



The INSPIRE Journal

Volume 12

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November 2003

Coordinated Observations End; Field Observations Begin

In an effort to increase the level of participation in natural radio observations, the Coordinated Observation Program is being concluded. While it may seem contradictory to cancel an existing observation program, it is hoped that by de-emphasizing observations on just two weekends each year, more INSPIRE participants will take the opportunity to make Field Observations and submit data tapes for analysis. Of course, those who wish can still observe on the Coordinated Observation schedule (third weekend of November and fourth weekend of April).

See the "Report on Field Observations" on Page 21 for information on procedures to follow for recording and submitting data. Data log forms can be found on Pages 48 and 49.

Happy Observing!

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The INSPIRE Journal is a publication of The INSPIRE Project, Inc., a nonprofit educational/scientific corporation of the State of California. The purpose of the INSPIRE Project, Inc., is to promote and support the involvement of students in space science research. All officers and directors of the corporation serve as volunteers with no financial compensation. The INSPIRE Project, Inc., has received both federal and state tax-exempt status (FEIN 95-4418628). The *Journal* is published two times per year: November 1 and April 1. Submission deadlines: October 1 and March 1

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Field Observations are THE Way to Participate!

Everyone is invited to participate in Field Observations. Field Observations offer an opportunity to record natural radio and have the results published in the *INSPIRE Journal*. Field observations may be made any time. All reports received by next March 1 will be included in the next *Journal*.

See the "Report on Field Observations" on Page 21 for a description of observation procedures.

Coordinated Observation Program Ends!

In an effort to increase participation in natural radio observations, the Coordinated Observation program has concluded. In the past, some who might have made observations did not because the weekend chosen for Coordinated Observations did not work for them. All INSPIRE participants are invited to make observations whenever it is convenient and submit the data to be included in a report on the *INSPIRE Journal*. Those who would still like to follow the Coordinated Observation schedule may do so and submit their data for analysis as in the past. Coordinated Observations have been held on the third weekend of November and the last weekend of April (unless there is a conflict with Easter).

Subscription Information Included on the Address Label

You can determine the status of your subscription to *The INSPIRE Journal* by looking at the address label. In the upper right corner of the label is a 2-digit number that indicates the year your subscription will expire. All subscriptions expire with the November issue. If your label shows "03", then this issue will be the last under this subscription. If your label shows "04", then your subscription is good through the November 2004 issue. If you have any questions or if you feel that the information shown is incorrect, please contact the editor.

Write for *The INSPIRE Journal*

The procedure for contributing articles for *The INSPIRE Journal* could not be simpler! Just send it in! Any format is acceptable. Electronic format is easier to work with. A Word file on disk for either the PC or Mac platform is preferred. An email message will work, too. If that does not work for you, a paper copy will do. Any diagrams or figures can be scanned in.

What about topics? Anything that interests you will probably interest most INSPIRE participants. As long as the topic is related to natural radio or the equipment used, it will get printed. The deadlines for submissions are March 1 for the spring edition and October 1 for the fall edition. Don't worry about the deadlines, though. If you miss a deadline, you will just be very early for the next edition!

We at INSPIRE are looking forward to hearing from you.

LORAN TRANSMITTER SITE TOUR

by
Robert Bennett
Las Cruces, NM

In May 2002, our local amateur radio club was invited to tour the Las Cruces Loran transmitter site. The radio club was fortunate in that a member of the club was a USCG serviceman stationed at the facility. The site is open to the public one morning a week and can provide tours with prior arrangement. However, the club received a total tour of the site and was allowed to view up close several items that normal visitors are prevented from seeing due to safety concerns. This article consists of a fact sheet and Loran coverage map provided by the USCG plus many photographs taken by the author.

LORAN Fact Sheet (Courtesy of USCG)

On April 13, 1991, the United States Coast Guard commissioned the last of four new Loran-C transmitting stations at a location near Las Cruces, NM. Loran-C coverage, once available only in U.S. coastal and Great Lakes areas, now includes the entire continental U.S. Loran-C coverage also currently exists throughout the North Atlantic region, Mediterranean Sea area, and much of the Far East.

