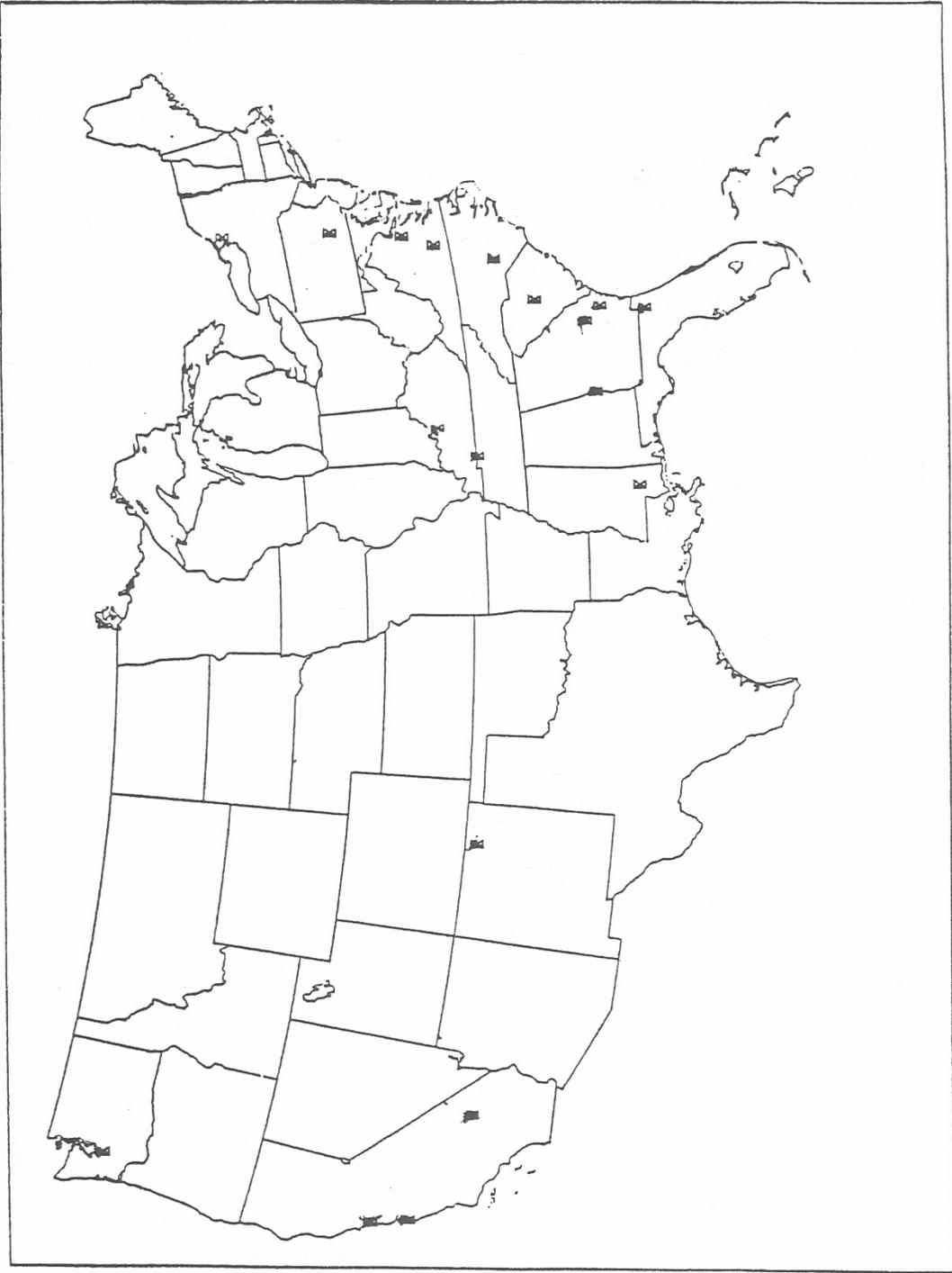


Figure 5-1. Distribution of GMF assignments with geographical coordinates in the 216-220 MHz band.

