JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1001
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 5250
(11-8-68)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF [illegible] STATION

NAME OF STATION: 273C01

CHIEF OF PARTY: P.C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the intersection of State Highways 50 and 55 in Kekaha, go northerly on State Highway 55 for 15.5 miles to Makaha Road. Turn left and go westerly, downhill, along a narrow asphalt road for 5.1 miles to the end of the road at the northwest end of Makaha Ridge. The radar was not in place at the time the survey was done. Point observed was the center of a ring of bolts atop a low building sheathed in sheet rock. The radar will be the most northerly one of three at the northwest end of the ridge.

A short-base connection was made to triangulation station MAKAW 1966, distance being 19.818 meters (65.020 feet) southeast of MAKAW.

COES-DC 34313

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: 273C01

STATE: HAWAII YEAR: 1967 SECOND -ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °08 ′17.″1893	ELEVATION	454 METERS
GEODETIC LONGITUDE:	159 43 52.0680	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	421,771.82	110,773.72	- 0 ° 05 ′ 14 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

QF 5.2

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1002
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

FORM 525
(5-18-68)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: 1964-2 (USNHO) STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: W.S. Simmons YEAR: 1966 DESCRIBED BY: A.K.R.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.† HEIGHT OF LIGHT ABOVE STATION MARK METERS.

SURFACE-STATION MARK, UNDERGROUND-STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION‡ ° ′ ″
	MAKAW				00 00 00.00
desc	Reference Mark No. 1	SSW	22.536	6.869	210 30 46

Detailed description:

The station is located in a bare, rocky area at the west end of Makaha Ridge, about 13 miles north of Kekaha and 4.5 miles west of Hawaii State Highway 55.

To reach the station from the junction of Hawaii State Highways 50 and 55 at Kekaha, go northerly on Hawaii State Highway 55 for 15.5 miles to an asphalt road on the left. Turn left and go westerly, downhill, for 4.9 miles to the station on the left.

The station mark is a U.S. Navy Hydrographic Office triangulation station disk, stamped 1964-2, set in the top of a mass of plaster of paris that projects 1 inch above the surface of the ground. It is about 75 yards southwest of the center of the asphalt road and 10-1/2 feet north of a wooden witness post with sign.

Reference mark No. 1 is a U.S. Navy Hydrographic Office reference mark disk, stamped 1964-2, set in the top of a mass of plaster of Paris that projects 1 inch above the surface of the ground. It is 13.9 feet southwest of a wooden witness post with sign and is about the same elevation as the station mark.

*Refers to notes in manuals of triangulation and state publications of triangulation. ‡Direction-angle measured clockwise, referred to initial station.
†To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 27171-P69

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: 1964-2 USNHO

STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °08 ′13.″0842	ELEVATION:	454.22 METERS
GEODETIC LONGITUDE:	159 43 53.0462		1490.2 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ IOR Δ α ANGLE *
HI 4	5104	421,679.22	110,359.61	- 0 ° 05 ′ 14 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ IOR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH* (From south) ° ′ ″	CODE
MAKAW	186 15 31.4	186 20 45	5104

POSITION DETERMINED BY TRAVERSE FROM STATION MAKAW

AND CHECKED BY ADDITIONAL OBSERVATIONS

QF 504

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 HAWAII STATION 1003
LATITUDE 22 °00′ TO 22 °30′
LONGITUDE 159 °30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-65)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
TRAVERSE

DESCRIPTION OF [redacted] STATION

NAME OF STATION: 273901

CHIEF OF PARTY: Phillip C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object:

15.5 miles north along State Highway 55 from the junction of State Highway 50 and 55 in Kekaha, thence 5.1 miles west down the ridge along an asphalt road.
A connection was made to triangulation station MAKAW 1966, distance being (102.566 meters) or (336.502 feet) southeast of station MAKAW 1966. It is a white radar mounted on a cylindrical pedestal which is 10 feet in height and is centered on the top of a 15-foot square building. This is the south and highest one of two identical radars. The connection was made to the center of the radar.

Described by .....

Comm-DC 34313

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: 273901

STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °08 ′14.″7755	ELEVATION: SCALED	460 METERS / FEET
GEODETIC LONGITUDE:	159 43 50.7638		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	421,894.07	110,529.96	- 0 °05 ′13 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

QF 510

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1004
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 5250
(11-8-55)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
TRAVERSE

DESCRIPTION OF [redacted] STATION

NAME OF STATION: 273902

CHIEF OF PARTY: Phillip C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object:

15.5 miles north along State Highway 55 from the junction of State Highway 50 and 55 in Kekaha, thence 5.1 miles west down the ridge along an asphalt road.
A connection was made to triangulation station MAKAW 1966, distance being (83.538 meters) or (274.074 feet) southeast of station MAKAW 1966. It is a white radar mounted on a cylindrical pedestal which is 10 feet in height and is centered on the top of a 15-foot square building. This is the north and lowest one of two identical radars. The connection was made to the center of the radar.

Described by .....

Comm-DC 34313

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: 273902

STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °08 ′15.″6085	ELEVATION:	459 METERS
GEODETIC LONGITUDE:	159 43 50.6307	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE
HI 4	5104	421,906.71	110,613.99	- 0 °05 ′13 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

QF 511

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1005
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 445b
(11-8-55)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF ~~TRIANGULATION~~ STATION

NAME OF STATION: 274201

CHIEF OF PARTY: P.C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the intersection of State Highways 50 and 55 in Kekaha, go northerly on State Highway 55 for 15.5 miles to Makaha Road. Turn left and go westerly, downhill, on Makaha Road for 4.5 miles to a bladed road on the right. Turn right and go northwesterly for about 100 feet to a 55-foot aluminum tower.

The mark is a plain brass disk, stamped 274201 1967, set in the top of a 4-inch pipe that projects 8 inches above the surface of the ground. It is 1.0 foot west-northwest of the north leg of the tower, 1.0 foot southwest of the north corner of the concrete foundation of the tower and plumbed under the center of the most northerly one of two 6-foot dish antennae mounted near the top of the tower.

A traverse connection was made to triangulation station GOAT, distance being 14.9353 meters (49.000 feet) south of station GOAT.

Described by .....

Cass-DF

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: 274201

STATE: HAWAII YEAR 1967 SECOND -ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °08′06.6280	ELEVATION:	512.96 METERS
GEODETIC LONGITUDE:	159 43 35.2529		1682.9 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 4	5104	423,351.14	109,705.60	- 0° 05′ 07″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION GOAT

QF 513

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1006
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-65)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
TRAVERSE
DESCRIPTION OF ~~TRIANGULATION INTERSECTION~~ STATION

NAME OF STATION: 274202

CHIEF OF PARTY: P.C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the intersection of State Highways 50 and 55 in Kekaha, go northerly on State Highway 55 for 15.5 miles to Makaha Road. Turn left and go westerly, downhill, for 4.5 miles to a bladed road on the right. Turn right and go northwesterly on the bladed road for about 100 feet to a 55-foot aluminum tower.

The mark is a plain brass disk, stamped 274202 1967, set in the top of an irregular mass of concrete. It is 0.8 foot west-northwest of the west leg of the tower, 0.2 foot west of the west edge of the concrete foundation of the tower and plumbed under the center of the most southerly one of two 6-foot dish antennae mounted near the top of the tower.

A traverse connection was made to triangulation station GOAT, distance being 16.5377 meters (54.257 feet) south of station GOAT.

Described by .....

Coast-DC 34313

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: 274202

STATE: HAWAII YEAR: 1967 SECOND -ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °08′06.5765	ELEVATION:	512.92 METERS
GEODETIC LONGITUDE:	159 43 35.2775		1682.8 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE °
HI 4	5104	423,348.82	109,700.41	- 0 ° 05 ′ 07 ″

° PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH ° (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION GOAT

QF 514

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1007
HAWAII
LATITUDE 22 °00′ TO 22 °30′
LONGITUDE 159 °30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-55)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF ~~TRIANGULATION INTERSECTION~~ STATION

NAME OF STATION: 274203

CHIEF OF PARTY: P.C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the intersection of State Highways 50 and 55 in Kekaha, go northerly on State Highway 55 for 15.5 miles to Makaha Road. Turn left and go westerly, downhill, on Makaha Road for 4.5 miles to a bladed road on the right. Turn right and go northwesterly on the bladed road for about 100 feet to a 55-foot aluminum tower.

The mark is a plain brass disk, stamped 274203 1967, set in the top of a 4-inch pipe that projects 4 inches above the surface of the ground. It is 1.4 feet southwest of the north leg of the tower, 0.8 foot west-northwest of the west edge of the concrete foundation of the tower and plumbed under the center of a circular, black and white optical target mounted near the top of the tower.

A traverse connection was made to triangulation station GOAT, distance being 15.7862 meters (51.792 feet) south of station GOAT.

Described by .....

Comm-DC 34313

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: 274203

STATE: HAWAII YEAR: 1967 SECOND -ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °08 ′06.6008	ELEVATION:	512.94 METERS 1682.9 FEET
GEODETIC LONGITUDE:	159 43 35.2725		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ FOR Δ α ANGLE *
HI 4	5104	423,349.29	109,702.86	- 0 °05 ′07 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ FOR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION GOAT

QF 515

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1008
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 5250
(11-8-55)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF [illegible] STATION

NAME OF STATION: 274204

CHIEF OF PARTY: P.C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the intersection of State Highways 50 and 55 in Kekaha, go northerly on State Highway 55 for 15.5 miles to Makaha Road. Turn left and go westerly, downhill, on Makaha Road for 4.5 miles to a bladed road on the right. Turn right and go northwesterly on the bladed road for about 100 feet to a 55-foot aluminum tower.

The mark is a plain brass disk, stamped 274204 1967, set in the top of a 4-inch pipe that projects 3 inches above the surface of the ground. It is 3.3 feet north-northeast of the north leg of the tower, 1.7 feet west-northwest of a wooden witness post, 1.6 feet south-southwest of another wooden witness post and plumbed under the center of a circular, black and white optical target mounted near the top of the tower.

A traverse connection was made to triangulation station GOAT, distance being 14.1328 meters (46.367 feet) south of GOAT.

Described by .....

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: 274204

STATE: HAWAII YEAR: 1967 SECOND -ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °08 ′06.″6544	ELEVATION:	512.86 METERS
GEODETIC LONGITUDE:	159 43 35.2322		1682.6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β IOR Δ α ANGLE *
HI 4	5104	423,353.09	109,708.26	- 0 °05 ′07 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β IOR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION GOAT

QF 516

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1009
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-55)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: 274205

CHIEF OF PARTY: P.C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the intersection of State Highways 50 and 55 in Kekaha, go northerly on State Highway 55 for 15.5 miles to Makaha Road. Turn left and go westerly, downhill, on Makaha Road for 4.5 miles to a bladed road on the right. Turn right and go northwesterly, along the bladed road for about 100 feet to a 55-foot aluminum tower.

The mark is a plain brass disk, stamped 274205 1967, set in the top of a 4-inch pipe that projects 2 inches above the surface of the ground. It is 3.5 feet southwest of the west leg of the tower and plumbed under the center of a circular, black and white target mounted near the top of the tower.

A traverse connection was made to triangulation station GOAT, distance being 17.3942 meters (57.067 feet) south of station GOAT.

Described by _____

Comm-DC 3431

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: 274205

STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °08 ′06.″5500	ELEVATION:	513.00 METERS
GEODETIC LONGITUDE:	159 43 35.3006		1683.1 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE *
HI 4	5104	423,346.64	109,697.74	- 0 °05 ′07 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION GOAT

QF 517

JUN 1978
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1010
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-55)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF TRIANGULATION/INTERSECTION STATION

NAME OF STATION: 274206

CHIEF OF PARTY: P.C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the intersection of State Highways 50 and 55 in Kekaha, go northerly on State Highway 55 for 15.5 miles to Makaha Road. Turn left and go westerly, downhill, on Makaha Road for 4.5 miles to a bladed road on the right. Turn right and go northwesterly on the bladed road for about 100 feet to a 55-foot aluminum tower.

The mark is a plain brass disk, stamped 274206 1967, cemented in a drill hole in the concrete foundation of the tower. It is 3.4 feet southwest of the northeast edge of the concrete, 0.7 foot southeast of the northwest edge and plumbed under the center of a circular black and white optical target mounted near the top of the tower.

A traverse connection was made to triangulation station GOAT, distance being 15.7181 meters (51.568 feet) south of station GOAT.

Described by .....

Coast-DC 3431

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: 274206

STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °08 ′06.6026	ELEVATION:	512.99 METERS
GEODETIC LONGITUDE:	159 43 35.2542		1683.0 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR $\Delta\alpha$ ANGLE °
HI 4	5104	423,351.01	109,703.04	- 0 05 07

° PLANE AZIMUTH HAS BEEN COMPUTED BY THE β OR $\Delta\alpha$ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH ° (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION GOAT

QF 518

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1011
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-55)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF [redacted] STATION

NAME OF STATION: 274207

CHIEF OF PARTY: Phillip C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object:

15.5 miles north along State Highway 55 from the junction of State Highway 50 and 55 in Kekaha, thence 5 miles west down the ridge along an asphalt road.

A traverse connection was made to triangulation station ADOBE, distance being 20.8464 meters (68.394 feet) north of triangulation station ADOBE. The mark is a plain bronze disk set in the top of a 7-inch round concrete monument which projects 3 inches above the surface of the ground. It is 21.4 feet west of the west corner of the communications building and 2.2 feet south of the north leg of a white triangular shaped tower. This point is plumbed directly under the center of a bolt in the front and center of an orange convex fiberglass cover of the antenna.

Described by .....

Comm-DC 343:

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: 274207

STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °08 ′11.8185	ELEVATION	469.09 METERS
GEODETIC LONGITUDE:	159 43 48.7028		1539.0 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	422,087.39	110,231.27	- 0 °05 ′12 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION ADOBE

QF 519

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 HAWAII
STATION 1012
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 | KAUAI

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: A-POINT

STATE: HAWAII YEAR: 1968 SECOND -ORDER

SOURCE: G-14107

GEODETIC LATITUDE:	22 °02 ′11.″68286	ELEVATION:	5 METERS
GEODETIC LONGITUDE:	159 47 07.83282	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR △ α) ANGLE *
HI 4	5104	403,297.48	73,921.98	- 0 ° 06 ′ 26 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ (OR △ α) FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

QF 608

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1013
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

FORM 525
(6-18-68)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: ADOBE STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: Phillip C. Johnson YEAR: 1967 DESCRIBED BY: R.M.M.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1 METERS,† HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.

	SURFACE-STATION MARK, UNDERGROUND-STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION‡ ° ′ ″
	LUCKY 1966				00 00 00.0
Desc.	274207 (Reference Mark No. 2)	N	(68.394)	20.846	195 16 12.0
Desc.	Reference Mark No. 1	NE	(66.025)	20.124	255 26 34.6

Detailed description:

The station is 11.7 miles north-northwest of Kekaha, 4.5 miles west of State Highway 55, in a small grassy area just southwest of the communications building at the Makaha Ridge Radar Site.

To reach the station from the junction of State Highway 50 and 55 in Kekaha, go north on State Highway 55 for 15.5 miles to an asphalt road on the left. Turn left and go west down the hill on the asphalt road for 5.0 miles to the station on the right.

The station mark, a standard disk stamped ADOBE 1967, is set in the top of a 12-inch round concrete monument which is set flush with the surface of the ground. It is 79 feet west of the south corner of the communications building, 71.8 feet south of the west corner of the building, 66 feet south of a white triangular shaped tower and 45.5 feet southwest of the southwest edge of an asphalt drive.

Reference mark No. 1, a standard disk stamped ADOBE NO 1 1967, is cemented in a drill hole in the west corner of the middle one of three steps leading to the communications building. It is 2.8 feet southwest of the edge of the building, 0.85 foot northeast of the southwest edge of the step and 0.75 foot southeast of the northwest edge of the step.

Reference mark No. 2, a plain bronze disk stamped 274207 1967, is set in the top of a 7-inch round concrete monument which projects 3 inches above the surface of the ground. It is 21.4 feet west of the west corner of the building and 2.2 feet south of the north leg of a white triangular shaped tower.

Note: Both reference marks were traversed.

*Refers to notes in manuals of triangulation and state publications of triangulation. ‡Direction-angle measured clockwise, referred to initial station.
†To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 57171-P69

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: ADOBE

STATE: HAWAII YEAR: 1967 SECOND -ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °08 ′11.1939	ELEVATION:	468.28 METERS
GEODETIC LONGITUDE:	159 43 48.9851		1536.3 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE*
HI 4	5104	422,060.75	110,168.28	- 0° 05′ 12″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH* (From south) ° ′ ″	CODE
LUCKY	7 33 37.5	7 38 50	5104

QF 503

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1014
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-65)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF [redacted] STATION

NAME OF STATION: Arcas Launcher

CHIEF OF PARTY: P.C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object:

The station is the center of a bolt in the center of an arcas launcher.
A traverse connection was made from triangulation station LAPA, distance being 28.4826 meters or (93.447 feet) north of station LAPA.