Loran, an acronym for Long Range Navigation, was developed by the United States during World War II. The current version of Loran, Loran-C, has been around since the late 1950's. The U.S. Coast Guard has operated Loran systems since their development in order to meet United States national interests both nautically and internationally.

Although Loran-C is more commonly associated with maritime users, it has also been used by aircraft for many years. Technological advances are allowing for Loran-C to be used in many more applications than before. Significant growth in the size of the terrestrial, and civil aviation user communities are expected in the very near future. There are estimated to be over a half million Loran-C users worldwide. This includes about 80,000 Loran-C receivers already being used in aircraft. In response to civil aviation users needs, the Federal Aviation Administration (FAA), with Coast Guard assistance is incorporating Loran-C into the National Airspace System for supplemental enroute and non-precision approach purposes. Loran-C will allow the aviator to fly directly from one point to another and should permit easier location of small airports during poor weather conditions. Benefits of Loran-C use by the aviator include improved safety, time savings, and reduction of fuel costs.

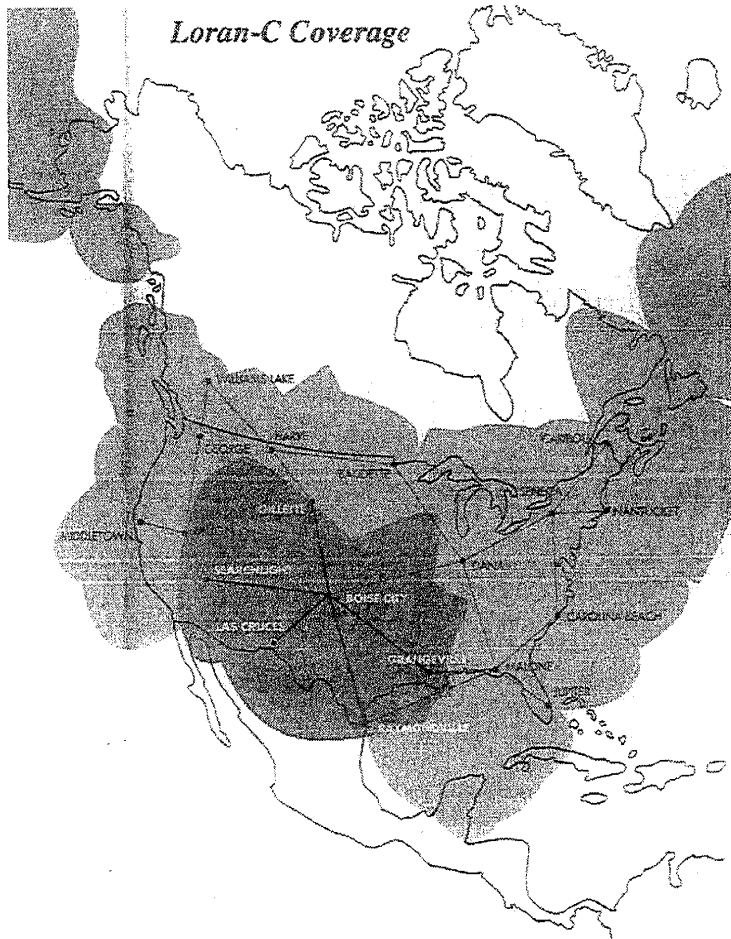
In consonance with this FAA goal, the Mid-Continent Loran-C Expansion Project was established. The service provided under the project completes Loran-C coverage over the

continental U.S., and provides radio navigation service to several thousand small airports that previously had none. It also improves coverage to the west of the Great Lakes, and provides improved maritime coverage to a part of the Gulf of Mexico. The project includes the formation of two new Loran-C chains, the North Central U.S. (NOCUS) Chain with a repetition interval of 82,900, and the South Central U.S. (SOCUS) Chain with a repetition interval of 96,100 microseconds, and the addition of one baseline to the Great Lakes Chain, repetition interval 89,700 microseconds. To form the new chains, four new Loran-C transmitting stations were constructed. They are located at Harve MI, Gillette WY, Boise City OK, and Las Cruces NM. It was also necessary to modify five existing stations to permit operating on the new rates as well as their present rates. These stations were Searchlight NV, Baudette MN, Grangeville LA, Raymondville TX and Williams Lake, British Columbia, Canada

It was also necessary to construct five new monitor sites in the service area. The installation of additional equipment to two control sites at Middletown, CA, and Malone, FL, will allow these existing stations to control the two new chains.