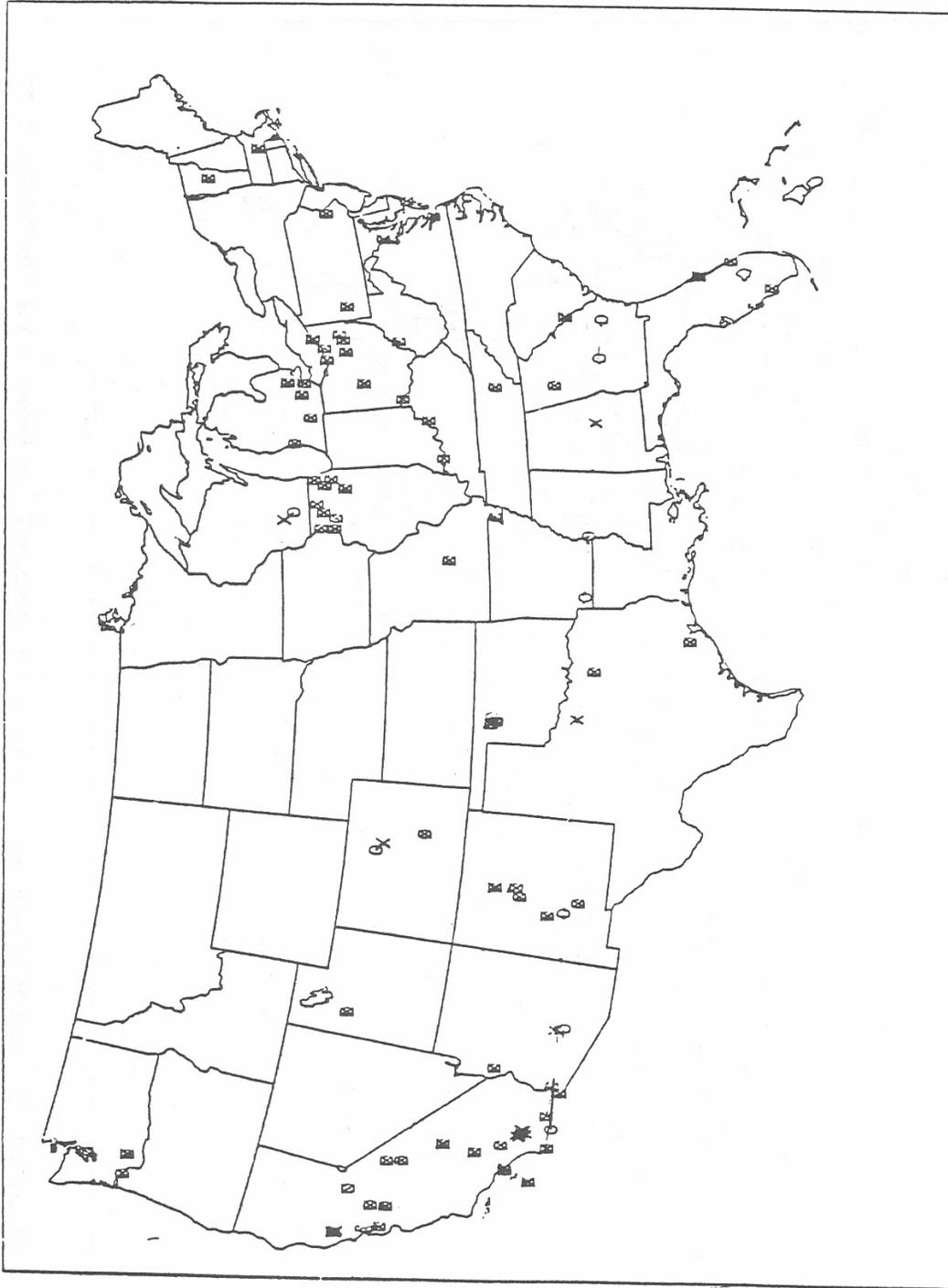


Figure 5-2. Distribution of GMF assignments with geographical coordinates in the 220-225 MHz band.

four assignments for the SPASUR system, a bi-static radar used to collect data on satellite trajectories. It is a CW Doppler fence radar with transmitters in Alabama, Arizona and Texas and receivers in Arkansas, Mississippi, California, New Mexico and two in Georgia.

Non-Government Usage

In the lower adjacent band, there are TV channel 13 (210-216 MHz) operations throughout the U.S. which have the potential to receive interference from Wind Profilers. To date no study has been performed to assess the compatibility between Wind Profilers and TV-13 receivers. Figure 5-3 is a contour map prepared by A. D. Ring & Associates, P.C. for TV Answer Inc. which shows 170 km contours of the TV-13 transmitters throughout the U.S.

The 216-220 MHz band is allocated to the maritime mobile service on a primary basis. Footnote NG121 limits the use of this band to operations along the Mississippi River and connecting waterways, Gulf Intercoastal Waterways, and the offshore waters of the Gulf of Mexico. No maritime mobile assignments are listed in the GMF; however, there are license records for the Automated Maritime Telecommunications Service (AMTS) in the FCC database located in the areas specified by footnote NG121. Presently, there is a Notice of Proposed Rulemaking (NPRM) from the FCC regarding expanding maritime mobile service to nationwide. If the Report and Order is adopted, the footnote NG121 will be modified or deleted. The land mobile, aeronautical mobile and fixed services are all allocated on a secondary basis. In the lower adjacent band 210-216 MHz, TV-13 operates nationwide. The heaviest concentration of TV-13 locations is in the eastern half of the country. The majority of GMF assignments are non-Government assignments as shown in TABLE 5-1. The majority of the non-Government assignments are surface telemetry stations in the mobile service. Other usage includes land mobile, fixed and experimental operations. As with Government operations, the non-Government assignments are primarily for seismology. On the frequency 219 MHz, there is an experimental (XC) Wind Profiler assignment for the University of Alaska at North Star County, AK. The assignment is for research in air turbulence using the radar under Air Force contract. The system has an ERP of 40 kW and an emission designator of 2M00P0N.

220-225 MHz Band

Government Usage

In the band 220-225 MHz, there are 132 GMF assignments (68 in 220-222 MHz and 64 in 222-225 MHz). The GMF shows that all assignments are in the fixed and experimental services. All of the fixed assignments are for the Army AN/GRC-103. The AN/GRC-103 is a point-to-point communication system used for training at military installations throughout the US&P. These fixed assignments utilize one or more transportable transmitting and/or receiving stations. Due to the allocation change, these assignments operate on a Non-Interference Basis (NIB). Currently, there are no radiolocation assignments in the 220-222 MHz and 222-225 MHz bands; footnote RR627 precludes additional radiolocation assignments.