Described by .....

Coms-DC 343:

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: ARCAS LAUNCHER

STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °04 ′17.″9944	ELEVATION:	28.50 METERS
GEODETIC LONGITUDE:	159 46 38.4708		93.5 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	406,083.15	86,662.84	- 0 °06 ′15 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION LAPA

QF 524

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1015
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 | KAUAI

Awaa (Kauai Island, O. B. French, 1910).—On a conspicuous peak about 1 mile northwest of Puu o Kila, and northeast of Halemanu. Peak sometimes called Awaawaapuhi, from the valley of that name which is to the southwest and west. Station marked by a ¾-inch drill hole at the center of a cross in a rock which projects about 1 foot above the surface, and is about 10 meters "makai" (seaward) from the highest part of the summit. Reference marks are crosses cut in large rocks at the following azimuths and distances from the station: No. 1, cross in large outcropping country rock, 321° 09′, 27.6 feet; No. 2, cross in large bowlder, 140° 50′, 16.8 feet; No. 3, cross in flat rock which projects slightly above the surface, 223° 08′, 17.5 feet.

(3-18-69) COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: AWAA
ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Kauai
Island: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION °	′	″
MAKAHA 2 1927				00	00	00.0
RM No. 1	SE	26.804	8.170	245	26	29
Ref. Cross # 1	SE	27.500	8.382	259	51	31
RM No. 2	S	19.512	5.947	301	23	00

Station cross and all 3 of the old reference crosses were recovered and found in good condition and the distances and azimuths checked quite well. The station was re-marked with a standard disk and two new reference marks were established. A complete description follows:

Station is located in northwest part of Kauai, about 1-1/2 miles north of Kokee Park Headquarters and 1/2-mile west of the Air National Guard site, on a timbered hill of about 4122 feet elevation which has a group of very large boulders and rock outcrops on it's west end.

To reach station from the Kokee Park Headquarters, go northerly on paved road for 2.1 miles to sign on left "HONOPU TRAIL 3.5". From here pack westerly on good trail for about 1/3-mile to where trail drops down abruptly off point of ridge, losing about 50 feet elevation; continue on trail for about 200 yards to a point about midway along south side of hill on right. Leave trail and work way up hillside through dense ferns, for about 150 yards to top and station on west end of hill.

Station mark is a standard disk stamped "AWAA 1910 1966", cemented in a drill hole at center of old chiseled cross in the south end of a large, smooth rock, 6 feet long, 4 feet wide at the south end and tapering to a point on the north end.

Reference mark number one is a standard disk stamped "AWAA 1910 NO 1 1966", cemented in a drill hole in the east end of a large bedrock outcrop 16 feet across and projecting 2-1/2 feet. It is about 2-1/2 feet higher than station mark and is in the same outcrop on which reference cross # 1 is located.

Reference mark number two is a standard disk stamped "AWAA 1910 NO 2 1966", cemented in a drill hole in the high point of a large bedrock outcrop that slopes down the west side of the hilltop and projects about 2 feet above the general ground line.

Reference cross # 1 is a 3-inch, chiseled cross on the west end of the large, 16-foot outcrop and is about 1 foot lower than station mark.

NOTE: Packing time about 45 minutes.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27179-P69

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: AWAA
STATE: HAWAII YEAR: 1910 SECOND ORDER
SOURCE: G-SP156

GEODETIC LATITUDE:	22 °08 ′58.″192	ELEVATION:	1250 METERS
GEODETIC LONGITUDE:	159 39 22.476	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE
HI 4	5104	447,122.25	114,878.99	- 0 °03 ′32 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
MAKAHA 2	61 °18 ′41.″3	61 °22 ′13 ″	5104

QI 026

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1017
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 | KAUAI

Form 525b
(11-8-65)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

DESCRIPTION OF TRAVERSE STATION

NAME OF STATION: BALL R.M. 1

CHIEF OF PARTY: D.J.Florwick YEAR: 1965 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the sentry post at the main gate at Bonham Auxiliary Landing Field go northerly along an asphalt road for 1.1 miles to a track road on the left. Turn left, west, for 100 yards to the station in the middle of a clearing.

The point traversed to was a punch mark at the cross of the arrow in the reference mark disk which is set in the top of a 12-inch square concrete monument which projects 6 inches above the surface of the ground.

A traverse connection was made to triangulation station BALL, distance being 10.9625 meters (35.966 feet) west of station BALL.

Described by

Comm-DC 34311

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BALL RM 1

STATE: HAWAII YEAR: 1965 SECOND ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °03 ′18.″3249	ELEVATION:	3.89 METERS
GEODETIC LONGITUDE:	159 46 50.0966		12.8 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ IOR Δ α ANGLE °
HI 4	5104	404,978.54	80,643.65	- 0 06 19 "

° PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ IOR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH ° (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION BALL

QF 434

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 HAWAII STATION 1016
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

FORM 525
(9-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BALL STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: D.J. Florwick YEAR: 1965 DESCRIBED BY: A.K.R.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 3' METERS,† HEIGHT OF LIGHT ABOVE STATION MARK 3 METERS.

	SURFACE-STATION MARK, UNDERGROUND-STATION MARK / DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION‡
	HIGH				00 00 00.00
	East Antenna, Jupiter	WNW	(44.524)	13.5708	36 07 05.4
11b	Reference Mark No. 2	N	26.220	7.993	90 00 01.8
11a	Reference Mark No. 1	W	(35.966)	10.9625	359-59 50.0

Detailed description:

The station is located in the northeast corner of Bonham Auxiliary Landing Field, about 1.1 miles north of the main gate, 0.4 mile east of the beach and 150 yards south of an irrigation canal.

To reach the station from the main gate at Bonham Auxiliary Landing Field, go northerly along an asphalt road for 1.1 miles to a track road on the left. Turn left and go west for about 100 yards to the station mark in the middle of a clearing.

The station mark is a standard disk, stamped BALL 1965, set in the top of a 12-inch diameter concrete cylinder that projects 4 inches above the surface of the ground. It is 5 feet south of a 4-inch by 4-inch white witness post.

Reference mark No. 1 is a standard disk, stamped BALL NO 1 1965, set in the top of a 12-inch square concrete post that projects 6 inches above the surface of the ground. It is 2.4 feet south of a 4-inch by 4-inch white witness post.

Reference mark No. 2 is a standard disk, stamped BALL NO 2 1965, set in the top of a 12-inch diameter concrete cylinder that projects 4 inches above the surface of the ground. It is 1.9 feet south of a 4-inch by 4-inch white witness post.

*Refers to notes in manuals of triangulation and state publications of triangulation. ‡Direction-angle measured clockwise, referred to initial station.
†To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 27171-P69

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BALL
STATE: HAWAII YEAR: 1965 SECOND ORDER
SOURCE: G-13403

GEODETIC LATITUDE:	22 °03 ′18.″3249	ELEVATION:	3.53 METERS
GEODETIC LONGITUDE:	159 46 49.7143		11.6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β (OR Δ α) ANGLE *
HI 4	5104	405,014.51	80,643.59	- 0 06 19 *

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β (OR Δ α) FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
	° ′ ″	° ′ ″	
OHAIULA	274 22 08.3	274 28 27	5104

POSITION DETERMINED BY TRAVERSE FROM STATION HIGH
AND CHECKED BY ADDITIONAL OBSERVATIONS

QF 432

JUN 1978

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1016

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

BALL (continued)

FORM 526e (8-10-59)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: BALL
ESTABLISHED BY: D.J.F. YEAR: 1965 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Kauai
Island: Kauai
HEIGHT OF TELESCOPE ABOVE STATION MARK METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION °	′	″
OHAIULA				00	00	00.0
RM No. 1	W	35.968	10.964	175	37	06
RM No. 2	N	26.209	7.989	265	37	51

Station was recovered and all marks found in good condition. A complete description follows:

Station is located about 1-1/4 miles northwest of Mana village, 1/2-mile east of the shoreline and 1/2-mile north-northeast of north end of runway of Bonham Auxiliary Landing Field, in the center of a large cleared area about 250 feet diameter, surrounded by large kiawe trees.

To reach station from the entrance to Bonham Auxiliary Landing Field, go north for 1.1 miles to track side road left. Turn left and go about 100 yards to station on left.

Station mark is a standard disk stamped "BALL 1965", set in the top of a 12-inch diameter, concrete monument that projects 2 inches. It is 18 feet south of center line of track road, 45 feet southeast of a large wooden antenna, and 2.4 feet west of a white witness post.

Reference mark number one is a standard disk stamped "BALL NO 1 1965", set in the top of a 12-inch-square, concrete monument projecting 4 inches. It is 10 feet south of center line of track road, 26 feet south of the antenna pole, and 1.5 feet northwest of a white witness post.

Reference mark number two is a standard disk stamped "BALL NO 2 1965", set in the top of a 12-inch-diameter, concrete monument that projects 2 inches. It is 8 feet north of center line of track road and 1-1/2 feet west-southwest of a white witness post.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27179-P66

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: BALL
ESTABLISHED BY: D.J. Florwick YEAR: 1965 STATE: Hawaii BENCH MARK ALSO
RECOVERED BY:* F.L. Jeffries YEAR: 1968 COUNTY Kauai
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 7 miles northwest of Kekaha
HEIGHT OF TELESCOPE ABOVE STATION MARK FEET. HEIGHT OF LIGHT ABOVE STATION MARK FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION °	′	″
The station was not observed at this time.						

The station mark, reference mark No. 1 and reference mark No. 2 were recovered as described in 1965 and found in good condition. Following is a new description.

The station is located in the northeast corner of Barking Sands Pacific Missile Range Facility, about 1.4 miles north of the control tower, 1/4 mile north of the north end of the runway and 150 yards south of an irrigation canal.

To reach the station from the main gate of the Barking Sands Pacific Missile Range Facility, go north on Nohili Road for 0.6 mile to the intersection with Kalanamahiki Place North. Turn left and go north on Kalanamahiki Place North for 0.6 mile to Palai Olani Road. Turn left and go west on Palani Olani Road for 0.05 mile to Kukue Road. Turn right and go north on Kukui Road for 0.35 mile to Hoku Road. Turn left and go west on Hoku Road 0.05 mile to a track road right. Turn right and go north-northeast on track road for 0.2 mile to a cleared area and the station.

The station mark is a standard disk, stamped BALL 1965, set in the top of a 12-inch diameter concrete cylinder post that projects 4 inches above the surface of the ground. It is 5 feet south of a 4-inch by 4-inch white witness post.

Reference mark number 1 is a standard disk, stamped BALL NO 1 1965, set in the top of a 12-inch square concrete post that projects 6 inches above the surface of the ground. It is 2.4 feet south of a 4-inch by 4-inch white witness post.

Reference mark number 2 is a standard disk, stamped BALL NO 2 1965, set in the top of a 12-inch diameter concrete cylinder post that projects 4 inches above the surface of the ground. It is 1.9 feet south of a 4-inch by 4-inch white witness post.

*Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

FORM C&GS-526a 10-24-641
USCOMM-DC 6991-P64

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

USCOMM-NOAA-ASHEVILLE

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 HAWAII STATION 1018
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

FORM 525
(9-18-68)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BARK STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: D.J.Florwick YEAR: 1964 DESCRIBED BY: R.K.Moore

NOTE.*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.† HEIGHT OF LIGHT ABOVE STATION MARK METERS.					
1a 7a	SURFACE-STATION MARK, UNDERGROUND-STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION‡ ° ′ ″	
	BONHAM 1961				0	00′ 00.00
	Bonham Auxiliary Landing Field, Control Tower	NW	(Aprox. 0.4 mile)		04	57 41.6
11a	RM 1	NNE	35.534	10.830	52	01 17
11a	RM 2	SE	47.852	14.586	155	34 44

Detailed description:

The station is located on the Bonham Auxiliary Landing Field, about 8.6 miles west of the town of Waimea and about 0.5 mile south of State Highway 50.

To reach the station from the main gate at Bonham Auxiliary Landing Field, go south on a macadam road for 0.85 mile to a side road right and the Pacific Missile Range Headquarters. Turn right and go west and south for 0.15 mile to the station on the right.

The station mark, a standard disk stamped BARK 1964, is set in the top of a 12-inch square concrete block and projecting 2 inches above the ground. It is 60 feet south of the southwest corner of a large parking area that has radar trailers on the paved area, 45 feet west of a road forks, 65 feet southeast of a radar and 4 feet east of a 7 foot dirt bank.

Reference mark number 1, a standard disk stamped BARK NO 1 1964, is set in the top of a 12-inch square concrete block and projecting 1 inch above the ground. It is 60 feet south of the southwest corner of the paved area and 33 feet northwest of the road forks.

Reference mark number 2, a standard disk stamped BARK NO 2 1964, is set in the top of a 12-inch square concrete block and projecting 1 inch above the ground. It is 42 feet south of the road forks and 25 feet north of a fuel dump.

*Refers to notes in manuals of triangulation and state publications of triangulation. ‡Direction-angle measured clockwise, referred to initial station.
†To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 27171-P68

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BARK

STATE: HAWAII YEAR: 1964 SECOND ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °01 ′39.″9823	ELEVATION:	4.68 METERS
GEODETIC LONGITUDE:	159 47 09.7492		15.4 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ IOR Δ α ANGLE *
HI 4	5104	403,111.19	70,723.46	- 0 °06 ′26 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ IOR Δ α FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE
BONHAM	164 06 05.6	164 12 32	5104

QF 414

JUN 1978

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1018

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

BARK (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: BARK
ESTABLISHED BY: D.J. Florwick YEAR: 1964 STATE: Hawaii BENCH MARK ALSO ☒
RECOVERED BY:* D.J. Florwick YEAR: 1965 COUNTY: Kauai
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 7 miles northwest of Kekaha
HEIGHT OF TELESCOPE ABOVE STATION MARK 19 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 18 FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION °	′	″
BONHAM 1961				00	00	00.0
Bonham Auxiliary Landing Field Control Tower	NNW	(0.45 Mile)		04	57	39.0
Reference Mark No. 1	NNE	35.57	10.842	52	00	43
Reference Mark No. 2	SE	47.86	15.588	155	34	26

The station mark, reference mark No. 1 and reference mark No. 2 were recovered as described in 1965 and found in good condition. Following is a new description.

The station is located 7 miles northwest of the small village of Kekaha, on Bonham Auxiliary Landing Field, near the southwest corner of a large parking area know as the Instrumentation Van Pad.

To reach the station from the junction of State Highway 50 and 55 in the small village of Kekaha, go northwest on State Highway 50 for 6.55 miles to a fork in the road. Keep the left fork and go west on an oiled road for 0.4 mile to a crossroad at the main gate of Bonham Auxilliary Landing Field. Turn left and go south on an oiled road for 0.8 mile to a side road right. Turn right and go west on an oiled road for 0.1 mile to a T-road at the west edge of of parking area. Turn left and go south through the parking area for 0.1 mile to the station on the right near the base of a large U-shaped dirt bank.

The station mark, a standard disk stamped BARK 1964, set in the top of a 12-inch square concrete monument which projects 1 inch above the surface of the ground. It is 95 feet southwest of the southwest corner of a white concrete block building, 86 feet south-southwest of the southwest corner of the Instrumentation Van Pad, 42 feet west of the center of a fork in a track road and 5 feet east of the edge of a U-shaped dirt bank. Note: 1a, 7a.

Reference mark No. 1, a standard disk stamped BARK NO 1 1964, set in the top of a 12-inch square concrete monument which is set flush with the surface of the ground. It is 66 1/2 feet west-southwest of the southwest corner of a white concrete block building, 57 1/2 feet south of the southwest corner of the Instrumentation Van Pad and 24 feet west of the center of the track road. Note: 11a.

Reference mark No. 2, a standard disk stamped BARK NO 2 1964, set in the top of a 12-inch square concrete monument which is set flush with the surface of the ground. It is 116 1/2 feet south of the south edge of the Instrumentation Van Pad, 98 feet south-southwest of the southwest corner of the white concrete block building, 23 feet southwest of the center of a track road and 13 feet east of the center of a track road. Note: 11a.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: BARK
ESTABLISHED BY: D.J. Florwick YEAR: 1964 STATE: Hawaii BENCH MARK ALSO ☒
RECOVERED BY:* F.L. Jeffries YEAR: 1968 COUNTY: Kauai
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: On Barking Sands PMRF
HEIGHT OF TELESCOPE ABOVE STATION MARK 19 FEET. HEIGHT OF LIGHT ABOVE STATION MARK FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION °	′	″
The distances and directions to the reference marks were not checked on this date.						