Service from the SOCUS chain, less the Las Cruces, NM station started Christmas Day 1990. The Las Cruces station was added in April 1991 to complete the SOCUS chain. The NOCUS chain became operational in April 1991, along with the provision of additional coverage to the Great Lakes chain by the new Dana, IN, Boise City, OK baseline.

Completion of the Loran-C Mid-Continent Expansion Project is a major step to realizing the implementation of Loran-C into the National Air Space. This joint FAA/Coast Guard Project is an excellent example of the government at work to satisfy the needs of the user, promote commerce, and help ensure air safety in the National Air Space. The cooperative spirit displayed by both the FAA and the Coast Guard during this very major project has resulted in a needed service that was provided on time, and within budget. Civil aviation users now will be able to use Loran-C throughout the entire continental U.S. and a major part of Alaska.

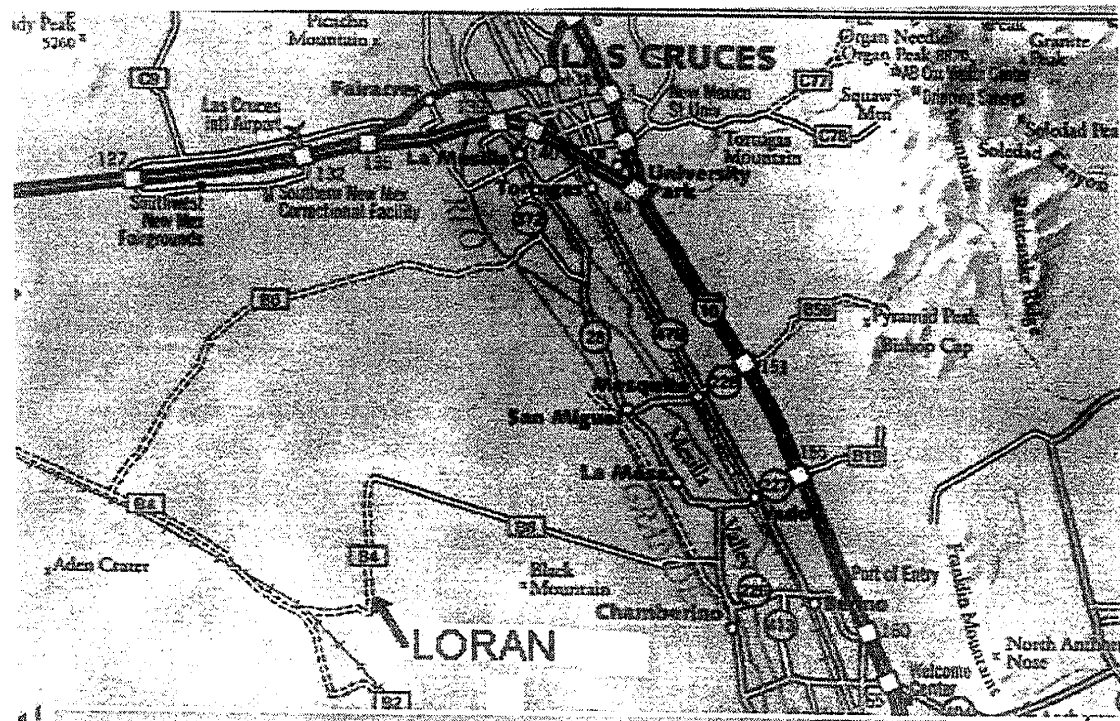


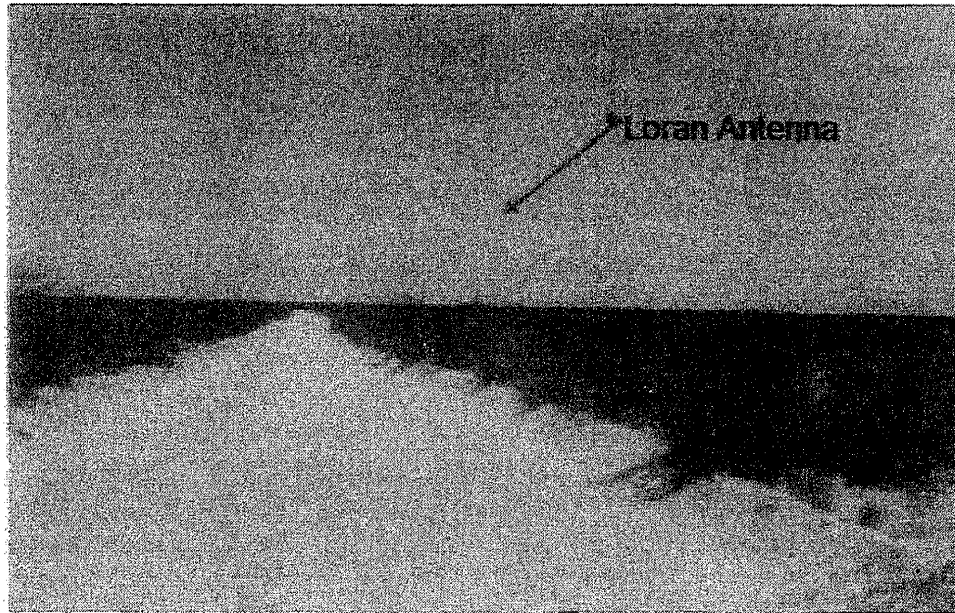
LEFT:

Map showing the coverage of the various Loran-C chains.

BELOW:

Map showing the location of the Las Cruces Loran Station. The author's natural radio receiving site is off the top of the map to the Northeast. The road distance from central Las Cruces to the Loran site is 31 Miles.





This photo shows the Loran site from the access road. The site is about 3 miles from the point the picture was taken.



View of the Loran site from the front gate. The building is about 0.5 miles from the gate.