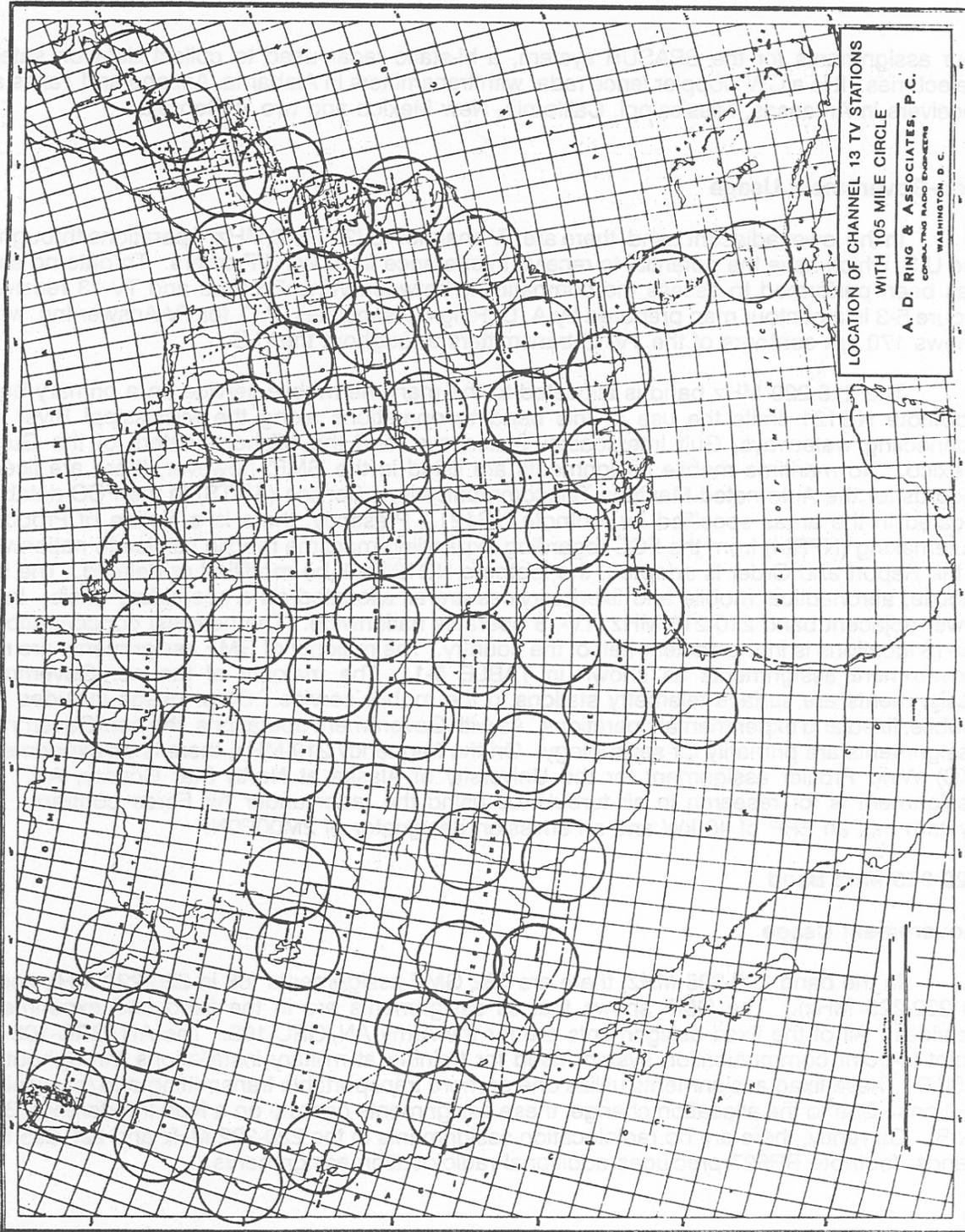


Figure 5-3. Map of TV-13 Transmitters Throughout the U.S.

Non-Government Usage

The only non-Government usage shown in the GMF are experimental assignments. Because of the allocation change, the 220-222 MHz band is only allocated to the land mobile service on a primary basis. At the present time, there are no land mobile operations in the band. It is anticipated that there will be a heavy concentration of narrow-band land mobile operations. All of the XD assignments are for the development of single and multi-transmitter system equipment or the development of Amplitude Companded Single Side Band (ACSSB) equipment in the new band 220-222 MHz.

Other than the amateur activities in the 220-225 MHz band, the non-Government usage reflected by license records contained in the FCC database is used mainly for telemetry systems. The major usage is in the industrial area with petroleum and electric utility industries being extensive users. Other users are broadcasters, universities, steel companies, aluminum companies, heavy equipment, geology, automotive and tire test tracks and other transportation industries. The amateur service is the heaviest user of the 220-225 MHz band throughout the U.S. The 220-222 MHz band is used by the amateurs for point-to-point communications using single sideband (SSB) and frequency modulation techniques. Experiments are conducted involving propagation and long-distance communications. The 222-225 MHz portion of the band is used for FM communications involving conventional land mobile communications techniques using repeaters, base stations and land mobile units. Communications are usually within a 60 km radius of the repeater. The southern California area contains the heaviest concentration of activities.

Amateur use in the 220-225 MHz band is extracted from the American Radio Relay League (ARRL) directory, 1990-1991 edition and is provided below.¹⁸

220.00-220.05 MHz	EME (Earth-Moon-Earth)
220.05-220.06 MHz	Propagation beacons
220.06-220.10 MHz	Weak signal CW
220.10 MHz	Calling frequency
220.10-220.50 MHz	General weak signal, rag chewing and experimental communications
220.50-221.90 MHz	Experimental and control links
221.90-222.00 MHz	Weak signal guard band
222.00-222.05 MHz	EME
222.05-222.06 MHz	Propagation beacons
222.06-222.10 MHz	Weak signal CW
222.10 MHz	Calling frequency
222.10-222.30 MHz	General operation CW or SSB, etc.
222.34-223.38 MHz	Repeater inputs
223.34-223.90 MHz	Simplex and repeater outputs (local option)
223.94-224.98 MHz	Repeater outputs

¹⁸ American Radio Repeater League (ARRL), The ARRL Repeater Directory, 1990-1991 ed., p. 34, p. 37.

BAND II: 400.15-406 MHz

General

In the 400.15-406 frequency range, there are four national allocation bands. A statistical characterization of each of the bands is provided. The bands support meteorological satellites and radiosondes. This frequency range is used by both the Government and non-Government in the space services and meteorological aids service. These services are used to gather meteorological data for weather forecasting, severe storm warning, public safety, and research. The meteorological aids service is limited to radiosondes and associated ground transmitters. Numerous government agencies use radiosondes. The meteorological data is presently gathered by satellite imagery and radiosondes. Wind Profilers are also being used experimentally as identified in the following paragraphs. The DOC operates the GOES and TIROS-N satellites for weather forecasting. The SARSAT receiver, also located on these satellites, operates in the upper adjacent allocation band 406-406.1 MHz. The SARSAT system provides a safety-of-life service.