The station mark, reference mark No. 1 and reference mark No. 2 were recovered and found to be in good condition. A new description follows.

The station is located 6 1/2 miles northwest of the small village of Kekaha, on Barking Sands Pacific Missile Range Facility, just south of a large parking area know as the Instrumentation Van Pad.

To reach the station from the main gate at Barking Sands Pacific Missile Range Facility, go south on Nohili Road for 0.1 mile to side road right. Turn right and go west and south on LII Way for 0.4 mile to end of pavement after passing through the Van Pad area and the station.

The station mark is a standard disk, stamped BARK 1964, set in the top of a 12-inch square concrete monument which projects 1 inch above the suface of the ground. It is 95 feet southwest of the southwest corner of a white concrete block building, 86 feet south-southwest of the southwest corner of the Instrumentation Van Pad, 42 feet west of the center of a fork in a track road and 5 feet east of the edge of a U-shaped dirt bank.

Reference mark No. 1 is a standard disk, stamped BARK NO 1 1964, set in the top of a 12-inch square concrete monument which is set flush with the surface of the ground. It is 66 1/2 feet west-southwest of the southwest corner of a white concrete block building, 57 1/2 feet south of the southwest corner of the Instrumentation Van Pad and 24 feet west of the center of the track road.

Reference mark No. 2 is a standard disk, stamped BARK NO 2 1964, set in the top of a 12-inch square concrete monument which is set flush with the surface of the ground. It is 116 1/2 feet south of the south edge of the Instrumentation Van Pad, 98 feet south-southwest of the southwest corner of the white concrete block building, 23 feet southwest of the center of a track road and 13 feet east of the center of a track road.

*Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

FORM C&GS-526e (12-68)
USCOMM-DC 38291-P68

U.S. DEPARTMENT OF COMMERCE
ESSA
COAST AND GEODETIC SURVEY

USCOMM-NOAA-ASHEVILLE

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1019
HAWAII
LATITUDE 22 °00′ TO 22 °30′
LONGITUDE 159 °30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

SEE STATION PELE

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BENCH MARK USGS NR PELE

STATE: HAWAII YEAR: 1961 SECOND ORDER

SOURCE: G-12519
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °05′01.″746	ELEVATION:	1114.0 METERS
GEODETIC LONGITUDE:	159 40 09.159		3655 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	442,707.09	91,024.13	- 0°03′49″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION PELE

QF 248

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1020
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

FORM 525
(9-18-68)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BONHAM STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: Walter R. Helm YEAR: 1961 DESCRIBED BY: R.K. Moore

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS.† HEIGHT OF LIGHT ABOVE STATION MARK METERS.

NOTE.*	SURFACE-STATION MARK, UNDERGROUND-STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION						
		OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION† °	′	″
4 none		MAKAHA 2 1927				0	00	00.0
12c		RM 2	S	10.895	3.319	159	31	05
12c		RM 1	NNW	18.214	5.553	324	19	40

Detailed description:

The station is located 6-1/2 miles, air line, northwest of Kekaha, 1 mile, air line, west of Mana, 0.3 mile northwest of the control tower at Bonham Air Force Base, and on a small sandy ridge 50 feet east of the high water line on the west coast of Kauai Island.

To reach the station from the main gate at Bonham Air Force Base, go west and south for 0.15 mile to a fork. Take the right fork and go 0.55 mile to the control tower on the right. Turn right and go west across the landing field. Turn right and follow the track road north for 0.1 mile to a crossroad. Turn left and go west for 0.1 mile to the end of truck travel. Pack north for about 200 feet to the station.

The station mark, a standard disk stamped BONHAM 1961, is cemented in a drill hole in a boulder which projects 2 inches above the ground.

Reference mark 1, a standard disk stamped BONHAM NO 1 1961, is cemented in a drill hole in a boulder which projects 3 inches above the ground.

Reference mark 2, a standard disk stamped BONHAM NO 2 1961, is cemented in a drill hole in a boulder which is flush with the ground.

*Refers to notes in manuals of triangulation and state publications of triangulation. †Direction-angle measured clockwise, referred to initial station.
*To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 27171-P69

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BONHAM

STATE: HAWAII YEAR: 1961 SECOND ORDER

SOURCE: G-12519

GEODETIC LATITUDE:	22 °02′16.899	ELEVATION	8.41 METERS 27.6 FEET
GEODETIC LONGITUDE:	159 47 21.027		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 4	5104	402,057.11	74,450.67	- 0 00 31

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) °	′	″	PLANE AZIMUTH * (From south) °	′	″	CODE
SILVER	280	56	21.1	281	02	52	5104

QF 247

JUN 1978

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1020

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

BONHAM (continued)

FORM 526e (9-18-59) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: BONHAM
ESTABLISHED BY: W.R. Helm YEAR: 1961 STATE: Hawaii
RECOVERED BY:* W.R. Porter YEAR: 1964 COUNTY: Kauai Island. Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK 2 METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION °	′	″
OPAE 1910 1927				00	00	00.0
Kekaha, U.S. Army Training Station, Radio Mast, Center and highest 1 of 9	SE	4	miles	63	58	43.6
R.M. No. 2	SSW	10.890	3.320	113	07	04
R.M. No. 1	N	18.211	5.550	277	54	25

Station was recovered and all marks found in good condition. a complete description follows:

Station is located on the west tip of Kauai Island, about 9-1/2 miles airline northwest of Waimea village and 1 mile west of the old village of Mana; on the low sand ridge along the shoreline at the west side of Bonham Airfield and about 0.3 mile west-northwest of the control tower.

To reach station from the control tower, go westerly, crossing the runway, for 0.2 mile; turn right and follow track road northerly for 0.1 mile to dim side road left. Turn left and go 0.1 mile to end of road in sand. Pack northerly about 200 feet to station.

Station mark is a standard disk stamped "BONHAM 1961", cemented in a drill hole in a flat boulder that projects about 2 inches above ground. It is 42.5 feet north-northeast from a 20-foot pole that is painted alternate orange and white.

Reference mark number one is a standard disk stamped "BONHAM NO 1 1961", cemented in a drill hole in a flat rock about flush with ground and at same elevation as station.

Reference mark number two.is a standard disk stamped "BONHAM NO 2 1961", cemented in a drill hole in a sandstone rock that is flush with the ground and about 2 feet lower than station.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27173-P59

FORM 526e (9-18-59) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: BONHAM
ESTABLISHED BY: W.R Helm YEAR: 1961 STATE: Hawaii
RECOVERED BY:* D.J.Florwick YEAR: 1964 COUNTY: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION °	′	″
				0	00′	00.00
CANUTE (H&N)	SSW	*10.895	*3.319	194	57	06
RM 2	N	18.223	5.554	359	41	04
RM 1						

The station mark, reference mark number 1 and reference mark number 2 were located and found in good condition. A new complete description follows.

The station is located on the west tip of Kauai Island, about 9.5 miles northwest of Waimea, 0.25 mile west-northwest of the control tower and on a low sand ridge along the shoreline at the west side of the Bonham Auxiliary Landing Field, airport.

To reach the station from the control tower, go westerly, crossing the runway for 0.2 mile. Turn right and follow a track road northerly for 0.1 mile to a dim side road left. Turn left and go westerly for 0.1 mile to end of truck travel. Pack northerly about 200 feet to the station.

The station mark, a standard disk stamped BONHAM 1961, is cemented in a drill hole in a flat boulder and projecting 2 inches above the ground. It is about 45 feet north-northeast of a target pole and about 25 feet east of the high water line.

Reference mark number 1, a standard disk stamped BONHAM NO 1 1961, is cemented in a drill hole in a boulder 24 inches in diameter and projecting 5 inches above the ground.

Reference mark number 2, a standard disk stamped BONHAM NO 2 1961, is cemented in a drill hole in a boulder 12 inches in diameter and flush with the ground.

* 1961 distance.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27173-P59

(continued on next page)

USCOMM-NOAA-ASHEVILLE

JUN 1978

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1020

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

BONHAM (continued)

RECOVERY NOTE, TRIANGULATION STATION R

NAME OF STATION: BONHAM
ESTABLISHED BY: W.R. Helm YEAR: 1961 STATE: Hawaii
RECOVERED BY:* D.J. Florwick YEAR: 1965 COUNTY: Kauai BENCH MARK ALSO [X]
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 6 1/2 miles northwest of Kekaha
HEIGHT OF TELESCOPE ABOVE STATION MARK 5.5 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4.9 FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION
OHAIULA 1964				° 00 00 00.0
Reference Mark No. 2	S	10.897	3.320	138 14 26
Reference Mark No. 1	N	18.216	5.555	303 01 06

The station mark, reference mark No. 1 and reference mark No. 2 were recovered and found to be in good condition. A new description follows:

The station is located 6 1/2 miles northwest of Kekaha, 1 mile west of Mana, 0.3 mile northwest of the control tower at Bonham Auxiliary Landing Field and on a sandy Knoll at the west edge of Bonham Auxiliary Landing Field.

To reach the station from the junction of State Highway 50 and 55 in Kekaha, go northwest on State Highway 50 for 6.55 miles to a fork in the road. Keep left fork for 0.4 mile to the main gate at Bonham Auxiliary Landing Field. Continue straight ahead, westerly and south, for 0.15 mile to a fork. Keep the right fork and go 0.55 mile south to the control tower on the right. Turn right, west, and cross the landing field to a track road along the west edge of the landing field. Turn right and follow the track road north for 0.1 mile to a crossroad. Turn left and go west for 0.1 mile to the end of truck travel. From here pack north for about 200 feet to the top of a sandy knoll and the station.

The station mark, a standard disk stamped BONHAM 1961, is cemented in a drill hole in a boulder which projects 2 inches above the ground. It is 42 feet north-northeast of a wooden pole and about 60 feet east of the high water line of the Pacific Ocean.

Reference Mark No. 1, a standard disk stamped BONHAM NO 1 1961, is cemented in a drill hole in a boulder which projects 5 inches above the ground. It is about 60 feet east of the high water line of the Pacific Ocean and about the same elevation as the station.

Reference Mark No. 2, a standard disk stamped BONHAM NO 2 1961, is cemented in a drill hole in a boulder which is flush with the ground. It is 31.5 feet north-northeast of a wooden pole, about 55 feet east of the high water line of the Pacific Ocean and about 2 feet lower then the station.

* Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

FORM C&GS-526a (6-24-64)
USCOMM-DC 8931-P64

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION R

NAME OF STATION: BONHAM
ESTABLISHED BY: W.R. Helm YEAR: 1961 STATE: Hawaii
RECOVERED BY:* F.L. Jeffries YEAR: 1968 COUNTY: Kauai BENCH MARK ALSO [X]
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: On Barking Sands PMRF
HEIGHT OF TELESCOPE ABOVE STATION MARK 5.5 FEET. HEIGHT OF LIGHT ABOVE STATION MARK FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION
SILVER 1966				00 00 00.00
RM # 2	SSW	10.90	3.322	100 57 56
RM # 1	N	18.22	5.553	265 42 05

The station mark, reference mark No. 1 and reference mark No. 2 were recovered and found to be in good condition. A new description follows.

The station is located on the west edge of Barking Sands Pacific Missile Range Facility, 6 1/2 miles northwest of Kekaha, 1 mile west of Mana, 0.3 mile northwest of the control tower and on a low sandy knoll.

To reach the station from the main gate to Pacific Missile Range Facility, Barking Sands, go north on Nohili Road for 0.4 mile to the intersection of Kaiwa Road. Continue north and east on Kaiwa Road for 0.15 mile to crossroad. Turn left and go north on Kalanamahiki Place North for 0.55 mile. Turn left and go west on Palai Olani Road for 0.3 mile to a fork. Take left fork and go south for 0.35 mile to OIO Road. Continue south on OIO Road which parallels the west side of the runway for 0.55 mile to a side road right. Turn right and go west on track road for 0.1 mile to the station.

The station mark is a standard disk, stamped BONHAM 1961, cemented in a drill hole in a large boulder which projects 4 inches above the ground. It is 42 feet north of a wooden target pole and 124 feet east of the high water line of the Pacific Ocean.

Reference mark No. 1 is a standard disk, stamped BONHAM NO 1 1961, cemented in a drill hole in a boulder which projects 5 inches above the ground. It is 122 feet east of the high water line of the Pacific Ocean and 60 feet north of a wooden target pole.

Reference mark No. 2 is a standard disk, stamped BONHAM NO 2 1961, cemented in a drill hole in a boulder which is flush with the ground. It is 123 feet east of the high water line of the Pacific Ocean and 36.5 feet north of a wooden target pole.

* Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

FORM C&GS-526a (12-68)
USCOMM-DC 36291-P68

U.S. DEPARTMENT OF COMMERCE
ESSA
COAST AND GEODETIC SURVEY

USCOMM-NOAA-ASHEVILLE

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1021
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 °00′
DIAGRAM NF 4-6 | KAUAI

Form 525b
(11-8-55)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: Bonham Auxil Landing Field, Control Tower

CHIEF OF PARTY: Donald J. Florwick YEAR: 1964 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object:

The object observed is the top of a metal rod which is the highest point of the Bonham Auxiliary Landing Field control tower on Kauai Island, Hawaii.

The tower is of steel construction, painted red and white and is approximately 100 feet in height.

RECOVERY NOTE, TRIANGULATION STATION
INTERSECTION

NAME OF STATION: Bonham Auxil Landing Field, Control Tower
ESTABLISHED BY: D.J.F. YEAR: 1964 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Kauai
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Kauai

R

Detailed statement as to the fitness of the original description, including marks found, stampings, changes made, and other pertinent facts:

Station was recovered. It is a 4-legged, skeleton-steel structure, painted alternate red and white, about 100 feet tall, located at the center of Bonham Airbase. Object observed on was metal rod extending from center of top of roof.

FORM C&GS-526 (1-69)
USCOMM-DC 18508-P65

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BONHAM AUX LANDING FLD CONT TR

STATE: HAWAII YEAR: 1964 THIRD ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °02 ′03.″6481	ELEVATION:	METERS
GEODETIC LONGITUDE:	159 47 14.6540		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE °
HI 4	5104	402,654.19	73,112.41	- 0 06 28

° PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH ° (From south) ° ′ ″	CODE

QF 420

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 HAWAII STATION 1022
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

FORM 525 (8-15-69) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: CABLE STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: D.J.Florwick YEAR: 1964 DESCRIBED BY: B.L.Trad

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS,† HEIGHT OF LIGHT ABOVE STATION MARK METERS.

	SURFACE-STATION MARK, UNDERGROUND-STATION MARK / DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION‡
	CANUTE (H&N)				° ′ ″
desc.	MPS-25 FEEDHORN	NNE	(27.451)	8.367	10 21 11.2
desc.	RM 1	NW	44.190	13.470	311 03 02.

Detailed description:

The station is located on Bonham Auxiliary Landing Field, on a sand knoll near the MPS-25 Boresight Tower, about 0.2 mile southeast of the Bonham Auxiliary Landing Field Control Tower, 0.15 mile west of the Navy Barracks.

To reach from Bonham Auxiliary Landing Field main gate, go west 0.15 mile to a forks; take left fork, go south 0.4 mile to a crossroad; continue straight ahead, go south 0.1 mile to a side road right; turn right, go west and then south 0.2 mile to supply buildings; turn right, go west 200 feet to the MPS-25 Boresight Tower and Station.

Station mark, a standard disk stamped CABLE 1964, is set in the top of a 4-inch cast iron sewer pipe projecting 12 inches above the ground. It is 27 feet south-southeast of the MPS-25 Boresight Tower.

Reference mark 1, a standard disk stamped CABLE NO 1 1964, is set in the top of a 4-inch cast iron sewer pipe projecting 12 inches above the ground. It is about 5 feet higher than the station and is on a 14-foot bank of sand, 25 feet west of the MPS-25 Boresight Tower.

MPS-25 FEEDHORN, a plain brass disk stamped MPS-25 FEEDHORN 1964, set in the top of a 4-inch cast iron sewer pipe projecting 10 inches above the ground. It is located 4 feet south of the center of the MPS-25 Boresight Tower.