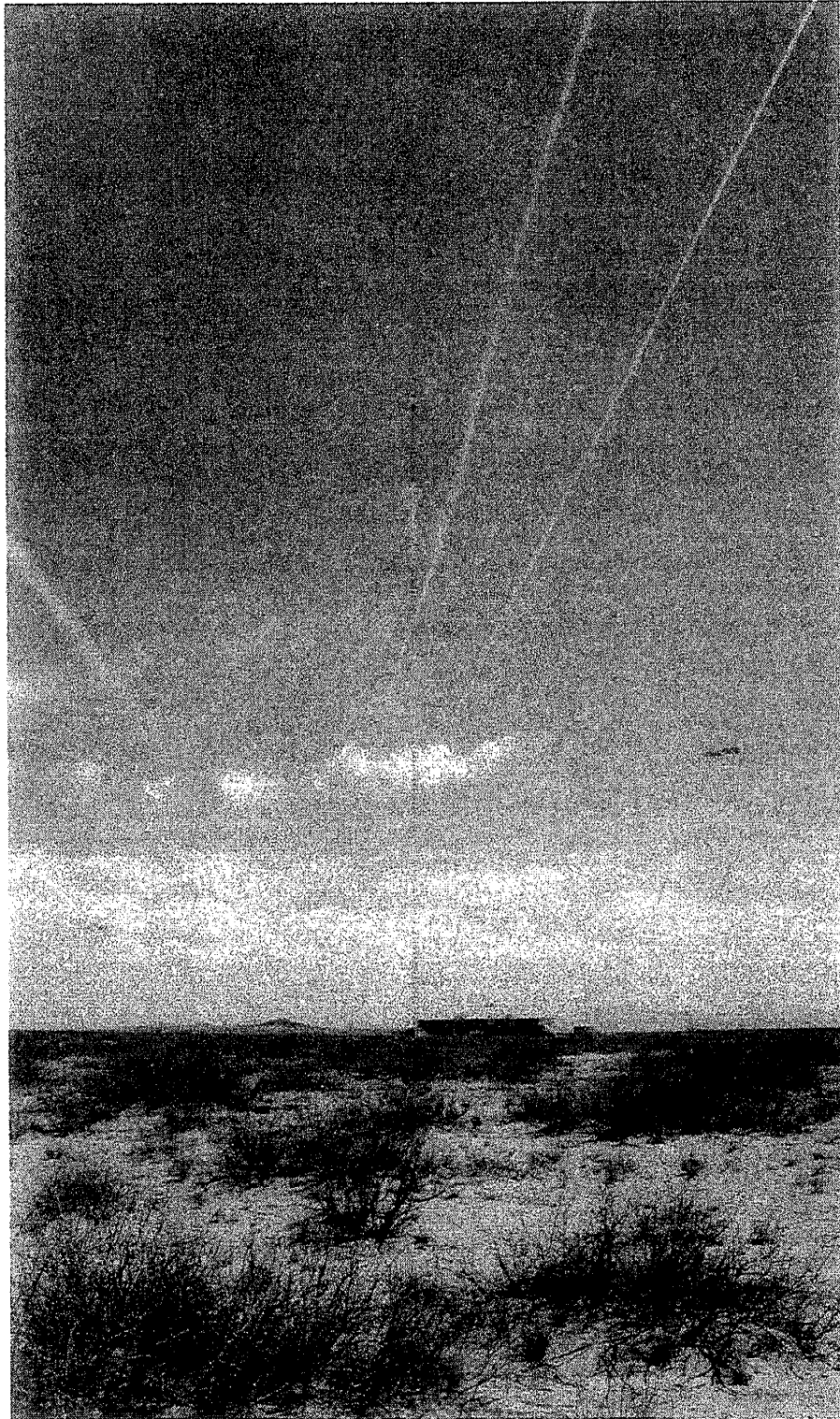