Provided in TABLES 5-4, 5-5, 5-6 and 5-7 are the agency/service distribution in the 400.15-401, 401-402, 402-403 and 403-406 MHz bands, respectively. The tables are discussed under Government and non-Government usage for each band. In a few cases where an assignment has more than one service, the assignment is counted for each service the system operates. The service category "NO SPECIFIC" applies to the experimental assignments and other assignments without a service designation. Experimental assignments are excluded from the maps.

There are 7,993 GMF assignments in this band. This is far more than any other band under consideration. These assignments are concentrated in the 401-402 MHz band which has 7,741 of the assignments. The GMF shows that the vast majority of stations are meteorological-satellite earth stations. These assignments are primarily for the Army and Interior. There are also many radiosondes and associated ground stations.

400.15-401 MHz Band

TABLE 5-4 shows that this band has 110 GMF assignments. All of the assignments have band assignments with an operating frequency range of 400.15-406 MHz. All of the assignments have the station class WXR (radiosonde) or WXRG (radiosonde ground) with the exception of one experimental (XR) NASA space system. The DOC has all except nine of the assignments. Agriculture, Energy, NASA, Navy and NSF have the rest. Eighteen of the assignments are Commerce assignments in Alaska. Other assignments are located in the continental U.S. and Puerto Rico. There are also three USA and two US&P assignments.

**TABLE 5-4
AGENCY/SERVICE DISTRIBUTION OF
FREQUENCY ASSIGNMENTS IN THE 400.15-401 MHz BAND**

	A	C	DOE	N	NASA	NSF	TOTAL/SERVICE	PERCENT
METEOROLOGICAL SATELLITE					1		1	0.9%
METEOROLOGICAL AIDS	1	100	3	1		2	107	97.3%
NO SPECIFIC		1			1		2	1.8%
TOTAL/AGENCY	1	101	3	1	2	2	110	100.0%
PERCENT	0.9%	91.8%	2.8%	0.9%	1.8%	1.8%		100.0%

401-402 MHz Band

TABLE 5-5 shows that this band has 7,741 assignments. The majority of assignments are for meteorological-satellite earth stations (Earth-to-space). The agencies with the most meteorological satellite earth stations (TM) are Interior (3,280), Army (3,262) and Commerce (873). Most of the TM assignments are for GOES or are in support of TIROS-N. In this band, the GOES-I will receive data from terrestrial Data Collection Platforms (DCP), which is scheduled to be launched in July 1991. There are 201 occurrences of the XR station class. The non-Government has all but one XR station class occurrence. There are four Army WXR station classes and six Navy WXRG station classes.

**TABLE 5-5
AGENCY/SERVICE DISTRIBUTION OF
FREQUENCY ASSIGNMENTS IN THE 401-402 MHz BAND**

	A	AF	AR	C	DOE	EPA	I	N	NASA	NG	NSF	TVA	TOTAL/SERVICE	PERCENT
EARTH EXPLORATION SATELLITE							1						1	0.0%
METEOROLOGICAL AIDS		2	4					6					12	0.2%
METEOROLOGICAL SATELLITE	9		3262	873	24	1	3280	1	2		3	67	7522	97.2%
RADIODETERMINATION SATELLITE				2									2	0.0%
SPACE OPERATION				3									3	0.0%
NO SPECIFIC				1						200			201	2.6%
TOTAL/AGENCY	9	2	3266	879	24	1	3281	7	2	200	3	67	7741	
PERCENT	0.1%	0.0%	42.2%	11.4%	0.3%	0.0%	42.4%	0.0%	0.0%	2.7%	0.0%	0.9%		100.0%

402-403 MHz Band

TABLE 5-6 shows that in this band, there are 10 GMF assignments. The station classes that occur in this band are TM, WXR, WXRG and XT. All of the WXR assignments are in California. The three TM assignments are for Commerce's Project Seas, a shipboard environmental data acquisition system with up to 100 units aboard commercial, research and NOAA ships. The one experimental (XT) assignment is also for Commerce. It is for a lab made Wind Profiler radar in Erie, CO. It operates on a frequency of 402.6 MHz. It has a power emission designator and gain of 1.2 MW, 1 M00P0N and 26 dBi, respectively. Also in this band, the GOES will receive from terrestrial Data Collection Platforms (DCP).

**TABLE 5-6
AGENCY/SERVICE DISTRIBUTION OF
FREQUENCY ASSIGNMENTS IN THE 402-403 MHz BAND**

	AF	AR	C	TOTAL/SERVICE	PERCENT
METOROLOGICAL SATELLITE			3	3	30.0%
METOROLOGICAL AIDS	2	4		6	60.0%
NO SPECIFIC			1	1	10.0%
TOTAL/AGENCY	2	4	4	10	100.0%
PERCENT	20.0%	40.0%	40.0%		100.0%

403-406 MHz Band

TABLE 5-7 shows that in the band 403-406 MHz, there are 132 GMF assignments. Nearly all of the assignments are WXR, WXRG or experimental stations.

**TABLE 5-7
AGENCY/SERVICE DISTRIBUTION OF
FREQUENCY ASSIGNMENTS IN THE 403-406 MHz BAND**

	A	AF	AR	C	DOE	N	NASA	NG	NSF	TOTAL/SERVICE	PERCENT
METEOROLOGICAL AIDS	2	25	30		25	21	2		12	117	88.6%
MOBILE	1									1	0.8%
NO SPECIFIC		2		3		1	1	7		14	10.6%
TOTAL/AGENCY	3	27	30	3	25	22	3	7	12	132	100.0%
PERCENT	2.3%	20.5%	22.7%	2.3%	18.9%	16.7%	2.3%	5.3%	9.0%		100.0%

There are twelve experimental GMF assignments for the Wind Profiler. On the frequency 404.2 MHz, there is an assignment for the Wind Profiler at Windsor, CT. A summary of the twelve assignments on 404.37 MHz is listed below.