*Refers to notes in manuals of triangulation and state publications of triangulation. ‡Direction-angle measured clockwise, referred to initial station.
†To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 27171-P68

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: CABLE

STATE: HAWAII YEAR: 1964 SECOND ORDER

SOURCE: G-14044

GEODETIC LATITUDE:	22 °01′55.3140	ELEVATION:	6.86 METERS
GEODETIC LONGITUDE:	159 47 09.1712		22.5 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	x	y	θ OR Δ α ANGLE*
HI 4	5104	403,168.47	72,270.45	- 0 06 26

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
	° ′ ″	° ′ ″	
BONHAM	152 52 57.2	152 59 23	5104

QF 581

JUN 1978

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1022

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

CABLE (continued)

(9-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: CABLE
ESTABLISHED BY: D.J. Florwick YEAR: 1964 STATE: Hawaii
RECOVERED BY:* F.L. Jeffries YEAR: 1968 COUNTY: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK 5.5 METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
				° ′ ″
BONHAM 1961				0 00 00.00
MPS-25 FEEDHORN 1964	N	27.44	8.364	37 58 05
RM 1	NW			338 39 51

The station mark, reference mark 1 and MPS-25 FEEDHORN were recovered and found to be in good condition. The distance to reference mark 1 was not verified. A new and complete description follows:

The station is located on the Barking Sands Pacific Missile Range Facility, about 1/4 mile southeast of the control tower, 1/4 mile southwest of the main gate and on a low sandy knoll.

To reach the station from the main gate of the Barking Sands Pacific Missile Range Facility, go south on Nohili Road for 0.1 mile to a side road right. Turn right and go west and south on LII Way for 0.15 mile. Turn right and go west across a grassy area for 200 feet to the base of the low sandy knoll and the station at top of knoll.

The station mark, a standard disk stamped CABLE 1964, is set in the top of a 4-inch cast iron pipe that projects 10 inches above the surface of the ground. It is 31 feet south of the center of the MPS-25 Boresight Tower.

Reference mark 1, a standard disk stamped CABLE NO 1 1964, is set in the top of a 4-inch cast iron pipe that projects 12 inches above the surface of the ground. It is about 5 feet higher than the station and 29 feet west of the center of the MPS-25 Boresight Tower.

MPS-25 FEEDHORN is a plain brass disk, stamped MPS-25 FEEDHORN 1964, set in the top of a 4-inch cast iron pipe that projects 8 inches above the surface of the ground. It is 4 feet south of the MPS-25 Boresight Twoer.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 2711

JUN 1978

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1023
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

FORM 525
(9-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: CANE STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: D. J. Florwick YEAR: 1965 DESCRIBED BY: R.M.M.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1.77 METERS,† HEIGHT OF LIGHT ABOVE STATION MARK 1.48 METERS.

1b SURFACE-STATION MARK, UNDERGROUND-STATION MARK
7a DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION† ° ′ ″
	OHAIULA 1964				00 00 00.0
Desc.	AGAVE ANTENNA 327801	SE			80 55 39.7
Desc.	Reference Mark No. 1	SW	97.59	29.745	204 20 42

Detailed description:

The station is located 6 1/2 miles northwest of Kekaha, 0.35 mile east of the Pacific Ocean, at Bonham Auxiliary Landing Field.

To reach the station from the junction of State Highway 50 and 55 in Kekaha, go northwest on State Highway 50 for 6.55 miles to a fork in the road. Keep the left fork and go west on an oiled road for 0.4 mile to a crossroad at the main gate at Bonham Auxiliary Landing Field. Turn left and go south on an oiled road for 0.8 mile to a side road right and the station northeast of the northeast corner of the supply building.

The station mark, a standard disk stamped CANE 1965, set in the top of a 14-inch concrete cylinder which is set flush with the surface of the ground. It is 79.5 feet northeast of the northeast corner of the supply building, 54 feet south-southwest of a tall target pole and 19 feet northwest of the northwest leg of the Agave Antenna Tower.

Reference mark No. 1, a standard disk stamped CANE NO 1 1965, cemented in a drill hole in the northeast corner of a concrete pad which supports a cooling unit on the north side of the supply building.

Agave Antenna, a plain bronze disk stamped AGAVE ANTENNA 327801 1965, set in the top of a 12-inch concrete cylinder which is set flush with the surface of the ground. It is set directly under the center of the Agave Antenna Tower.

*Refers to notes in manuals of triangulation and state publications of triangulation. †Direction-angle measured clockwise, referred to initial station. ‡To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 27171-P69

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: CANE

STATE: HAWAII YEAR: 1965 SECOND ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °01 ′46.″3012	ELEVATION	4.46 METERS
GEODETIC LONGITUDE:	159 47 05.5755		14.6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE*
HI 4	5104	403,505.08	71,360.35	- 0 06 25

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH* (From south) ° ′ ″	CODE
OHAIULA	228 29 56.0	228 36 21	5104

QF 430

JUN 1978

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1023

LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

CANE (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: CANE
ESTABLISHED BY: D.J. Florwick YEAR: 1965 STATE: Hawaii BENCH MARK ALSO [X]
RECOVERED BY:* F.L. Jeffries YEAR: 1968 COUNTY: Kauai
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: On Barking Sands PMRF
HEIGHT OF TELESCOPE ABOVE STATION MARK 5.5 FEET. HEIGHT OF LIGHT ABOVE STATION MARK FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	° ' "
The distances and directions to the marks were not retaken at this time.				

The station mark, reference mark No. 1 and Agave Antenna 327801 mark were recovered and found to be in good condition. A new description follows.

The station is located 6 1/2 miles northwest of Kekaha, 0.35 mile east of the Pacific Ocean, at Barking Sands Pacific Missile Range Facility.

To reach the station from the main gate of the Barking Sands Pacific Missile Range Facility, go south, on Nohili Road for 0.2 mile where Nohili Road turns left. Continue south, on graveled road for 0.1 mile to a point where the graveled road turns right. Continue south across grassy area for 50 yards and the station.

The station mark is a standard disk, stamped CANE 1965, set in the top of a 14-inch concrete cylinder which is flush with the surface of the ground. It is 79.5 feet northeast of the northeast corner of the supply building, 54 feet south-southwest of a tall target pole and 19 feet northwest of the northwest leg of the Agave Antenna Tower.

Reference mark No. 1 is a standard disk, stamped CANE NO 1 1965, cemented in a drill hole in the northeast corner of a concrete pad which supports a cooling unit on the north side of the supply buiding.

Agave Antenna a plain bronze disk stamped AGAVE ANTEENA 327801 1965, set in the top of a 12-inch concrete cylinder which is flush with the surface of the ground. It is set directly under the center of the Agave Antenna Tower.

* Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

FORM C&GS-526a (12-68)
USCOMM-DC 36291-P68

U.S. DEPARTMENT OF COMMERCE
ESSA
COAST AND GEODETIC SURVEY

USCOMM-NOAA-ASHEVILLE

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1024
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

FORM 525
(9-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: CANUTE (H&N) STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: D.J. Florwick YEAR: 1964 DESCRIBED BY: K.R.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1 METERS.† HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.

	SURFACE-STATION MARK, UNDERGROUND-STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION† ° ′ ″
	KOLO				00 00 00.00
desc	Reference Mark No. 2	NNW	30.056	9.161	250 51 26
desc	Reference Mark No. 1	ENE	29.607	9.024	349 30 23

Detailed description:

The station is located on the southwest end of a row of sand dunes at Barking Sands Beach on the western side of Kauai Island.

To reach the station from the junction of State Highways 50 and 55 in Kekaha, go west on State Highway 50 for 7.0 miles to a fork. Take the left fork, as per sign, "Beehan Air Base" and go 0.4 mile to a sentry post at a crossroad.. Turn right and go northerly for 1.05 miles to the end of the pavement. Continue north on graveled road for 0.2 mile to a locked gate. (Normally unlocked during business hours) Pass through gate and continue north for 0.3 mile to a fork. Take the left fork and continue northerly on the main road for 0.15 mile to a sentry post at the Sandia Corporation's Missile Site. Go northwest, through the fenced area, for 0.1 mile to a crossroad.. Turn left and go southwest for 0.1 mile to a fork. Take the center road and go northwest, towards the second small rocket launcher for 0.1 mile. Take track road through fence and go northwest for 0.15 mile to bottom of sand dune. Pack up steep, sandy slope, bordered on both sides by thick brush, for about 50 yards, then bear left for about 50 yards to the station mark. A 4-wheel drive vehicle may be driven to the station by an alternate route. This is best determined by inquiry at the Sandia Corporation's compound. The combination to the locked gate may also be obtained there.

The station mark is a plain brass disk, stamped CANUTE H&N 1964, set in the top of a 16-inch square concrete post that projects 2 inches above the sand. It is about 30 feet north of the north edge of some thick brush.

Reference mark No. 1 is a standard disk, stamped CANUTE NO 1 1964, set in the top of a 5-inch cement-filled cast iron sewer pipe that projects 12 inches above the sand. It is 30 feet south of a group of 3 wooden posts and about 2 feet lower than the station mark.

Reference mark No. 2 is a standard disk, stamped CANUTE NO 2 1964, set in the top of a 5-inch cement-filled cast iron sewer pipe that projects about 15 inches above the sand. It is 40 feet southwest of the group of 3 wooden posts and about the same elevation as the station mark.

RECOVERY NOTE, TRIANGULATION STATION R

NAME OF STATION: CANUTE (H&N)
ESTABLISHED BY: D.J. Florwick YEAR: 1964 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY:* D.J. Florwick YEAR: 1965 COUNTY: Kauai
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 12 miles northwest of Kekaha
HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ′ ″
KOLO 1964				00 00 00
Reference Mark No. 2	NW	30.055	9.161	250 50 38
Reference Mark No. 1	ENE	29.605	9.026	349 30 24

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: CANUTE H N
STATE: HAWAII YEAR: 1964 SECOND ORDER
SOURCE: G-13403

GEODETIC LATITUDE:	22 °03 ′55.″8367	ELEVATION:	31.5 METERS
GEODETIC LONGITUDE:	159 47 08.0645		103 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE
HI 4	5104	403,295.35	84,432.07	- 0 °06 26 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β OR Δ α FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH* (From south) ° ′ ″	CODE
PEACH	268 29 27.0	268 35 53	5104

QF 415

JUN 1978

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1024

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

CANUTE (H&N) (continued)

The station mark, reference mark No. 1 and reference mark No. 2 were recovered as described and found in good condition. The horizontal distances and directions to the reference marks were verified. The route to the station has changed. Following is a new description.

The station is located on the highest one of a row of sand dunes at Barking Sands Beach on the west side of Kauai Island.

To reach the station from the main gate at Bonham Auxiliary Landing Field, go north on an oiled road for 1.25 miles to a bladed road left at a sign BARKING SANDS. Turn left and go west and south on the bladed road for 0.5 mile to a fork in the road. Turn sharp right and go north on a bladed and track road for 0.5 mile to the foot of the highest sand dune in the area and the end of truck travel. From the end of truck travel pack north up the south side of the sand dune for about 5 minutes to the station.

The station mark, a plain bronze disk stamped CANUTE H&N 1964, is set in the top of a 16-inch square concrete monument which projects 3 inches above the surface of the sand. It is 66 feet south-southwest of three wooden posts and 40 feet north of the north edge of some thick brush.

Reference mark No. 1, a standard disk stamped CANUTE HN NO 1 1964, is set in the top of a 5-inch cement-filled cast iron pipe which projects 8 inches above the surface of the sand. It is 43 feet south of three wooden posts and is 2 feet lower in elevation than the station mark.

Reference mark No. 2, a standard disk stamped CANUTE HN NO 1 1964, is set in the top of a 5-inch cement-filled cast iron pipe which projects 15 inches above the surface of the sand. It is 61 1/2 feet southwest of three wooden posts.

(9-16-59) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: CANUTE (H&N)
ESTABLISHED BY: D.J.F. YEAR: 1964 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Kauai Island: Kauai
HEIGHT OF TELESCOPE ABOVE STATION MARK METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ′ ″
OHIULA 1964				00 00 00.0
RM No. 2	NW	30.055	9.161	211 36 30
RM No. 1	NE	29.587	9.019	310 17 17

Station was recovered and all marks found in good condition. A complete description follows:

Station is located in western part of Kauai, about 2 miles airline north-northwest of Mana Village, about 500 feet east from shoreline, on the prominent sand dune at the southwest end of the brushy sand ridge along the shoreline.

To reach station from the junction of State Highways 50 & 55 at Kekaha, go northwest on State Highway 50 for 6.6 miles to fork; take left fork and go 0.4 mile to entrance to Bonham Auxiliary Landing Field. Turn right and go north for 1.3 miles; take dirt left fork at sign "BARKING SANDS" and go 0.5 mile; take right fork and go 0.35 mile to fence corner on right. Continue northerly on beach road for 0.15 mile to base of high dune and end of truck travel. Pack up dune about 50 yards to top and then along top about 50 yards to station. NOTE: A light jeep may be driven to station by a different route, around left side of dune to an approach road.

Station ma rk is a plain bronze disk, 3-1/2 inches in diameter, stamped "CANUTE 1964", set in the top of a 16-inch-square, concrete monument that projects 8 inches. It is 66 feet southwest of the center 1 of 3,4 x 4-inch wooden posts.

Reference mark number one is a standard disk stamped "CANUTE HN NO 1 1964", set in the top of a 4-inch cast-iron pipe filled with concrete and projecting 8 inches. It is on the east side of the dune and about 2 feet lower than station mark.

Reference mark number two is a standard disk stamped "CANUTE HN NO 2 1964", set in the top of a 4-inch cast-iron pipe filled with concrete and projecting 8 inches. It is on west side of dune and at about same elevation as station mark.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: CANUTE (H&N)
ESTABLISHED BY: D.J. Florwick YEAR: 1964 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY:* P.C. Johnson YEAR: 1967 COUNTY: Kauai
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 12 miles northwest of Kekaha
HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ′ ″
PEACH				00 00 00.00
Reference Mark No. 2	NNW	30.06	9.162	236 56 16
Reference Mark No. 1	ENE	29.61	9.027	335 35 57

The station mark, reference mark No. 1 and reference mark No. 2 were recovered and found to be in good condition. The distances and directions to both reference marks were verified. A new and complete description follows:

The station is located on the summit of a brushy sand dune at Barking Sands Beach on the west end of the Island of Kauai. It is the highest point in the immediate vicinity, overlooking a rocket-launching complex to the east.

To reach the station from the Main Gate of the Barking Sands Pacific Missile Range Facility, go north on an asphalt road for 1.25 miles to a road on the left and a sign, "Nohili Dunes." Turn left and go westerly on a bladed road for 0.55 mile to a three-way intersection. Turn sharp right and go northerly on a bladed road for 0.45 mile to the base of a sand dune at the beach. Pack northerly for about 100 yards to the station. A four-wheel drive vehicle with low-pressure tires may be driven to the station by circling to the west of the dune.

The station mark is a plain brass disk, stamped CANUTE H&N 1964, set in the top of a 16-inch square concrete post that projects 6 inches above the surface of the ground. It is 74-1/2 feet south-southwest of a radar reflector on a wooden pole.

Reference mark No. 1 is a standard disk, stamped CANUTE HN NO 1 1964, set in the top of a cement-filled cast iron sewer pipe that projects 4 inches above the surface of the ground. It is 52-1/2 feet south of the wooden pole with radar reflector and about 2 feet lower in elevation than the station mark.

Reference mark No. 2 is a standard disk, stamped CANUTE HN NO 2 1964, set in the top of a cement-filled cast iron sewer pipe that is about 1 foot below ground level. It is 67-1/2 feet southwest of the wooden pole with radar reflector and about the same elevation as the station mark.

* Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

FORM C&GS-526e (9-24-64)
USCOMM-DC 6951-P64

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1025
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Cavern (Kauai Island, F. G. Engle, 1927).—On the western coast of Kauai, about 1½ miles northeast of Barking Sands, in a black rock outcrop in a group of large black rocks on a hillside. It is 50 feet above and southeast of a burial cave in the hillside. It is reached by taking the road just inshore from the dunes of the Barking Sands northeast, crossing the railroad tracks and continuing to a reservoir and group of shacks. The station is a short climb from this reservoir. Marked according to note 2a, a standard disk in outcropping bedrock surrounded by a chiseled triangle. A reference mark, note 12c, standard reference disk in bowlder, was set 6.875 meters (22.56 feet) from the station in azimuth 214° 06′.

(4-16-59) U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: CAVERN
ESTABLISHED BY: F.G.E. YEAR: 1927 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Kauai
Island: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ′ ″
Bonham, ALF, Control Tower 1964				00 00 00.0
RM No. 1	NNE	22.582	6.883	181 31 16
RM No. 2	SSE	9.809	2.990	305 06 51

Station mark and reference mark were recovered in good condition. A new reference mark, number two, was established. A complete description follows:

Station is located on the western coast of Kauai, about 3-1/2 miles northeast of Bonham Auxiliary Landing Field and 1/2-mile inland from sea, at about 306 feet elevation on rocky hillside due east of north end of a long reservoir.