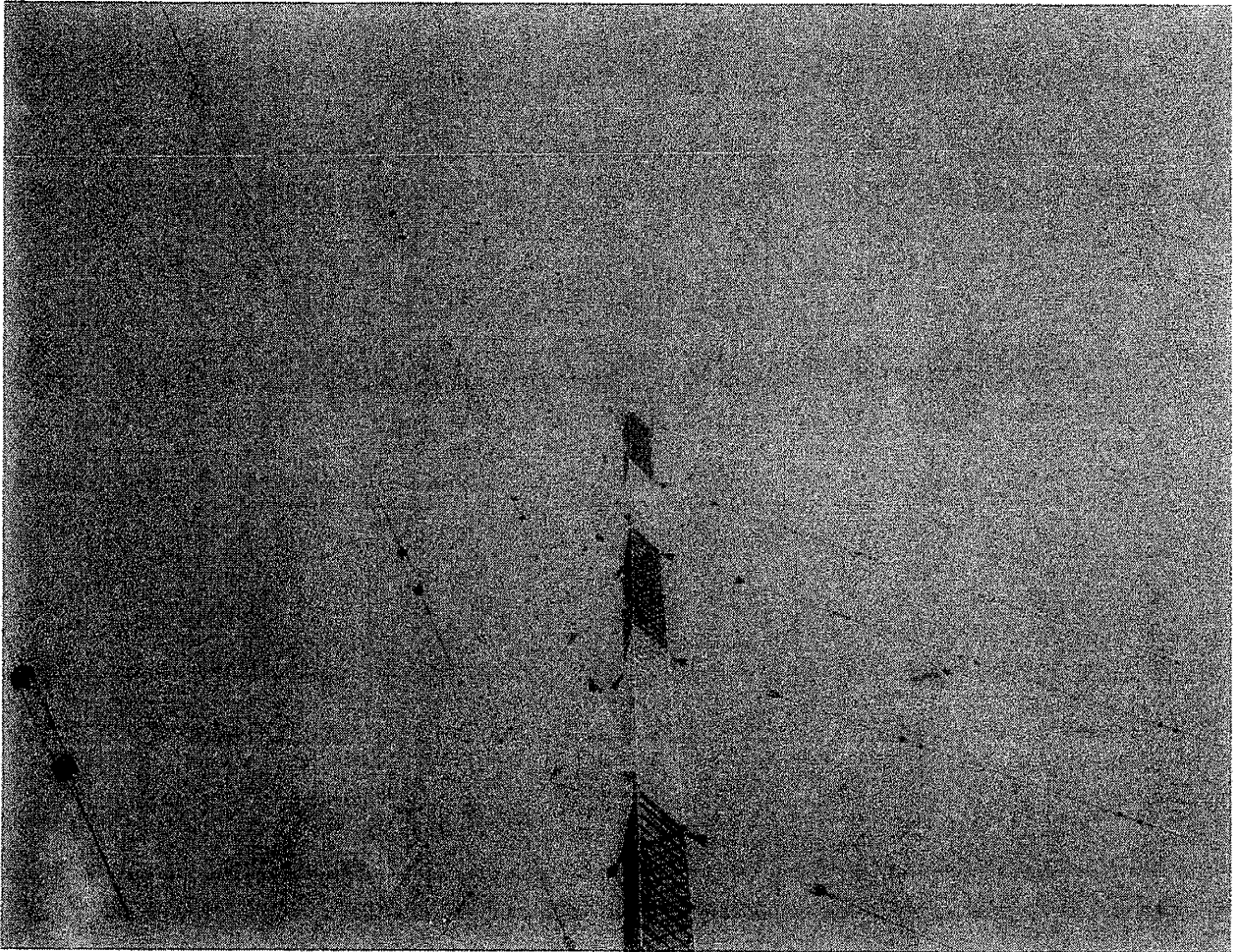