LOCATION	AGC	EMS	PWR	Comments
Ft. Huachuca, AZ	C	1M00P0N	1.2 kW	WP balloon experiment. Lab made. Area assign't
Ft. Ord, CA	N	2M12P0N	35 kW	TYCHO Model 400
Vandenburg, CA	AF	2M40P0N	50 kW	
Ft. Collins, CO	NG	2M40P0N	35 kW	ERP Colorado State Univ. ERL Boulder labs.
Longmont, CO	NG	1M20P0N	70 MW	For research of WPR.
		2M41P0N		TYCHO Tech. Inc.
Windsor, CT	NG	900KP0N	18 MW	For development and manufacturer of WP. UNISYS Corp.
Hillsboro, KS	C	1M00P0N	100 kW	Lab made. Area assign't
Sudbury, MA	AF	1M00P0N	16 kW	Manufactured by UNISYS
Fair Haven, NY	C	2M00P0N	9 kW	Project for high resolution & analysis of winds in the strososphere and lower stratosphere. Lab made. Area assignment.
Pt. Breeze, NY	*****	Same as Fair Haven, NY		*****
Watertown, NY	*****	Same as Fair Haven, NY		*****
State College, PA	NG	2M00P0N	280 kW	Same as Fair Haven, NY Not an area assignment. Penn State Univ.

There are two experimental assignments on the frequency 405.25 MHz listed in the GMF. They are summarized below.

Location	AGC	EMS	PWR	Comments
CO, CO	C	1M00P0N	50 kW	Lab made. Denver, CO Grand Junction, CO
Madison, CO	NG	2M00M1N	6.2 kW	Astronautics Corp. of America

The mainbeam gains range from 26-32 dBi for those assignments that listed them.

The Search And Rescue SATellite (SARSAT) receivers aboard the TIROS-N and GOES satellites will receive on uplink frequencies, 125 MHz, 243 MHz and 406.025 MHz, from Emergency Locator Transmitters (ELT) and Emergency Position Indicator Radio Beacons (EPIRB). In February 1987, NOAA released a technical memorandum on Profiler/Satellite Interference Analysis by Russell B. Chadwick.¹⁹ This report gives an engineering analysis of

¹⁹ Chadwick, R.B., Profiler /Satellite Interference Analysis. NOAA Technical Memorandum ERL ESG-24, U.S. Department of Commerce, National Oceanic And Atmospheric Administration, Environmental Sciences Group, Boulder, CO., February 1987.

interference between the Wind Profiler and the GOES, SARSAT and TDCS (Tiros Data Collection System). The approach used was to quantify interference potential by determining the interference-to-noise ratio at the satellite receiver. In doing so, the most severe interference potential was found to be with SARSAT, the details of which are in the report. In the adjacent band 406-406.1 MHz, the SARSAT receives on 406.025 MHz from Coast Guard EPIRBs.

BAND III: 420-450 MHz

General

The band is presently allocated to the radiolocation service on a primary basis limited to the military. Pulse-ranging radiolocation systems may be authorized on a case-by-case secondary basis for the Government and non-Government along the shoreline of Alaska and the contiguous 48 states pursuant to footnote US217, but limited by footnote US228. The amateur service is allocated to the non-Government on a secondary basis, except where limited by footnote NG135. The land mobile service is allocated on a primary basis to the non-Government within a 50-mile radius of Detroit, MI, Cleveland, OH, and Buffalo, NY in the frequency ranges specified in footnote US230.

TABLES 5-8, 5-9, and 5-10 show the current agency service distribution in the frequency ranges 420-430 MHz, 430-440 MHz and 440-450 MHz, respectively. The tables are discussed in the following paragraphs under government and non-government usage. In a few cases where an assignment has more than one service, the assignment is counted for each service the system operates. The service category "NO SPECIFIC" applies to the experimental assignments and assignments without a designated service. Figures 5-4, 5-5 and 5-5 are maps of the distribution of GMF assignments with geographical coordinates in these bands 420-430 MHz, 430-440 MHz and 440-450 MHz, respectively. Experimental assignments are excluded from the maps.

**TABLE 5-8
AGENCY/SERVICE DISTRIBUTION OF
FREQUENCY ASSIGNMENTS IN THE 420-430 MHz BAND**

	AF	AR	CG	DOE	N	NG	NASA	T	TOTAL/SERVICE	PERCENT
FIXED	4		1				2		7	3.2%
MOBILE	14	4	1	3	20		1		43	19.8%
AERONAUTICAL MOBILE	32				29			1	62	28.6%
LAND MOBILE	4						1		5	2.3%
RADIOLOCATION	7	3	11		8	31		2	62	28.6%
NO SPECIFIC	5	7	1	1	13	10		1	38	17.5%
TOTAL/AGENCY	66	14	14	4	70	41	4	4	217	100.0%
PERCENT	30.4%	6.5%	6.5%	1.8%	32.3%	18.9%	1.8%	1.8%		100.0%

**TABLE 5-9
AGENCY/SERVICE DISTRIBUTION OF
FREQUENCY ASSIGNMENTS IN THE 430-440 MHz BAND**

	AF	AR	CG	N	NASA	NG	NSF	T	TOTAL/SERVICE	PERCENT
FIXED	2								2	1.4%
AERONAUTICAL MOBILE	3			14					17	12.2%
MOBILE	9	3		2	1				15	10.8%
RADIOLOCATION	4	14	3	8	1	48		3	81	58.3%
NO SPECIFIC	8	9		5		1	1		24	17.3%
TOTAL/AGENCY	26	26	3	29	2	49	1	3	139	100.0%
PERCENT	18.7%	18.7%	2.2%	20.9%	1.3%	35.3%	0.7%	2.2%		100.0%

**TABLE 5-10
AGENCY/SERVICE DISTRIBUTION OF
FREQUENCY ASSIGNMENTS IN THE 440-450 MHz BAND**

	AF	AR	CG	I	N	NASA	NG	T	TOTAL/SERVICE	PERCENT
FIXED	1	1	1						3	3.1%
AERONAUTICAL MOBILE	6				19				25	25.5%
LAND MOBILE				1					1	1.0%
MARITIME MOBILE			1						1	1.0%
MOBILE	1	4			5				10	10.2%
RADIOLOCATION		3	2		6		13	2	26	26.5%
NO SPECIFIC	6	8			14	1	3		32	32.7%
TOTAL/AGENCY	14	16	4	1	44	1	16	2	98	100.0%
PERCENT	14.3%	16.3%	4.1%	1.0%	45.0%	1.0%	16.3%	2.0%		100.0%