To reach station from the junction of State Highways 50 & 55 at Kekaha, go northerly on State Highway 50 for 7.0 miles; take right fork and go 0.85 mile to crossroad at Mana village. Turn left and go 2.8 miles through cane fields to fork. Take left fork and go 0.35 mile to crossroad. Keep ahead, northerly, alongside sand ridge for 0.7 mile to side road right. Turn right and go 0.35 mile, passing around small reservoir, to T-junction. Turn left and go 0.2 mile to north end of long reservoir and end of truck travel. Pack easterly up brushy hillside to the 300-foot level and station.

Station mark is a standard disk stamped "CAVERN 1927", cemented in a drill hole in a large square rock, the second one south from the north end of a row of similar large rocks. It is 40 feet upslope from the edge of a prominent black rock ledge.

Reference mark number one is a standard disk stamped "CAVERN 1 1927" cemented in a drill hole in a 3 x 5-foot rock, about 1 foot lower than station mark.

Reference mark number two is a standard disk stamped "CAVERN 1927 NO 2 1966", cemented in a drill hole in the north face of a 7-foot-diameter, sloping rock, the largest one at station site. The mark is 1 foot below top of rock and about 2 feet higher than station mark.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27178-P59

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: CAVERN
STATE: HAWAII YEAR: 1927 THIRD ORDER
SOURCE: G-SP156

GEODETIC LATITUDE:	22 °05 ′04.″275	ELEVATION:	93.0 METERS
GEODETIC LONGITUDE:	159 45 12.940		305 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE
HI 4	5104	414,136.05	91,318.96	- 0 05 43

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH* (From south) ° ′ ″	CODE
BONHAM, ALF, CONTROL TOWER	32 08 31.6	32 14 15	5104

QI 163

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1026
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

TRAVERSE
DESCRIPTION OF [redacted] STATION

NAME OF STATION: Cliff

CHIEF OF PARTY: W.S. Simmons YEAR: 1966 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: 15.5 miles north along State Highway 55 from the junction of State Highway 50 and 55 in Kekaha, thence 5.1 miles west along an asphalt road.

A traverse connection was made to triangulation station MAKAW, distance being 6.767 meters, 22.200 feet east. The mark is a survey point of undetermined denomination. It is a 3/4-inch galvanized pipe which projects 4 inches above the surface of the ground.

Described by _____
U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

FORM C&GS-525b (1-68)
[illegible] 10510-P68

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: CLIFF

STATE: HAWAII YEAR: 1966 SECOND ORDER

SOURCE: G-13726
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °08 ′17.5864 ″	ELEVATION:	454 METERS
GEODETIC LONGITUDE:	159 43 52.2954	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β IOR Δ α ANGLE *
HI 4	5104	421,750.50	110,813.82	- 0 ° 05 ′ 14 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β IOR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION MAKAW

QF 469

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1027
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Coral (Kauai Island, F. G. Engle, 1927).—On southwest coast of Kauai, in Waieli, on a sandy headland about 240 feet northwest of two abandoned concrete footings projecting into the sea, and about 200 meters northwest of the mouth of an irrigation canal. It is best reached by taking the road to Barking Sands, and when the shore is approached turning south; the road crosses the ditch at Waieli about 500 meters inshore from this station. Station is set in a mass of rocks and concrete projecting 1 foot above the ground, about 6 feet above mean sea level, and 24.3 meters inshore from mean high water. Marked according to note 1c, a standard disk in irregular mass of concrete. Two reference marks, standard reference disks in irregular masses of concrete, note 11c, were set at the following distances and azimuths from the station: No. 1, 17.350 meters (56.92 feet), 330° 04′; No. 2, 13.612 meters (44.66 feet), 272° 22′. The azimuth of a tall ironwood tree about ¼ mile distant is 266° 24′.

(9-18-69) COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: CORAL
ESTABLISHED BY: F.G.E. YEAR: 1927 STATE: Hawaii
RECOVERED BY: Walter R. Helm YEAR: 1961 COUNTY: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ′ ″
Station not occupied.				

The station mark was recovered and found to be in good condition. An extensive search was made for reference marks 1 and 2, but neither could be found.

The station is about 1 mile south of the control tower at Bonham Air Force Base, 150 yards west of the east edge of a landing strip and on a small sandy ridge.

FORM 526a (9-18-69) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: CORAL
ESTABLISHED BY: F.G.E YEAR: 1927 STATE: Hawaii
RECOVERED BY: D.J.Florwick YEAR: 1964 COUNTY: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ′ ″
The station was not occupied at this date.				

The station mark was recovered and found in good condition. The reference marks were searched for, but were not recovered, and are believed to be destroyed. A complete description follows.

The station is located, airline, about 8.5 miles northwest of Waimea and 1.5 miles southwest of old Mana Village, on the west tip of Kauai Island, on the low, sand ridge along the shoreline and at the south end of Bonham Auxiliary Landing Field runway.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: CORAL
STATE: HAWAII YEAR: 1927 THIRD -ORDER
SOURCE: G-SP156

GEODETIC LATITUDE:	22 °01 ′06.″496	ELEVATION:	6.0 METERS 20 FEET
GEODETIC LONGITUDE:	159 47 15.234		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE *
HI 4	5104	402,588.76	67,345.37	- 0° 06′ 28″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE
BONHAM	175 36 46.7	175 43 15	5104

QI 166

JUN 1978
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1027

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

CORAL (continued)

To reach the station from the control tower on Bonham Auxiliary Landing Field, go west, crossing the runway, for 0.2 mile, turn left and follow good track road southerly, between shore and runway, for 1.0 mile to side road right. Turn right and go west for 50 yards to top of rise and station.

The station mark, a standard disk stamped CORAL 1927, is cemented in a drill hole in a sandstone rock that projects 2 inches above the ground. There is an 8-inch cylinorical coating of cement around the disk which gives the appearance of a concrete post. It is 22 feet east of the sand bank, 15 feet west of the center line of old beach road, 95 feet west of the edge of the runway, 55 yards west of the good road and about 150 yards northwest of the south end of the runway.

FORM 526a (9-19-69) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: CORAL
ESTABLISHED BY: F.G.E. YEAR: 1927 STATE: Hawaii
RECOVERED BY:* W.R. Porter YEAR: 1964 COUNTY: Kauai
Island: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK 2 METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION °	′	″
BONHAM 1961				00	00	00.0
OPAE 1910 1927	ENE	5	miles	78	09	03.4
Kekaha, U.S. Army Training Station, Radio mast, Center and highest 1 of 9	SE	2-3/4	miles	146	10	07.1

Station mark was recovered and found in good condition. The reference marks were searched for by distance and angle, but were not recovered, and are believed to be destroyed. A complete description follows:

Station is located, airline, about 8-1/2 miles northwest of Waimea village and 1-1/2 miles southwest of old Mana village; on the west tip of Kauai, on the low, sand ridge along the shoreline, at the south end of Bonham Airfield.

To reach station from the control tower on Bonham Airfield, go west, crossing the runway, for 0.2 mile; turn left and follow good track road southerly, between shore and runway, for 1.0 mile to side road right. Turn right and go west for 50 yards to top of rise and station.

Station mark is a standard disk stamped "CORAL 1927", cemented in a drill hole in a sandstone rock that projects about 2 inches above the sand. There is an 8-inch-diameter coating of cement around the disk which gives the appearance of a concrete post. The mark is 22 feet east of the sand bank, 15 feet west of center line of old beach road, 55 yards west of good track road, 90 yards west of edge of runway and about 150 yards northwest of south end of the runway.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27173-P69

NOAA FORM 76-31A (11-74)

FORM 526a (9-19-69) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: CORAL
ESTABLISHED BY: F.G.E. YEAR: 1927 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Kauai
Island: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION °	′	″
BONHAM				00	00	00.0
RM No. 3	NE	51.842	15.802	34	50	12
RM No. 4	ESE	53.213	16.220	115	23	00
Kekaha, US Army Training Station, Radio Mast (center & highest 1 of 9) 1964	SE			146	10	02.9

Station mark was recovered in good condition. Both old reference marks have been destroyed. Two new reference marks, numbers three and four, were established. A complete description follows:

Station is located about 8-1/2 miles northwest of Waimea village and 1-1/2 miles southwest of Mana village, on the west tip of Kauai, at the south end of Bonham Auxiliary Landing Field, on low, sand ridge along shoreline.

To reach station from the guard station at entrance to Bonham Auxiliary Landing Field, go south on macadam road for 0.85 mile to PMR office on right. Continue south for 0.7 mile to a track side road right. Turn right and go west 0.1 mile to edge of airfield. Go 0.15 mile, passing around end of runway, to base of sand ridge at southwest corner of the runway. Bear right, up onto ridge, and go northerly on track road for 0.1 mile to station on left.

Station mark is a standard disk stamped "CORAL 1927", cemented in a drill hole in a 10-inch-square outcropping sandstone rock that projects 2 inches. A capping of cement on top of the rock gives it the appearance of a concrete monument. Station is 21 feet east of the edge of the grassy sand bank, 27 feet west of center line of track road, 90 yards west of edge of runway, and about 150 yards north of a concrete bunker at point of cove.

Reference mark number three is a standard disk stamped "CORAL 1927 NO 3 1966", set in the top of a concrete-filled, 4-inch, cast-iron pipe that is set in concrete and projects 3 inches. It is 13 feet east of center line of track road and about 1 foot lower than station mark.

Reference mark number four is a standard disk stamped "CORAL 1927 NO 4 1966", set in the top of a concrete-filled, 4-inch, cast-iron pipe that is set in concrete and projects 4 inches. It is 13.5 feet east of center line of track road, about 16 inches lower than station mark, and sets at the northwest edge of a large, prominent patch of kiawe brush.

(U.S.G.S.,1980)--In a letter dated May 9, 1980, Mr. Benjamin L. Jones, District Chief, reported that station CORAL was destroyed during recent brush clearing operations at the Pacific Missle Range Facility, Kekaha, Kaui.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27173-P69

USCOMM-NOAA-ASHEVILLE

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 HAWAII
STATION 1028
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

East (Kauai Island, F. G. Engle, 1927).—On the north coast of Kauai, on east side of Wainiha Bay, between the bay and Lumahai River, on Lae o Kolokolo, on a red bluff about 100 feet above high water. Approached from the government highway on the west side of the river. Marked by a standard disk station mark cemented in a 1½-inch gas pipe which projects about 1 foot above surface of ground. Reference mark No. 1, standard reference disk in concrete block, note 11a, is 6.145 meters (20.16 feet) from the station in azimuth 323° 24′. Reference mark No. 2 is a standard disk cemented in a 1½-inch gas pipe driven flush with ground. It is 6.495 meters (21.31 feet) from station, in azimuth 241° 51′.

(11-8-55)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: EAST
ESTABLISHED BY: F.G.E. YEAR: 1927 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1965 COUNTY: Kauai
Island: Kauai

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station mark was recovered in good condition, however it is set in a concrete cylinder instead of as previously described. Both reference marks have been destroyed. Some pieces of rock and concrete were found at the location of R.M. No. 1, with the print of the disk in one piece of concrete. No trace was found of R.M. No. 2. The entire ridge is now covered with a dense growth of large ironwoods. No additional reference marks were set. A complete description follows:

Station is located about 2-1/2 miles west-northwest of Hanalei village on Kolokolo Point, at west side of the mouth of the Lumahai River and at east side of Wainiha Bay.

To reach station from the post office in Hanalei, go west on State Highway 56 for 3.4 miles to bridge at the Lumahai River, and end of truck travel. Walk northeast on trail along base of ridge, beginning at west end of bridge, for about 50 yards, then climb up steep slope to top of ridge and station. A 10-minute pack.

Station mark is a standard disk stamped "EAST 1927", set in the top of a 10-inch-diameter concrete cylinder projecting 6 inches above ground.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recov
NOTE.—One of these forms must be used for every station recovered.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: EAST
STATE: HAWAII YEAR: 1927 THIRD ORDER

SOURCE: G-SP156
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °13 ′11.″52	ELEVATION:	36.0 METERS
GEODETIC LONGITUDE:	159 32 09.13		118 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ IOR Δ α ANGLE *
HI 4	5104	487,866.68	140,416.48	- 0 00 49

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ IOR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

QI 153

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1029
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

Ex (Kauai Island, O. B. French, 1910).—On a hill in the middle of the Na Pali district, and about 2 miles north of Pihea. From this hill the ridge drops abruptly some 500 feet, then continues out at this lower level for a mile or so to the pali at the coast. Station is on the highest and most northern part of the summit, and is about 25 meters north of spot of bare soft red rock. It is approached by the trail from the Kaunuohua Ridge leading down to and past Na. Marked by a bottle set in the clay from which the top soil has been stripped. Reference marks are as follows: No. 1, iron rod, ¾ by 15 inches, driven in cleared earth with 2 inches projecting, distant 2.8 feet, in azimuth 105°; No. 2, 5 nails driven in the top of an 8-inch lihue stump, 3 feet high, distant 6.6 feet, in azimuth 198°; No. 3, iron rod ¾ by 15 inches, driven in cleared earth with 2 inches projecting, distant 2.8 feet, in azimuth 15°. R

(9-18-50) COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: EX
ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Kauai
Island: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ′ ″ (AZIMUTH)
Reference mark No. 1	SSW	2.598	0.792	17
Reference rod # 1	E	2.592	0.790	268
Reference rod # 3	S	2.871	0.875	354

The bottle marking the station was recovered in good condition. Both iron rod reference rods were recovered in good condition, however No. 1 was about 180° off from published azimuth. One nail of reference point 2 was found remaining in the old stump. A bare patch still remains where vegetation and humus had been removed, and the spot of bare red dirt mentioned in old description, about 25 meters south, was found. Station was re-marked with a standard disk, and 1 reference disk was set. A complete description follows:

Station is located in northwest part of Kauai, about 4-1/2 miles northeast of Kokee Park Headquarters, at about 4004 feet elevation, on last high point before ridge drops down abruptly to north, along a winding, north-south ridge, and on the highest and most northern part of the narrow winding summit of the hill.

To reach station from the Kokee Park Headquarters, go northerly on main road for 2.5 miles; take right fork at radar station, and go 0.2 mile; take dirt right fork, at entrance to Kalalau Lookout parking area, and go east 2.0 miles to end of road. Pack easterly on trail along ridge for about 1/2-mile to second hill past station PIHEA. Leave trail and go northerly on narrow winding ridge for about 1-1/2 miles to station NA. Continue along ridge for about 3/4-mile to station.

Station mark is a standard disk stamped "EX 1910 1966", secured to the top of a 1-inch iron pipe that is set in cement and projects 3 inches. It is at the northerly end of the 6 x 15-foot bare patch.

Reference mark number one is a standard disk stamped "EX 1910 NO 1 1966", secured to the top of a 1-inch iron pipe that projects 3 inches and is about 6 inches higher than station mark.

Reference rod # 1 is a 3/4-inch diameter iron rod driven flush with ground surface, in moss patch at west side of a clump of trees, and about 3 inches higher than station mark.

Reference rod # 3 is a 3/4-inch diameter iron rod, with about 2 inches projecting from ground and rusted to a point. It is 15 inches east of reference mark number one and about 1 foot higher than station mark.

NOTE: A 3-1/2-hr. pack after trail has been cleared, about 2 days required to clear trail. A 4-wheel-drive vehicle is required for the last 2 miles along the dirt road.

Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27178-P69

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: EX
STATE: HAWAII YEAR: 1910 SECOND ORDER

SOURCE: G-SP15e

GEODETIC LATITUDE:	22 °10 ′40.121	ELEVATION:	1221 METERS
GEODETIC LONGITUDE:	159 36 45.267		SCALED FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE °
HI 4	5104	461,908.93	125,151.52	- 0 02 ′ 33 ″

° PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH ° (From south) ° ′ ″	CODE

QI 021

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1030
HAWAII
LATITUDE 22 °00′ TO 22 °30′
LONGITUDE 159 °30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-65)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
TRAVERSE

DESCRIPTION OF [redacted] STATION

NAME OF STATION: FIC Van

CHIEF OF PARTY: F.L. Jeffries YEAR: 1968 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the main gate of the Barking Sands Pacific Missile Range Facility, go north on Nohili Road for 0.6 mile to the intersection with Kalanamahiki Place North. Turn left and go north on Kalanamahiki Place North for 0.6 mile to Palai Olani Road. Turn left and go west on Palai Olani Road for 0.05 mile to Kukui Road. Turn right and go north on Kukui Road for 0.35 mile to Hoku Road. Turn left and go west on Hoku Road for 0.1 mile to the station in the northwest corner of a large asphalt parking area.

The FIC Van is a white-painted semi trailer with various antennae mounted on the roof.

A traverse connection was made to triangulation station JUPITER, distance being 93.28 feet (28.432 meters) southwest of station JUPITER. Point traversed to was the center of the roof.