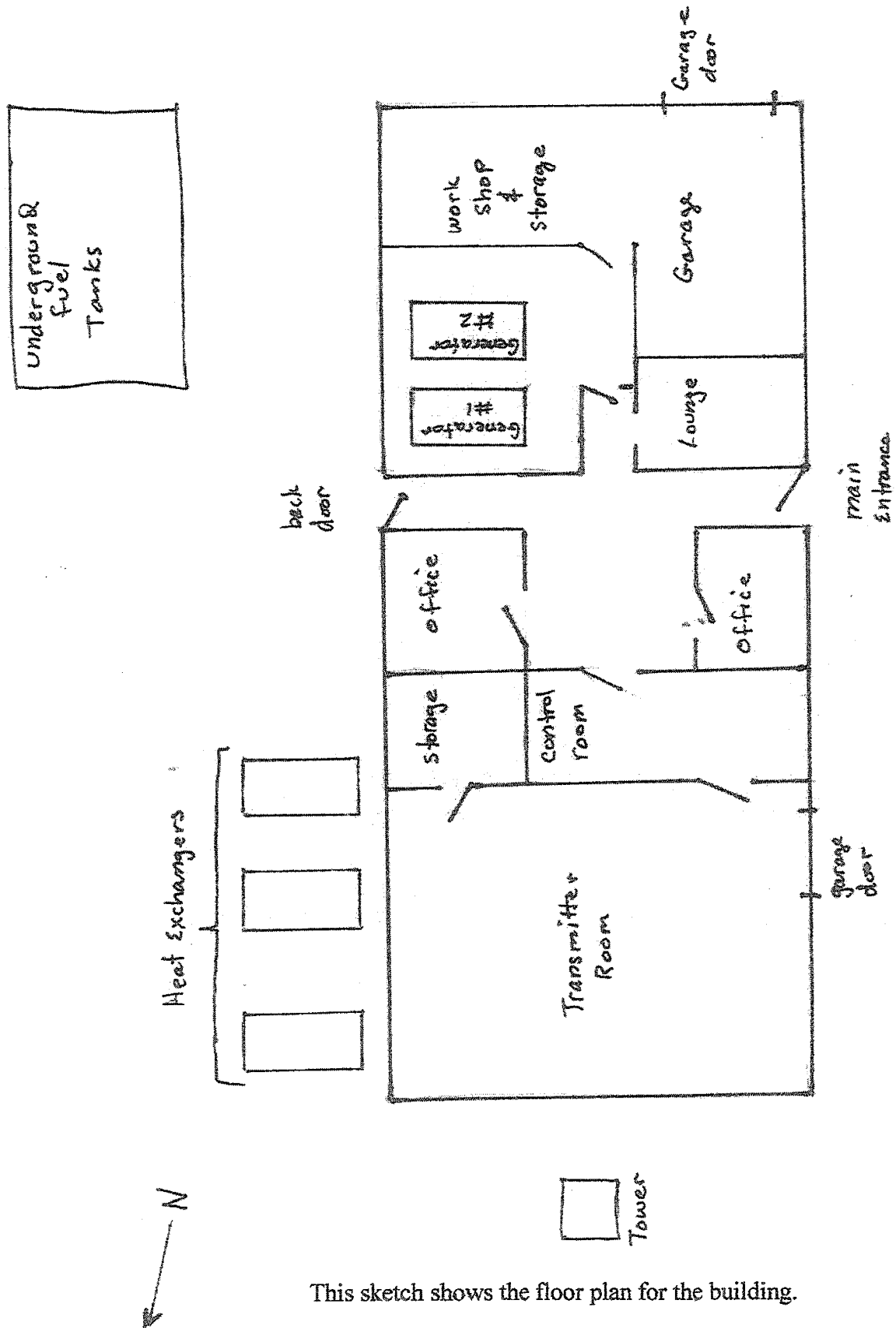