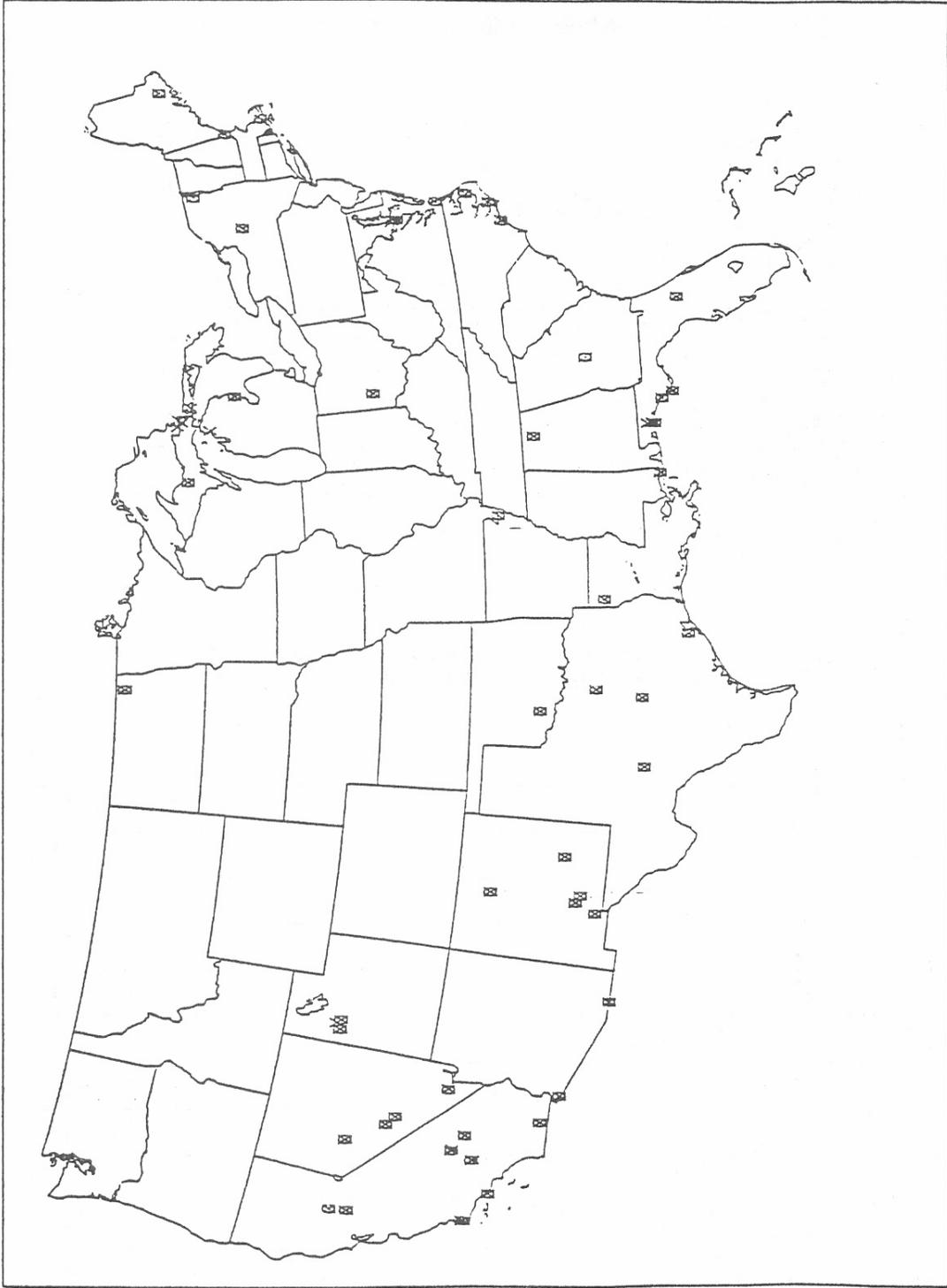


Figure 5-4. Distribution of GMF assignments with geographical coordinates in the 420-430 MHz band.