Described by. _____

Coast-DC 34313

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: FIC VAN

STATE: HAWAII YEAR: 1968 SECOND ORDER

SOURCE: G-14107
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °03 ′13.89820	ELEVATION. SCALED	5 METERS FEET
GEODETIC LONGITUDE:	159 47 01.05571		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 4	5104	403,946.76	80,198.87	- 0 °06 ′23 "

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ "	PLANE AZIMUTH * (From south) ° ′ "	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION JUPITER

QF 618

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1031
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

Flat (Kauai Island, F. G. Engle, 1927).—On northwest coast of Kauai, the highest part of the rounding top of a prominent peak just back of Kailiu Point. It is the outer peak on the seaward end of the ridge. Determination shows it to be the peak on which station *Makana 1910* is located. Peak was located as a hydrographic signal, and no marks placed.

(11-8-65)

RECOVERY NOTE. TRIANGULATION STATION INTERSECTION

R

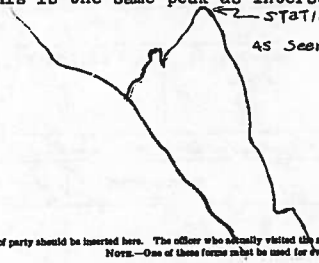
NAME OF STATION: Flat
ESTABLISHED BY: F.G.E. YEAR: 1927 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1965 COUNTY: Kauai
Island: Kauai

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station was identified and recovered. Located about 5-1/2 miles west-northwest of Hanalei, at Kailiu Point, on north end of the ridge on west side of Limahuli Stream.

Station is a slightly round-topped peak, or spire, of about 1100 feet elevation, with sides rising almost straight up.

NOTE: This is the same peak as intersection station MAKANA 1910.



As seen from vicinity of station HANALEI, looking westward.

* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.
NOTE.—One of these forms must be used for every station recovered.

Coms-DC 34314

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: FLAT
STATE: HAWAII YEAR: 1927 THIRD ORDER

SOURCE: G-SP156
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °13 ′17.″42	ELEVATION:	METERS
GEODETIC LONGITUDE:	159 34 58.28		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	471,973.32	141,018.07	- 0 °01 ′53 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

QI 156

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1032
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: FPQ 10 CALIBRATION REFLECTOR

CHIEF OF PARTY: F.L. Jeffries YEAR: 1968 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the main gate of the Barking Sands Pacific Missile Range Facility, go south on Nohili Road South for 0.2 mile to Pala Place. Turn left and go east on Pala Place for 0.05 mile to Kalanamahiki Place South. Turn right and go south on Kalanamahiki Place South for 0.2 mile to Lalana Place. Turn right and go west on Lalana Place for 0.1 mile. Turn right and go north on an asphalt road for 0.1 mile. Turn left and go west on a track road for 0.05 mile, then turn left and go south, cross-country, for 0.05 mile to the station.

The station mark is a plain brass disk, stamped FPQ 10 CALIBRATION REFLECTOR 1968, set in the top of a 3-inch cast iron sewer pipe that projects 5 inches above the surface of the ground. It is about 100 yards east of the east edge of the taxiway, 30 feet northwest of an old aircraft revetment and plumbed under the tip of a rod that projects from the center of an 8-foot, white-painted metal dish that is about 5 feet above ground level.

FORM C&GS-525b (1-65)
USCOMM-DC 16810-P65

Described by _____
U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY ✓

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: FPQ 10 CALIBRATION REFLECTOR

STATE: HAWAII YEAR: 1968 SECOND ORDER

SOURCE: G-14107

GEODETIC LATITUDE:	22 °01 ′48.30842	ELEVATION:	3.74 METERS
GEODETIC LONGITUDE:	159 47 11.67404		12.3 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	402,931.65	71,563.97	- 0 ° 06 ′ 27 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

QF 611

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1033
HAWAII
LATITUDE 22 °00′ TO 22 °30′
LONGITUDE 159 °30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

TRAVERSE
DESCRIPTION OF [redacted] STATION

NAME OF STATION: FPQ 10 FSR 324205

CHIEF OF PARTY: F.L. Jeffries YEAR: 1968 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the sentry post at the main gate of the Barking Sands Pacific Missile Range Facility, go west and south on Nohili Road North for 0.15 mile to a fork. Take the left fork and continue south on Nohili Road North for 0.5 mile to a road on the right. Turn right and go west and south on Iii Way 0.1 mile. Turn right and go west across a grassy area for 0.05 mile to the station.

The station is a red-painted object mounted at the top and north side of a 4-legged aluminum tower. Point traversed to was the center of a bolt head on the north side of the object.

A traverse connection was made to triangulation station CABLE 1964, distance being 10.7192 meters (35.168 feet) north of station CABLE 1964

Described by _____
U.S. DEPARTMENT OF COMMERCE
ESSA
COAST AND GEODETIC SURVEY

FORM C&GS-525b (12-68)
11SCOMM-DC 30290-P68

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: FPQ 10 FSR 324205

STATE: HAWAII YEAR: 1968 SECOND -ORDER

SOURCE: G-14107
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °01 ′55.″66097	ELEVATION:	6 METERS
GEODETIC LONGITUDE:	159 47 09.13653	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 4	5104	403,171.79	72,305.46	- 0 06 26

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION CABLE

QF 612

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1034
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

TRAVERSE
DESCRIPTION OF ~~TRIANGULATION INTERSECTION~~ STATION

NAME OF STATION: GKR 9

CHIEF OF PARTY: F.L. Jeffries YEAR: 1968 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the main gate of the Barking Sands Pacific Missile Range Facility, go south on Nohili Road South for 0.2 mile to Pala Place. Turn left and go east on Pala Place for 0.05 mile to Kalanamahiki Place South. Turn right and go south on Kalanamahiki Place South for 0.2 mile to Lalana Place. Turn right and go west on Lalana Place for 0.05 mile to the station on the right.

The station is the center of the pedestal of a radar mounted atop a 4-legged steel tower, about 20 feet east of the east wall of Building No. 106.

A traverse connection was made to triangulation station CANE 1965, distance being 23.228 meters (76.207 feet) southwest of station CANE.

FORM C&GS-525b (1-65)
C 18810-P65

Described by _____
U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GKR 9

STATE: HAWAII YEAR: 1968 SECOND ORDER

SOURCE: G-14107
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °01 ′45.″74452	ELEVATION: SCALED	15 METERS FEET
GEODETIC LONGITUDE:	159 47 06.12285		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	403,453.48	71,304.27	- 0° 06′ 25″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION CANE

QF 615

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1035
HAWAII
LATITUDE 22 °00′ TO 22 °30′
LONGITUDE 159 °30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

TRAVERSE
DESCRIPTION OF ~~TRIANGULATION INTERSECTION~~ STATION

NAME OF STATION: GMD Radar

CHIEF OF PARTY: F.L. Jeffries YEAR: 1968 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the main gate of the Barking Sands Pacific Missile Range Facility, go west and north on Ola Ka Moi Road for 0.5 mile to the U.S. Weather Bureau Station.

The station is the top and center of the pedestal of a radar in a fiberglass dome atop a wooden tower at the northeast corner of the weather station.

A traverse connection was made to an "A" point just outside the door of the fiberglass dome, distance being 3.227 ′ meters or 10.59 ′ feet east-southeast of the "A" Point.

Described by —
U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

FORM C&GS-525b (1-69)
[illegible] 10510-P65

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GMD RADAR

STATE: HAWAII YEAR: 1968 SECOND ORDER

SOURCE: G-14107
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °02 ′11.″57934	ELEVATION:	5 METERS
GEODETIC LONGITUDE:	159 47 07.85113	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	403,295.74	73,911.54	- 0 ° 06 ′ 26 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION A-POINT

QF 609

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1036
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

TRAVERSE
DESCRIPTION OF [redacted] STATION

NAME OF STATION: GMD RADAR 321202 MARK

CHIEF OF PARTY: W.S. Simmons YEAR: 1966 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: 0.15 mile west and south along an asphalt road from the main gate at Bonham Auxiliary Landing Field, thence 0.25 mile southwest along the right fork.

A traverse connection was made to triangulation station SILVER, distance being 114.8016 meters (376.645 feet) south-southwest of station SILVER. The mark is a plain brass disk, stamped GMD RADAR 1966, cemented in a drill hole in a 50 by 50-foot concrete pad. It is 100 yards northeast of the Administration Building, 29 feet north-northwest of the southeast corner of the pad, 21.6 feet south of the northeast corner of the pad and 5 feet west-northwest of the east edge of the pad.

Note: The GMD RADAR is to be positioned over this point at a later date.

FORM C&GS-525b (1-66)
[illegible] C 18510-P66

Described by _____
U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GMD RADAR 321202 MARK

STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-14044

GEODETIC LATITUDE:	22 °02 ′11.0006	ELEVATION:	2.98 METERS
GEODETIC LONGITUDE:	159 47 08.3524		9.8 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 4	5104	403,248.47	73,853.22	- 0 °06 ′26 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
	° ′ ″	° ′ ″	

QF 5d4

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1037
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: GMD TARGET ANT

CHIEF OF PARTY: F.L. Jeffries YEAR: 1968 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the main gate of the Barking Sand Pacific Missile Range Facility, go west and north on Ola Ka Moi Road for 0.5 mile to the U.S. Weather Bureau Station. Turn right and go east, cross-country, for 0.05 mile to the station mark.

The station mark is a plain brass disk, stamped GMD TARGET ANT 1968, cemented in a drill hole in the concrete footing of a tall wooden pole. It is plumbed under the center of a small dipole that projects from the center of a small dish at the top of the pole.

Described by _____
U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

FORM C&GS-525b (1-68)
C 18810-P68

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GMD TARGET ANT

STATE: HAWAII YEAR: 1968 SECOND -ORDER

SOURCE: G-14107

GEODETIC LATITUDE:	22 °02 ′09.″72387	ELEVATION:	4.14 METERS
GEODETIC LONGITUDE:	159 47 05.85944		13.6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	403,482.77	73,723.95	- 0° 06′ 25″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

QF 610

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1038
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

FORM 325
(8-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: GOAT STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: P.C. Johnson YEAR: 1967 DESCRIBED BY: A.K.R.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.† HEIGHT OF LIGHT ABOVE STATION MARK METERS.

NOTE.*	SURFACE-STATION MARK, UNDERGROUND-STATION MARK / DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION‡ ° ′ ″
1a 7a	LUCKY 1966				00 00 00.00
11b	Reference Mark No. 1	SE	44.380	13.525	236 14 29
desc	274206 (Reference Mark No. 2)	S	51.568	15.7181	302 10 18.1

Detailed descriptions:

The station is located on the north edge of Makaha Ridge, about 11.2 miles north of Kekaha, 4.1 miles west of Kokee Lodge and 0.4 mile east-southeast of the west end of the ridge.

To reach the station from the junction of State Highways 50 and 55 in Kekaha, go north on State Highway 55 for 15.5 miles to Makaha Road. Turn left and go westerly, downhill, on Makaha Road for 4.5 miles to a bladed road on the right. Turn right and go northwesterly on the bladed road for about 100 feet to a 55-foot aluminum tower and the station mark, as described below.

The station mark is a standard disk, stamped GOAT 1967, set in the top of a 12-inch diameter concrete post that projects 8 inches above the surface of the ground. It is 49-1/2 feet north of the north leg of the 55-foot aluminum tower, 20 feet southwest of the edge of a bluff, 9-1/2 feet east-northeast of a guy wire anchor and 5 feet west of a wooden witness post.

Reference mark No. 1 is a standard disk, stamped GOAT NO 1 1967, set in the top of a 12-inch diameter concrete post that projects 5 inches above the surface of the ground. It is 11 feet north-northwest of a guy wire anchor and 2.5 feet northeast of a wooden witness post.

274206 was used as reference mark No. 2. It is a plain brass disk, stamped 274206 1967, cemented in a drill hole in the 5-foot by 8-foot concrete foundation of the tower. It is 3.4 feet southwest of the northeast edge of the concrete slab, 0.7 foot southeast of the northwest edge and plumbed under a circular black and white optical target mounted near the top of the tower.

*Refers to notes in manuals of triangulation and state publications of triangulation. ‡Direction-angle measured clockwise, referred to initial station.
†To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 27171-P69

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GOAT

STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °08 ′07.″1136	ELEVATION	513.00 METERS 1683.1 FEET
GEODETIC LONGITUDE:	159 43 35.2501		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ φ ANGLE *
HI 4	5104	423,351.48	109,754.60	- 0 °05 ′07 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ φ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH* (From south) ° ′ ″	CODE
LUCKY	58 15 23.1	58 20 30	5104

QF 502

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1039
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

NO ORIGINAL TEXT

Hale (Kauai Island, O. B. French, 1910; F. G. Engle, 1927).—About 2 miles north of Pele, on a peak called Halemanu, in an open space on the summit. Station marked by drill hole in center of cross on top of large bowlder. In 1927 a standard disk station mark was placed in this hole. Reference marks established in 1910 were crosses cut in bowlders. In 1927 standard reference disks were placed in each of these marks. They are at the following distances and azimuths from the station: No. 1, 3.597 meters (11.80 feet), 42° 27′; No. 2, 1.440 meters (4.72 feet), 180° 27′; No. 3, 11.496 meters (37.72 feet), 326° 54′.

(11-8-58) U.S. DEPARTMENT OF COMMERCE — COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HALE
ESTABLISHED BY: O.B.French YEAR: 1910 STATE: Hawaii
RECOVERED BY:* W.R. Porter YEAR: 1960 COUNTY: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ′ ″

The marker at station HALE was removed and a new marker reset in the same location after completion of the excavation and grading work.

The revised description of the station is as follows: The station is located on a peak called Halemanu which is 2 miles north of Pele. Take highway 50 towards Kekaha, turn right at junction 55 and travel on highway 55 (Waimea Canyon road) for approximately 15.8 miles. Turn right into an asphaltic concrete road, continue for 800 feet until a cleared area with a building and tower is reached. The station is located between the building and the tower.

Reference mark No. 1 was set so that the marker will be in direct unobstructed line from HALE to PELE triangulation station. It is a standard disk and was firmly embedded in concrete.

Reference mark No. 2 is a standard disk and was firmly embedded in concrete.

Reference mark No. 3 is a standard disk and was firmly embedded in concrete.

(11-8-58) U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HALE
ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii
RECOVERED BY:* R.S.Yokoyama YEAR: 1961 COUNTY: Kaui

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Due to grading operations the 3 reference marks will be destroyed. When the grading operations are finished 3 new reference points will be installed. The station mark is now referenced by 4 iron pipes as indicated on sketch.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HALE
STATE: HAWAII YEAR: 1910 SECOND -ORDER
SOURCE: G-SP156

GEODETIC LATITUDE:	22 °06 ′58.810	ELEVATION:	1131.0 METERS
GEODETIC LONGITUDE:	159 40 21.611		3711 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	441,549.34	102,838.25	- 0 03 54

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

QI 029

JUN 1978
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

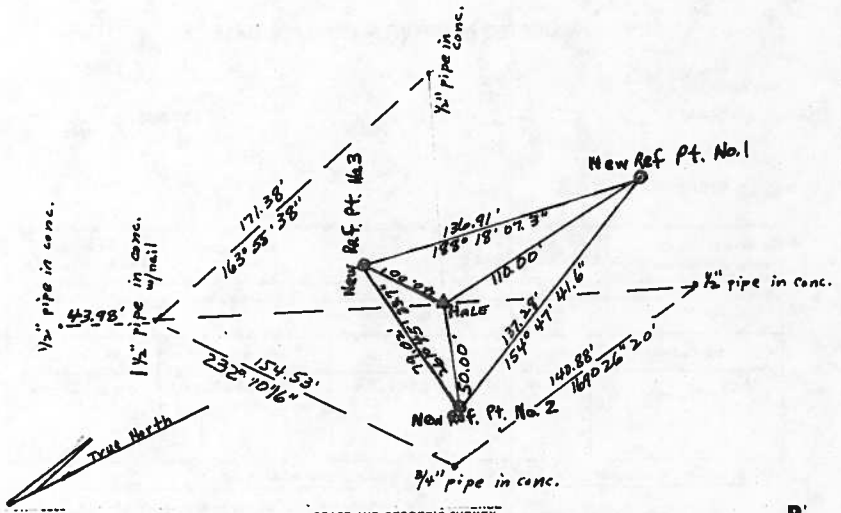
HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1039

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

HALE (continued)



(6-18-69) COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HALE
ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii
RECOVERED BY: Walter R. Helm YEAR: 1961 COUNTY: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION
MANU				0 00 00.0
RM 3	NE	40.000	12.193	27 41 55
RM 2	W	49.999	15.239	265 16 50
RM 1	This mark not measured to or direction taken to from station, because there is now a building between them.			

