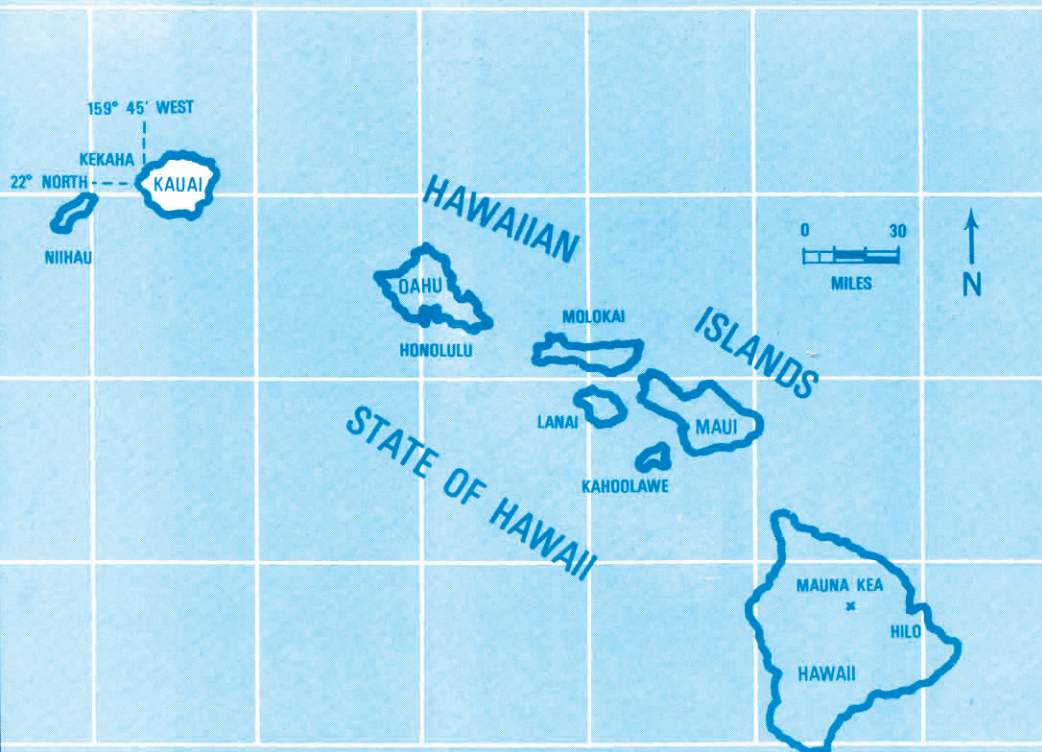


# WWVH

U.S. DEPARTMENT of COMMERCE  
**NATIONAL INSTITUTE of  
STANDARDS and TECHNOLOGY**

**TIME and FREQUENCY SERVICES**



**NIST RADIO STATION WWVH**  
**P.O. BOX 417**  
**KEKAHA, HAWAII 96752**  
**(808) 335-4361**



**Revised: August 1992**

# WWVH CHRONOLOGY

1948	Nov	Began broadcasts from Maui.
1964	Jul	Began voice announcements.
1971	Jul	Transferred operations to Kauai.
1971	Jul	Began Pacific Weather Warnings.
1972	Jan	New UTC time scale begun.
1972	Jun	First "leap second" in history of time added to the UTC time scale.
1974	Jan	Changed voice announcements from "Greenwich Mean Time" to "Coordinated Universal Time" (GMT to UTC).
1989	Jun	Began Geophysical Alert Broadcast. 45 minutes.
1990	Mar	Began Global Positioning Satellites Status Report Announcements. 43 and 44 minutes.

## TIME SETTING OR KEEPING PRECISION

Telephone	
(808) 335-4363	.05 second
WWVH Broadcast	.001 second
GOES Satellites	100 microseconds
VLF	3-25 microseconds
LORAN-C	1-8 microseconds
GPS Satellites	.1 microsecond

### CLOCK/Accuracy



SUNDIAL/Minutes



SPRING/Minutes



PENDULUM/Seconds



QUARTZ/Milliseconds

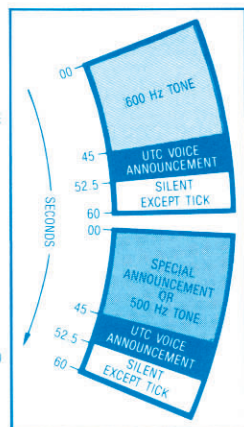


ATOMIC/Microseconds



A time code generator allows recorded voices and special announcements to be programmed automatically into the broadcast format. This information provides modulation through a synthesizer for the four standard broadcast frequencies which are accurate to a few parts in one million million ( $10^{12}$ ). A female voice announces WWVH's time, thus allowing distinction from WWV's male voice. The RF signals are amplified through high power transmitters and fed to the antenna systems. The antennas are modified  $1/2$  wave dipole phased arrays with the exception of the 2.5 MHz and standby monopoles.

## WWVH BROADCAST FORMAT



- BEGINNING OF EACH HOUR IS IDENTIFIED BY 0.8-SECOND LONG, 1500-Hz TONE.
- BEGINNING OF EACH MINUTE IS IDENTIFIED BY 0.8-SECOND LONG, 1200-Hz TONE.
- THE 29th & 59th SECOND PULSE OF EACH MINUTE IS OMITTED

# WWVH CONTINUOUS BROADCASTS

FREQUENCY (MHz)	RADIATED		½ WAVE ANTENNA	COVERAGE
	POWER (kW)			
2.5	5	}	Omni-directional	Ground wave - Local
5.0	10		Directional Array	Skip - Hemisphere
10.0	10			
15.0	10			



After serving the Pacific area for 23 years from the Island of Maui, Hawaii, Radio Station WWVH was relocated to the western edge of the Island of Kauai, Hawaii. This modern \$1.2 million facility is located on 30 acres near Kekaha at Kokole Point. Around the clock, continuous broadcast services from Hawaii supplement those from WWV in Fort Collins, Colorado, by providing principal coverage in the Pacific Basin.

Three atomic frequency standards at WWVH provide optimum timekeeping ability. These "atomic clocks" are accurate to 1 millionth of a second per month and variations are held to within 5 microseconds of the National Institute of Standards and Technology's UTC time scale. The U.S. primary standard is maintained by the Time and Frequency Division, National Institute of Standards and Technology, Boulder,