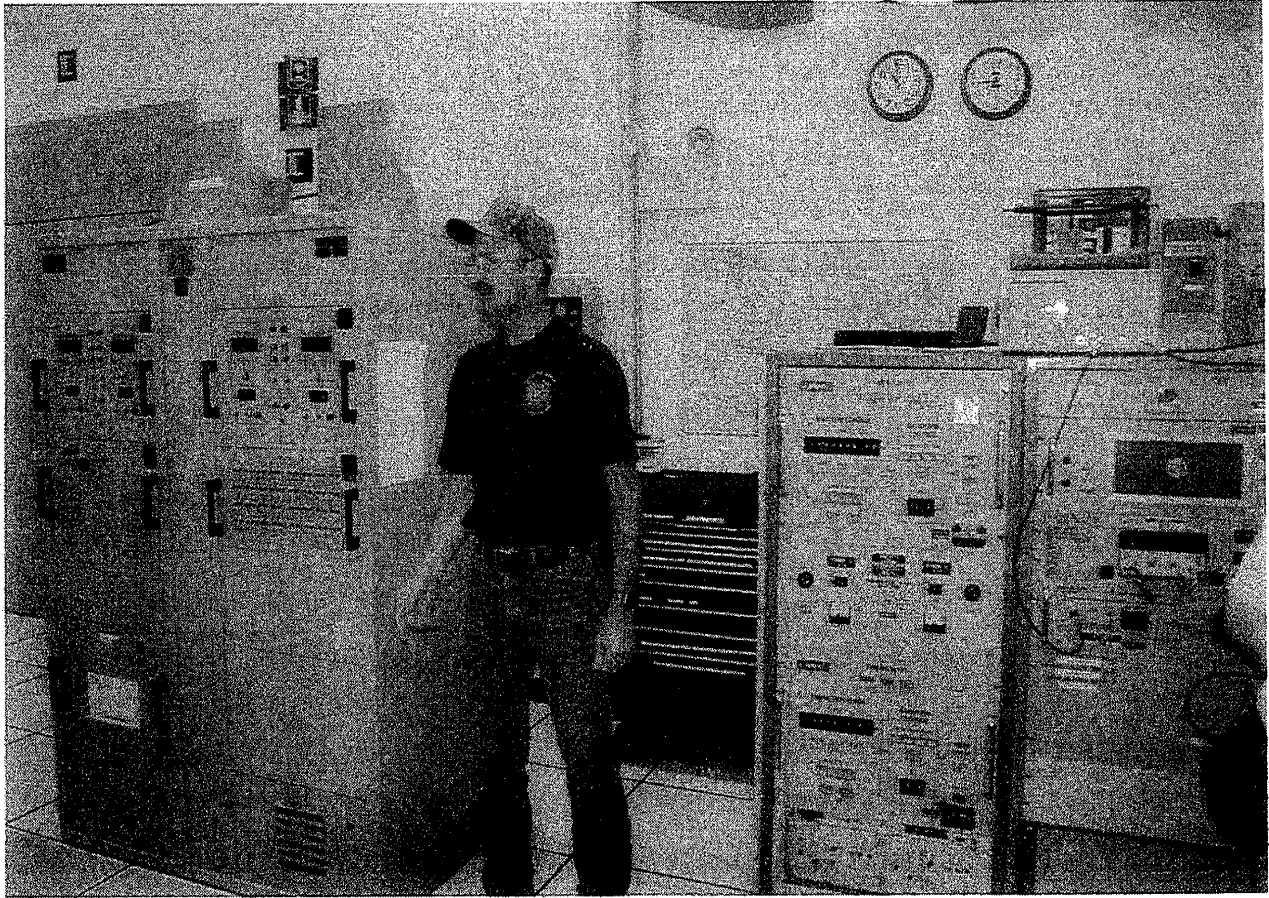
Photo of the site showing the size of the antenna in relation to the building. The tower is 750 feet tall and is insulated from ground. Some of the many guide wires that support the tower are visible in the photo. Note that the guide wires are broken at frequent intervals with insulators.