The station mark and reference marks 1, 2, and 3 were recovered and found to be in good condition. In April 1960 the top of the mountain was graded off, with the station and reference marks being reset by a local engineer. The position of the station mark was retained. A new description follows:

The station is located on a peak known as Halemanu. It is 10-1/2 miles, air line, north-northeast of Kekaha, 4 miles, air line, east of the west coast of Kauai Island, and 300 feet east of State Highway 55.

To reach the station from the Kokee Park Headquarters, go south on State Highway 55 for 1.4 miles to a paved road left. Turn left and go southeast for 0.15 mile to a gate and station within the compound. A drive station.

The station mark, a standard disk stamped HALE 1927 1960, is set 6 inches below the top of a 6-inch iron pipe which is flush with the pavement. It is 61.2 feet northeast of the northwest of the corner of the building, 46.5 feet northwest of the northeast corner of the building, 22 feet north of the most easterly set of double doors of the building, and 6.6 feet south of the southeast leg of a tower.

Reference mark 1, a standard disk stamped HALE 1 1927 1960, is set 2 inches below the top of a 3-inch iron pipe which is flush with the pavement. It is 88.7 feet southwest of the southeast corner of a building, 45.8 feet north-northeast of the southwest corner of a fence, 8.7 feet east of the southwest corner of the west concrete base for a large storage tank, and 6.8 feet south of the southeast corner of the east concrete base for a large storage tank.

Reference mark 2, a standard disk stamped HALE 2 1927 1960, is set 3 inches below the top of a 3-inch iron pipe which is flush with the pavement. It is 56.5 feet north of the northwest corner of a building, 26.8 feet west of the northwest leg of a tower, 23.0 feet east of the west fence line, and 20.0 feet south of the southwest corner of the power plant fence.

Reference mark 3, a standard disk stamped HALE 3 1927 1960, is set 6 inches below the top of a 6-inch iron pipe which is flush with the pavement. It is 49.4 feet west of the most northeasterly corner of the fence, 39.2 feet east of the southeast leg of the tower, and 34.7 feet north of the northeast corner of the building.

Form 526 (11-8-55) U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HALE
ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii
RECOVERED BY: W.R. Porter YEAR: 1964 COUNTY: Kauai
Island: Kauai

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station mark and all three reference marks were recovered and found in good condition and as described in 1961.

A new building is to be constructed at the Kokee Missile Tracking Station, and since it will cover the station mark a new station, HALE 2, was established just outside the compound fence. All of the marks are from 3 to 6 inches below blacktop surface, in 4-inch, iron pipe handholes and since they could not be removed, the holes were filled up with cement after the new station was established.

See description for HALE 2.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HALE
ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Kauai
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Kauai

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station is lost. There is now a concrete foundation, upon which a large building sets, on top of the station mark. A new station, HALE 2, was established nearby in 1964.

FORM C&GS-526 (1-68)
USCOMM-DC 16809-P68

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1040
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 526
Rev. Aug. 1948

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HALE 2 STATE: Hawaii COUNTY: Kauai
Island: Kauai
CHIEF OF PARTY: W.R. Porter YEAR: 1964 Described by: R.F. Hanson

NOTE.*	HEIGHT OF TELESCOPE ABOVE STATION MARK 2 METERS.†	HEIGHT OF LIGHT ABOVE STATION MARK METERS.
1a	Surface-station mark, Underground-station mark	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE feet	DISTANCE meters	DIRECTION‡ ° ′ ″
MANU 1961				00 00 00.0
R.M. No. 1	SSE	9.362	2.854	152 17 05
R.M. No. 2	NW	10.003	3.050	304 07 02

Detailed descriptions

Station is located about 11-1/2 miles airline north of the village of Waimea, on Halemanu Peak, just outside the compound fence of the Kokee Missile Tracking Station which now occupies the hill top.

To reach station from the Kokee Park headquarters, go southerly on State Highway 55 for 1.4 miles to paved side road left. Turn left and go 0.15 mile to guard station at entrance to compound. Walk along grassy bank around left side of fence for about 50 yards to station.

Station mark is a standard disk stamped "HALE 2 1964", set in the top of a 12-inch-square, concrete monument that projects about 4 inches above ground. It is 2.4 feet northeast of northeast side of fence, 10 feet southeast of a fence corner post, and 50 yards east-southeast of the gate to the compound.

Reference mark number one is a standard disk stamped "HALE 2 NO 1 1964", cemented in a drill hole in the concrete base of the second fence post east from the corner post. It is 2 inches inside the fence and about 6 inches higher than the station mark.

Reference mark number two is a standard disk stamped "HALE 2 NO 2 1964", cemented in a drill hole in the concrete base of the fence corner post. It is 4 inches outside the fence line.

*Refers to notes in manuals of triangulation and state publications of triangulation. †To nearest meter only, when no trigonometric leveling is being done. ‡Direction-angle measured clockwise, referred to initial station.

16—86329-1 U. S. GOVERNMENT PRINTING OFFICE

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HALE 2
STATE: HAWAII YEAR: 1964 SECOND ORDER
SOURCE: G-12664

GEODETIC LATITUDE:	22 °06 ′59.″258	ELEVATION	1130.94 METERS 3710.4 FEET
GEODETIC LONGITUDE:	159 40 20.784		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	441,627.15	102,883.37	- 0 03 ′54 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE
MANU	200 57 58.9	201 01 53	5104

POSITION DETERMINED BY TRAVERSE FROM STATION HALE
AND CHECKED BY ADDITIONAL OBSERVATIONS

QF 57s

JUN 1978

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1040

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

HALE 2 (continued)

FORM 525b (9-18-69) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

TRIANGULATION STATION RECOVERY NOTE

R

NAME OF STATION: HALE 2
Established: W.P.
STATE: Hawaii
Year 1964
COUNTY: Kauai
CHIEF OF PARTY: D.J.Florwick
YEAR: 1964
DESCRIBED BY: R.K.Moore

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS,† HEIGHT OF LIGHT ABOVE STATION MARK METERS.

1a SURFACE-STATION MARK, UNDERGROUND-STATION MARK
7a DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION‡ ° ′ ″
MANU 1961	S	9.360	2.853	152 29
Desc. RM 1	NNW	9.862	3.005	304 09
Desc. RM 2				

Detailed description:

The station mark, reference mark number 1 and reference mark number 2 were recovered and found in good condition. A new and complete description follows.

The station is located on the Pacific Missile Range, Kokee Park compound, 10.5 miles north-northeast of Kekaha, 4.0 miles east of the west coast of Kauai Island and 0.15 mile south of State Highway 55.

To reach the station from the Kokee Park Headquarters, go south on State Highway 55 for 1.35 miles to a paved road left. Turn left and go southeast for 0.15 mile to the Pacific Missile Range, Kokee Park compound. Turn left and go east-southeast for 0.05 mile and the station on the left.

The station mark, a standard disk stamped HALE 2 1964, is set in the top of a 12-inch square concrete block projecting 3 inches above the ground. It is 2 feet east of the north and south fence line and 8 feet southeast of the fence corner.

Reference mark number 1, a standard disk stamped HALE 2 NO 1 1964, is cemented in a drill hole in the concrete base of a steel fence post flush with the ground. It is 16 feet southeast of the fence corner. It is the same elevation as the station.

Reference mark number 2, a standard disk stamped HALE 2 NO 2 1964, is cemented in a drill hole in the concrete base of a steel fence post flush with the ground. It is located in the fence corner. It is the same elevation as the station.

*Refers to notes in manuals of triangulation and state publications of triangulation. ‡Direction-angle measured clockwise, referred to initial station.
†To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 27171-P69

FORM 526a (9-18-69) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HALE 2
ESTABLISHED BY: W.R. Porter YEAR: 1964 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Kauai
Island: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ′ ″
PIHEA 1910-1927				00 00 00.0
RM No. 1	SSE	9.352	2.851	123 41 25
RM No. 2	NW	9.870	3.008	275 44 25

Station was recovered and all marks found in good condition. A complete description follows:

Station is located about 10-1/2 miles north-northeast of Kekaha, on Halemamu Peak, just outside the northeast boundary fence of the Kokee Missile Tracking Station.

To reach station from the post office in Kekaha, go northwest for 0.2 mile; turn right and follow State Highway 55 for 15.2 miles to paved side road right. Turn right and go 0.1 mile to guard station at the missile tracking station, and end of truck travel. Walk along left side of fence on grassy ledge for 50 yards to station.

Station mark is a standard disk stamped "HALE 2 1964", set in the top of a 12-inch-square, concrete monument that projects 2 inches. It is above a 10-foot cutbank, 2.4 feet northeast of fenceline and a pipe fence-post, and 10 feet southeast of a fence corner.

Reference mark number one is a standard disk stamped "HALE 2 NO 1 1964", cemented in a drill hole in the concrete foundation of an iron pipe fence post, 2 inches inside the fenceline and about 6 inches higher than station mark.

Reference mark number two is a standard disk stamped "HALE 2 NO 2 1964", cemented in a drill hole in the concrete foundation of an iron pipe corner post of the fenceline. It is 4 inches outside fenceline and at about same eleva tion as station.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27173-P69

USCOMM-NOAA-ASHEVILLE

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1041
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-58)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: HASP Launcher

CHIEF OF PARTY: D.J.Florwick YEAR: 1964 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: The station is located on Bonham Auxiliary Landing Field, about 1.0 mile southwest of the main gate, about 0.05 mile southwest of the end of the north runway and in the center of an old parking area for planes.

A traverse connection was made to triangulation station SANDS 1964, distance being 136.022 meters (446.265 feet) north-northwest of station SANDS 1964. The mark is the center of the base of HASP Launcher.

Described by .....

Coms-DC 34313

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HASP LAUNCHER

STATE: HAWAII YEAR: 1964 THIRD ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °02 ′44.″3291	ELEVATION. METERS / FEET
GEODETIC LONGITUDE:	159 47 07.5614	

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ (OR Δ α) ANGLE *
HI 4	5104	403,329.17	77,216.22	- 0 ° 06 ′ 26 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ (OR Δ α) FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION SANDS

QF 425

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1042
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

FORM (10-16-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HELO STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: W.S. Simmons YEAR: 1966 DESCRIBED BY: R.M.M.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK] METERS.† HEIGHT OF LIGHT ABOVE STATION MARK] METERS.

NOTE.*	SURFACE-STATION MARK, UNDERGROUND-STATION MARK / DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION† ° ′ ″
	MAKAHA 2 1927				00 00 00
Desc.	USNHO Mark	SE	108.824	(33.170)	38 46 36
11b	Reference Mark No. 2	WNW	26.583	8.100	186 22 56
11b	Reference Mark No. 1	NE	25.448	7.756	279 08 10
	RM 1 To RM 2		37.658	11.476	

Description

The station is 11.5 miles north of Kekaha, 3.7 miles west of State Highway 55, 0.6 mile east of Makaha Point, on the north side of Makaha Ridge at the west end of Kauai Island.

To reach the station from the junction of State Highway 50 and 55 in Kekaha, go north on State Highway 55 for 15.5 miles to an asphalt road on the left. Turn left and follow the asphalt road down the ridge for 4.5 miles to the station on the right as described.

The station mark, a standard disk stamped HELO 1966, is set in the top of a 11-inch round concrete monument which projects 5 inches above the surface of the ground. It is 67 feet northeast of the center of the asphalt road, 41 feet southwest of a power pole, 5.8 feet west-northwest of a 4 by 4-inch white witness post and sign, 5.4 feet south of a 4 by 4-inch white witness post and 5.4 feet northeast of a 4 by 4-inch white witness post.

Reference mark No. 1, a standard disk stamped HELO NO 1 1966, is set in the top of a 11-inch round concrete monument which projects 7 inches above the surface of the ground. It is 17.6 feet southwest of the power pole, 1.4 feet west of a 4 by 4-inch white witness post and sign and is 1 foot lower in elevation than the station mark.

Reference mark No. 2, a standard disk stamped HELO NO 2 1966, is set in the top of a 12-inch round concrete monument which projects 3 inches above the surface of the ground. It is 55.4 feet west of the power pole, 51 feet north of the center of the asphalt road, 2.4 feet northeast of a 4 by 4-inch white witness post and sign and is 3 feet lower in elevation than the station mark.

USNHO is a U.S. Navy Hydrographic Office triangulation station disk set in a mass of plaster of Paris and rocks which is flush with the surface of the ground. It is 52 feet north of the center of the asphalt road.

Note: This area is to be under construction in the near future and is subject to change.

*Refers to notes in manuals of triangulation and ion. †Direction-angle measured clockwise, referred to initial ...tion.
†To nearest meter only, when no trigonor...

USCOMM-DC

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HELO

STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °07 ′59.″6478	ELEVATION:	545.10 METERS
GEODETIC LONGITUDE:	159 43 31.8087		1788.4 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 4	5104	423,673.91	109,000.75	- 0 °05 ′06 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE
MAKAHA 2	291 36 01.8	291 41 08	5104

QF 501

JUN 1978

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 HAWAII STATION 1043
LATITUDE 22 °00′ TO 22 °30′
LONGITUDE 159 °30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

FORM 225 (9-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HIGH STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: D.J. Florwick YEAR: 1965 DESCRIBED BY: R.M.M.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1 METERS,‡ HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.

	SURFACE-STATION MARK, †UNDERGROUND-STATION MARK / DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION‡ ° ′ ″
1b 7a	CANUTE (H&N) 1964				00 00 00.0
11b	Reference Mark No. 1	E	(82.036)	25.0046	84 05 38.1
11b	Reference Mark No. 2	N	27.630	8.422	347 07 39
	West Antenna, Jupiter	ENE	(86.132)	26.2530	66 21 01.8

Detailed description:

The station is 11 miles northwest of Kekaha, 150 yards south of an irrigation canal, 200 feet east of the Pacific Ocean, at the northwest corner of the Bonham Auxiliary Landing Field.

To reach the station from the main gate at Bonham Auxiliary Landing Field, go north on an oiled road for 0.6 mile to a side road left and a metal gate. Turn left passing through the gate and go west on an oiled road for 0.25 mile to a fork. Keep the right fork and go northerly on a bladed road for 0.5 mile to a point where the road turns south and the station as described.

The station mark, a standard disk stamped HIGH 1965, set in the top of a 12-inch concrete cylinder which projects 2 inches above the surface of the ground. It is 200 feet east of the Pacific Ocean, 133 feet west of the center of a track road and 52 feet east of the edge of a sandy bluff.

Reference mark No. 1, a standard disk stamped HIGH NO 1 1965, is set in the top of a 12-inch concrete cylinder which projects 4 inches above the surface of the ground. It is 134 feet east of the edge of the sandy bluff and 51 feet west of the center of the track road.

Reference mark No. 2, a standard disk stamped HIGH NO 2 1965, is set in the top of a 12-inch concrete cylinder which projects 2 inches above the surface of the ground. It is 137 feet west of the center of the track road and 55.5 feet east of the edge of the sandy bluff.

*Refers to notes in manuals of triangulation and state publications of triangulation. ‡Direction-angle measured clockwise, referred to initial station.
†To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 27171-P69

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HIGH

STATE: HAWAII YEAR: 1965 SECOND ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °03 ′18.3254	ELEVATION:	5.90 METERS
GEODETIC LONGITUDE:	159 47 12.2288		19.4 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE *
HI 4	5104	402,896.52	80,647.57	- 0 06 28

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH* (From south) ° ′ ″	CODE
CANUTE H N	185 54 29.6	186 00 58	5104

QF 431

JUN 1978

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1043

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

HIGH (continued)

FORM 526a (9-16-59) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HIGH
ESTABLISHED BY: D.J.F. YEAR: 1965 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Kauai
Island: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ′ ″
OHAIULA 1964				00 00 00.0
RM No. 2	NNW	27.617	8.418	259 34 34
RM No. 1	E	82.037	25.005	356 31 45

Station was recovered and all marks found in good condition. A complete description follows:

Station is located about 7-1/2 miles northwest of Kekaha and 1-1/2 miles north of the control tower at Bonham Auxiliary Landing Field, along sea shore, about 100 yards north of an old concrete bunker and 50 yards south-southwest of a large, brush-covered sand dune.

To reach station from the entrance to Bonham Auxiliary Landing Field, go north for 1.1 miles to track side road left. Turn left and go west on track road for 0.5 mile to sea and station.

Station mark is a standard disk stamped "HIGH 1965", set in the top of a 12-inch-diameter, concrete monument that projects 1 inch. It is set in an open grassy area, 55 feet east of edge of shoreline bank, 86 feet west-southwest of a wooden antenna pole and 150 feet east of water line.

Reference mark number one is a standard disk stamped "HIGH NO 1 1965", set in the top of a 12-inch-diameter, concrete monument that projects 2 inches. It is 25.5 feet south of the antenna pole and 2 feet lower than station mark.