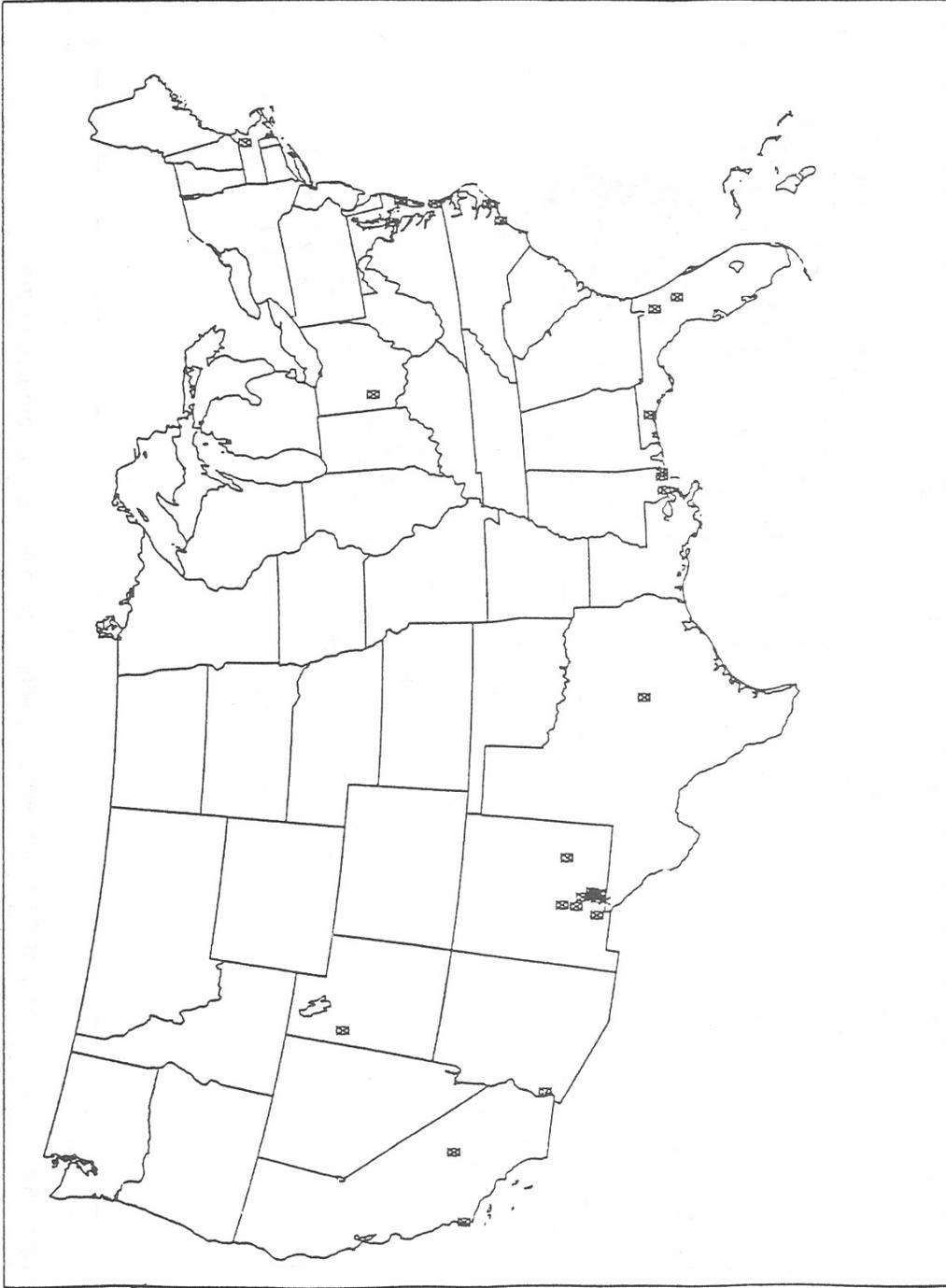


Figure 5-5. Distribution of GMF assignments with geographical coordinates in the 430-440 MHz band.

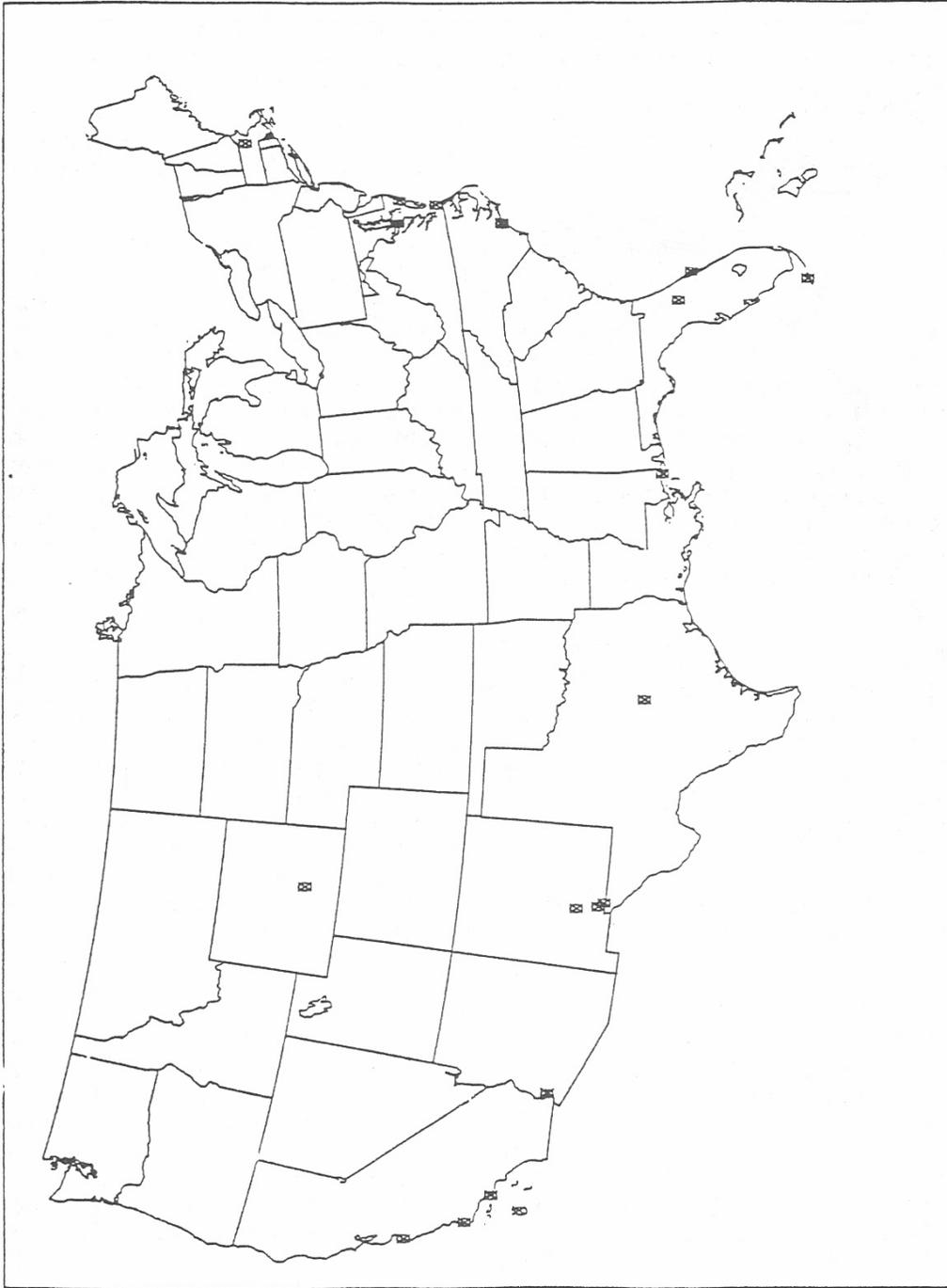


Figure 5-6. Distribution of GMF assignments with geographical coordinates in the 440-450 MHz band.