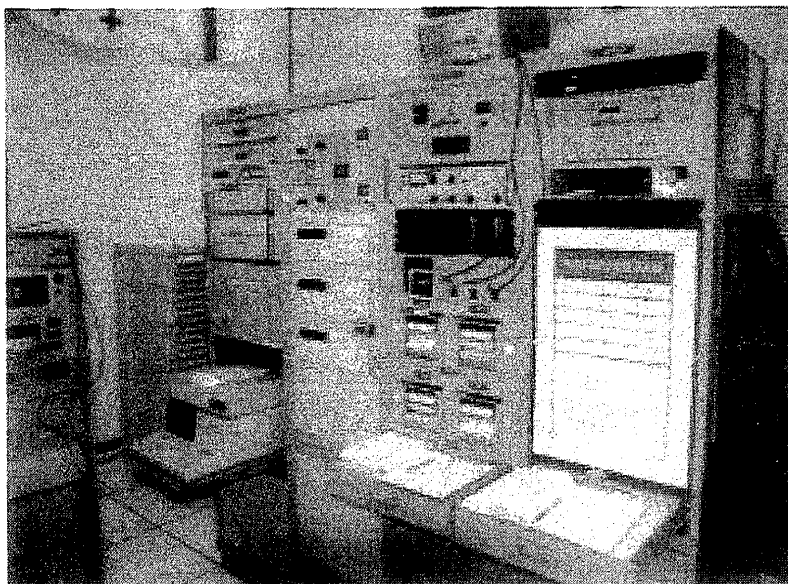
This is a picture of the top of the tower. The wires at the very top are not guide wires but form the capacitive top hat for the antenna. The top hat is used to increase the antenna's capacity to ground thereby making it resonant at 100 KHZ. Notice the many insulators in the guide wires.



This sketch shows the floor plan for the building.



This is a view of about half of the control room equipment. The two racks to the left of the man (our tour guide) contain status monitors. The rack to the right contains the controls for the two Loran Transmitters (primary and standby) and the rack on the extreme right is monitoring the transmitter output waveform.



These racks contain the station's primary atomic frequency standards (three of them), a receiver which is phased locked to WWVL for frequency comparison, and receivers tuned to the Loran master station. The Las Cruces station is a slave station and thus gets its main timing from the master station.