There are 454 GMF assignments in this band. Most of the stations are in the radiolocation service. The majority of assignments are for the DoD and the non-Government. The military has several high-powered early warning radar systems with band assignments. The non-Government band assignments are for several companies and corporations (e.g., Chrysler, Ford and General Motors in Michigan). For this band, the number of assignments in the GMF does not correspond to the number of equipments. Some systems have one assignment for a large number of equipments. Another system may have several assignments showing specific operating frequencies for a set of equipments.

The military currently uses the radiolocation service in the band 420-450 MHz primarily for long-range air and space surveillance on land based, shipborne and airborne platforms. It is noted that this 30 MHz is the only band allocated for military radiolocation below 1 GHz. As a result, it is expected that any new radar system will be considered for operations in this band. This band is used by the military for two reasons: (1) the propagation characteristics - at these frequencies there is low attenuation of the signal in bad weather, and (2) exclusive use of the band allows 24 hour operation of their surveillance radars. The land based radars are at widely dispersed geographic locations in the United States with fixed site installations. The shipborne and airborne radars are mobile. The shipborne radars operate in coastal waters, port areas and at sea. The airborne radars may operate anywhere in the country or at sea in support of fleets. Many of the flights are over inland testing and training routes and along the U.S. border. Most of the radars have the capability to operate in all or part of the band. Given in the following section are the representative land based, shipborne, and airborne characteristics to be used in the study.

Telecommand of drones (low power remote control) accounts for about one-fifth [94 (experimental assignments excluded) of 454] of the GMF assignments in the band. The Navy and Air Force mainly utilize the frequency band for telecommand of aerial drones, missiles, balloons and land mobiles. Many of the areas of operation have assignments throughout the band. Therefore, one deployment may have more than one assignment. The drones are operated at military installations throughout the country, many of which are on the coast. The coastal regions of the U.S. that are most affected are Southern California, Southern Nevada, Arizona, New Mexico, Florida, Puerto Rico and the Virgin Islands. Typical remote control operations have a power and bandwidth of 100 W and 600 kHz, respectively. Also common is a power of 600 W and bandwidth of 70 kHz. These characteristics account for approximately 49% and 14% of the total 95 telecommand assignments, respectively.

Government Usage

Nearly half (217) of the assignments in the 420-450 MHz band are in the frequency range 420-430 MHz band. This frequency range is used primarily for low power remote control (telecommand) of drones and some long range radars. The majority (62) of the drone control assignments are in this band. The telecommand aeronautical stations (FAD) and the telecommand land stations (FLD) are used for drone control and flight termination. As shown on the deployment map, the majority of assignments are on the Gulf Coast, the Chesapeake Bay, the North Carolina coast, Southern California, and the Southwest area. The Air Force submitted to the IRAC (Doc. 26736/1-2.4.2/6.2) on March 2, 1990 a proposal for a new U.S. footnote, USXXX, on 425 MHz \pm 300 kHz. The proposal would require that all users of the frequency 425 MHz in the vicinity of White Sands Missile Range, NM coordinate with the DoD Area Frequency Coordinator prior to transmission. Most of the assignments on 425 MHz are for flight termination.

In the 430-440 MHz frequency range there are 139 assignments. This frequency range is used primarily for military long range radars that operate throughout the band and military telecommand drone control. There are 17 drone control assignments. There are also a few assignments for balloon operations. The distribution of assignments is heaviest along the Chesapeake Bay, the coast of North Carolina, the mouth of the Mississippi and southern New Mexico.

In the 440-450 MHz frequency range, there are 98 assignments. The frequency range 440-450 MHz is used primarily for Government radiolocation, drone control, long range radars that operate throughout the band and experimental stations. There are 25 drone control assignments. The majority of assignments are along the Chesapeake Bay, the coast of North Carolina, southern New Mexico and southern California.

Non-Government Usage

In the band 420-450 MHz, there are over 800 frequency assignments for fixed and land mobile operations that appear only in the FCC database. The fixed and land mobile assignments are mainly located in the vicinity of Detroit, Michigan; Buffalo, New York and Cleveland, Ohio. There are non-Government frequency assignments to private corporations that perform radiolocation services in the geophysical (petroleum) industry. Most of the radiolocation assignments list the location as U.S. There is heavy amateur usage in this band nationwide. Most of the satellite and weak signal amateur operations are in the 430-440 MHz frequency range.

Amateur use in 420-450 MHz band extracted from the ARRL repeater directory, 1990-1991 edition, is provided below. (See Reference 18)

420.000-426.000 MHz	ATV repeater or simplex with 421.25 MHz video carrier, control links and experimental
426.000-432.000 MHz	ATV simplex with 427.250 MHz video carrier frequency
432.000-432.070 MHz	EME (Earth-Moon-Earth)
432.070-432.080 MHz	Propagation beacons
432.175-433.000 MHz	Weak signal CW
432.100 MHz	70-cm calling frequency
432.100-432.125 MHz	Mixed mode and weak signal work
432.125-432.175 MHz	OSCAR inputs
432.175-433.000 MHz	Mixed mode and weak signals
433.000-435.000 MHz	Auxiliary and repeater links
435.000-438.000 MHz	Satellite only (Internationally)
438.000-444.000 MHz	ATV repeater input with 439.250 MHz video carrier frequency and repeater links
442.000-445.000 MHz	Repeater inputs and outputs (local option)
445.000-447.000 MHz	Shared by auxiliary and control links, repeaters and simplex (local option)
446.000 MHz	National Simplex Frequency
447.000-450.000 MHz	Repeater inputs and outputs (local option)