Reference mark number two is a standard disk stamped "HIGH NO 2 1965", set in the top of a 12-inch-diameter, concrete monument that projects 1 inch. It is 85 feet west of the antenna pole, 53 feet east of edge of shoreline bank and at same elevation as station mark.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27173-P69

FORM 526a (9-16-59) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HIGH
ESTABLISHED BY: D.J. Florwick YEAR: 1965 STATE: Hawaii
RECOVERED BY:* F.L. Jeffries YEAR: 1968 COUNTY: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK 3.4 METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ′ ″
CANUTE (H&N) 1964				0 00 00.00
RM 1	E	82.035	25.002	84 05 17
RM 2	N	27.675	8.433	347 07 36

The station mark, reference mark 1 and reference mark 2 were recovered and found to be in good condition. A slight difference in distance to reference mark 2 was noted. The route to the station has changed due to road changes. A new and complete description follows:

The station is located near the beach on the Barking Sands Pacific Missile Range Facility, about 1.4 miles north of the control tower and 1/2 mile northwest of the north end of the runway.

To reach the station from the main gate of the Barking Sands Pacific Missile Range Facility, go north on Nohili Road for 0.6 mile to the intersection with Kalanamahiki Place North. Turn left and go north on Kalanamahiki Place North for 0.6 mile to Palai Olani Road. Turn left and go west on Palani Olani Road for 0.05 mile to Kukui Road. Turn right and go north on Kukui Road for 0.35 mile to Hoku Road. Turn left and go west on Hoku Road for 0.1 mile to the end of the pavement. Continue straight ahead on a track road for 0.1 mile to a three-way intersection. Turn right and go north and west on a track road for 0.2 mile to the end of the road at the beach and the station mark as described below.

The station mark, a standard disk stamped HIGH 1965, is set in the top of a 12-inch concrete cylinder that projects 1 inch above the surface of the ground. It is 86.5 feet west-southwest of an antenna pole and 54 feet east of a large range pole with a triangular target.

Reference mark 1, a standard disk stamped HIGH NO 1 1965, is set in the top of a 12-inch concrete cylinder that projects 3 inches above the surface of the ground. It is 134 feet east of the range pole, 27.5 feet south of the antenna pole and about 1 foot lower in elevation than the station mark.

Reference mark 2, a standard disk stamped HIGH NO 2 1965, is set in the top of a 12-inch concrete cylinder that projects 1 inch above the surface of the ground. It is 85.5 feet west-southwest of the antenna pole, 63.5 feet east-northeast of the range pole and about the same elevation as the station mark.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27173-P69

USCOMM-NOAA-ASHEVILLE

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1044
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-65)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF [redacted] STATION

NAME OF STATION: HIGH RM 1

CHIEF OF PARTY: D.J. Florwick YEAR: 1965 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the sentry post at the main gate at Bonham Auxiliary Landing Field, go northerly along an asphalt road for 0.6 mile to a metal gate on the left. Turn left, passing through the gate and go west on an oiled road for 0.25 mile to a fork. Take the right fork and go northerly on a bladed road for 0.5 mile to the mark on the left, at a point where the road turns to the south.

The mark is a standard reference mark disk, stamped HIGH NO 1 1965, set in the top of a 12-inch concrete cylinder that projects 4 inches above the surface of the ground. It is 134 feet east of the edge of a sandy bluff and 51 feet west of the center of a track road.

A traverse connection was made to triangulation station HIGH, distance being 25.0046 meters (82.036 feet) east of station HIGH.

Point traversed to was a punch mark in the center of the arrow cast in the tablet.

Described by .....

Cor

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HIGH RM 1

STATE: HAWAII YEAR: 1965 SECOND ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °03′18.″3253	ELEVATION:	5.47 METERS
GEODETIC LONGITUDE:	159 47 11.3568		17.9 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ α) ANGLE *
HI 4	5104	402,978.55	80,647.41	- 0 06 27

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ (OR Δ α) FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION HIGH

QF 433

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1045
HAWAII
LATITUDE 22 °00′ TO 22 °30′
LONGITUDE 159 °30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

NO ORIGINAL TEXT

Hinihini (Kauai Island, O. B. French, 1910; F. G. Engle, 1927).—Identical with the Hawaiian Government Survey station on Puu Hinihini, on the summit at the "makai" (seaward) end of a ridge, between the lands of Waipa and Lumahai; about ½ mile west of Hanalei Bay and 2 miles west of the village, from which it may be seen very plainly. Marked by a 1½-inch gas pipe driven in the ground. Reference marks are as follows: No. 1, bottle set in ground with neck projecting 2 inches, distant 15.6 feet in azimuth 328° 55′; No. 2, bottle set in ground with neck projecting 2 inches, distant 14.7 feet, in azimuth 167° 50′; No. 3, bottle set in the ground with 2 inches of neck projecting, distant 23.4 feet, azimuth 226° 25′. In 1927 the station mark and all reference marks were recovered as described. A standard disk station mark was cemented in the iron pipe marking the station.

(11-8-55) RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HINIHINI
ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1965 COUNTY: Kauai
Island: Kauai

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station mark was recovered in good condition. Only 1 of the old bottle reference marks, number 3, was recovered; it is in good condition. A complete description follows:

Station is located about 2 miles west-northwest of Hanalei village and 1/2-mile west of the west side of the entrance to Hanalei Bay, on the east end of a brush-covered ridge.

To reach station from the post office in Hanalei, go west on State Highway 56 for 2.8 miles to where highway makes a sharp right turn after rounding point of ridge. (This is end of truck travel). A trail starts about 150 feet west of here, going up onto cutbank on left. Follow this trail and go southeast up fairly open slope about 1/4-mile to crest, then go left along ridge-line about 150 yards to station.

Station mark is a standard disk, unstamped, set in concrete beneath the 5-foot-square, concrete platform of the Type B-1 signal. Access to the mark is had through a small hand-tunnel passing beneath the center concrete pedestal of the signal. A red and white metal target is set in the concrete pedestal and extends 8 feet above it.

Reference mark is a brown bottle set in the ground with 3 inches of the neck projecting. It is set at the northwest side of a large lehua bush, 7.150 meters, (23.456 ft) from station, in azimuth 226° 25′ and is 1 foot lower than station mark.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HINIHINI
STATE: HAWAII YEAR: 1910 THIRD ORDER
SOURCE: G-SP156

GEODETIC LATITUDE:	22 °12′49.″107	ELEVATION:	210.0 METERS
GEODETIC LONGITUDE:	159 31 37.645		689 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 4	5104	490,824.67	138,154.17	- 0°00′37″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
	° ′ ″	° ′ ″	

QI 130

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1046
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-55)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: JAY-JAY(H&N)

CHIEF OF PARTY: D.J. Florwick YEAR: 1964 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: The station is located at the Sandia Corporation's Barking Sands Missile Site, in the center of the intersection of two dirt roads and about 100 yards north-northwest of a gate in a cyclone fence.

To reach the station from the junction of State Highways 50 and 55 in Kekaha, go west on State Highway 50 for 7.0 miles to a fork. Take the left fork, as per sign, "Bonham Air Base" and go 0.4 mile to a sentry post at a cross road. Turn right and go northerly for 1.05 miles to the end of the pavement. Continue north on graveled road for 0.2 mile to a locked gate. (Normally unlocked during business hours) Pass through gate and continue north for 0.3 mile to a fork. Take the left fork and continue northerly on the main road for 0.15 mile to a sentry post. Go northwest, through fenced area, for 0.1 mile to a cross road and the station mark.

The station mark is a plain brass disk, stamped JAY-JAY SANDIA GRID NORTH-0 EAST-0 H&N 1964, set in the top of a 10-inch square concrete post that is about 3 inches below the surface of the road and protected by a metal lid.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: JAY-JAY (H&N)
ESTABLISHED BY: D.J.F. YEAR: 1964 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Kauai
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Kauai

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station was recovered as previously described. Original description is adequate.

FORM C&GS-526 (1-58)
USCOMM-DC 18509-P58

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: JAY-JAY H N

STATE: HAWAII YEAR: 1964 SECOND ORDER

SOURCE: G-13403

GEODETIC LATITUDE:	22 °03 ′49.″1434	ELEVATION:	2.31 METERS
GEODETIC LONGITUDE:	159 46 54.0499		7.6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 4	5104	404,012.39	83,754.20	- 0 °06 ′21 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
	° ′ ″	° ′ ″	

QF 416

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1047
HAWAII
LATITUDE 22 ° 00′ TO 22 °30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

DESCRIPTION OF TRIANGULATION/TRAVERSE STATION

NAME OF STATION: Judy Launcher

CHIEF OF PARTY: P.C. Johnson YEAR: 1967 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object:

The station is the center of a judy launcher.
A traverse connection was made from triangulation station LAPA, distance being 32.1814 meters or (105.582 feet) north of station LAPA.

Described by
U.S. DEPARTMENT OF COMMERCE
ESSA
COAST AND GEODETIC SURVEY

FORM C&GS-525b (12-68)
USCOMM-DC 30290-P68

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: JUDY LAUNCHER

STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE: G-13403
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °04′18.″1019	ELEVATION:	28.96 METERS
GEODETIC LONGITUDE:	159 46 38.2766		95.0 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE °
HI 4	5104	406,101.44	86,673.66	- 0 06 15

° PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH ° (From south) ° ′ ″	CODE ′

POSITION OETERMINED BY TRAVERSE FROM STATION LAPA

QF 525

JUN 1978
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 HAWAII STATION 1048
LATITUDE 22 °00′ TO 22 °30′
LONGITUDE 159 °30′ TO 160 °00′
DIAGRAM NF 4-6 KAUAI

FORM 525
(9-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: JUPITER STATE: Hawaii COUNTY: Kauai

CHIEF OF PARTY: F.L. Jeffries YEAR: 1968 DESCRIBED BY: A.K.R.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.† HEIGHT OF LIGHT ABOVE STATION MARK METERS.

	SURFACE-STATION MARK, UNDERGROUND-STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION‡ ° ′ ″
	HIGH 1965				00 00 00.00
desc	Reference Mark No. 1	ESE	27.05	8.244	185 08 06
desc	Reference Mark No. 2	W	57.30	17.466	329 30 50

Detailed description:

The station is located in a level, sandy area of the Barking Sands Pacific Missile Range Facility, about 1.4 miles north of the control tower, 1/4 mile northwest of the north end of the runway and 1/4 mile east of the beach.

To reach the station from the main gate of the Barking Sands Pacific Missile Range Facility, go north on Nohili Road North for 0.6 mile to the intersection with Kalanamahiki Place North. Turn left and go north on Kalanamahiki Place North for 0.6 mile to the intersection with Palai Olani Road. Turn left and go west on Palai Olani Road for 0.05 mile to Kukui Road. Turn right and go north on Kukui Road for 0.35 mile to Hoku Road. Turn left and go west on Hoku Road for 0.1 mile to the station mark on the right.

The station mark is a standard disk, stamped JUPITER 1968, set in the top of a 3-inch cast iron sewer pipe that is flush with the surface of the ground. It is 95 feet east-northeast of the northwest corner of a large asphalt parking area, 54.3 feet west-northwest of the northeast corner of the parking area and 16.4 feet north of a cable rack.

Reference mark No. 1 is a standard disk, stamped JUPITER NO 1 1968, set in the top of a 3-inch cast iron sewer pipe that is flush with the surface of the ground. It is 40.3 feet east of the east edge of a metal frame supporting some electrical junction boxes, 27.8 feet west of the northeast corner of the asphalt parking area and 3.8 feet north of the cable rack.

Reference mark No. 2 is a standard disk, stamped JUPITER NO 2 1968, set in the top of a 3-inch cast iron sewer pipe that is flush with the surface of the ground. It is 31.2 feet east-northeast of the northwest corner of the asphalt parking area, 30.0 feet west-northwest of the west edge of the junction box frame and 7.8 feet north of the cable rack.

*Refers to notes in manuals of triangulation and state publications of triangulation. ‡Direction-angle measured clockwise, referred to
†To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 27171-P69

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: JUPITER

STATE: HAWAII YEAR: 1968 SECOND -ORDER

SOURCE: G-14107

GEODETIC LATITUDE:	22 °03 ′14.34121	ELEVATION:	3.42 METERS
GEODETIC LONGITUDE:	159 47 00.18542		11.2 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE*
HI 4	5104	404,028.72	80,243.42	- 0 °06 ′23 ″

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH* (From south) ° ′ ″	CODE
HIGH	109 32 17.5	109 38 41	5104

QF 616

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1049
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Form 525b
(11-8-55)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: Jupiter Van

CHIEF OF PARTY: F.L. Jeffries YEAR: 1968 STATE: Hawaii COUNTY: Kauai

Description, including sketch of object: From the main gate of the Barking Sands Pacific Missile Range Facility, go north on Nohili Road for 0.6 mile to the intersection with Kalanamahiki Place North. Turn left and go north on Kalanamahiki Place North for 0.6 mile to Palai Olani Road. Turn left and go west on Palai Olani Road for 0.05 mile to Kukui Road. Turn right and go north on Kukui Road for 0.35 mile to Hoku Road. Turn left and go west on Hoku Road for 0.1 mile to the station in the northeast corner of a large asphalt parking area.

The Jupiter Van is a white-painted, four wheeled trailer with a fiberglass roof.

A traverse connection was made to triangulation station JUPITER, distance being 16.710 meters (54.82 feet) southeast of station JUPITER. Point traversed to was the center of the roof.

Described by .....

Coast-DC 34313

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: JUPITER VAN

STATE: HAWAII YEAR: 1968 SECOND ORDER

SOURCE: G-14107
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	22 °03 ′14.°03697	ELEVATION:	5 METERS
GEODETIC LONGITUDE:	159 46 59.70260		SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE °
HI 4	5104	404,074.08	80,212.63	- 0 ° 06 ′ 23 °

° PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH ° (From south) ° ′ ″	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION JUPITER

QF 617

JUN 1978
U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1050
HAWAII
LATITUDE 22 ° 00′ TO 22 ° 30′
LONGITUDE 159 ° 30′ TO 160 ° 00′
DIAGRAM NF 4-6 KAUAI

Kailiu (Kauai Island, F. G. Engle, 1927).—On northwest corner of Kauai, on Kailiu Point, on top of a sandy, grass-covered mound near high-water line. Station is on highest point, near western end of sandy point, and not far from the beginning of the napali or cliff coast. There are some houses about 100 meters inshore from station. Station marked by oval-shaped stone partly embedded in sand. Reference marks, note 12c, standard reference disks in bowlders which are partly embedded in sand, are at the following azimuths from station: No. 1, 24° 29′; No. 2, 76° 09′.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAILIU
ESTABLISHED BY: F.G.E. YEAR: 1927 STATE: Hawaii
RECOVERED BY: D.M. Whipp YEAR: 1965 COUNTY: Kauai

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station mark was searched for but not recovered. Reference mark number one was recovered in good condition. Reference mark number two was found destroyed; the boulder in which it was set was laying on top of the ground, so the disk was removed.

The station mark was located on a pure sand dune, which shows evidence of erosion. The entire area is now covered with a heavy growth of large ironwood trees up to 100 feet tall.

Reference mark number one is a standard disk stamped "KAILIU NO 1", cemented in a drill hole in a 2 x 3-foot rock that projects 4 inches above ground. It is 24 feet west of fence line, 30 feet west of centerline of track road, 60 feet south of base of sand ridge, 50 yards north of a road fork and two gates (the right fork leads in to two houses), and 3 feet west of a black lava boulder. It is about 25 feet lower than sand dune on which station was located.

NOTE: Because there was no distance recorded from station to reference mark number one a position cannot be computed for it.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAILIU
ESTABLISHED BY: F.G.E. YEAR: 1927 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: U.S.G.S. YEAR: 1965 COUNTY: Kauai
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Northwest corner of Kauai

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station and one reference mark recovered. Located along the NW coast of Kauai about 2.5 mi. WNW of the mouth of the Wainiha River, about 1.5 miles NE of the mouth of Hanakapia Stream about 0.2 mile N of State Hwy 56 and about 300 feet from the shore line on a low sandy ridge in the timbered area. Station mark is a C&GS tablet stamped KAILIU 1927 set in boulder and about one foot below normal surface of sand, is about 28 feet E of high point of top (about 6 feet lower), 18 feet S of fence and about 5 feet N of ridgeline.

Reference mark 1 is a C&GS tablet stamped NO 1 1927, 155.15 feet from station in azimuth 24°29'.

To reach from the mouth of the Wainiha River, drive W on State Hwy 56 for 3.0 miles to drive on right, follow drive 0.2 mile to gate near house, pass thru gate and continue N for about 200 feet to base of sand hill and ETT. Proceed on foot to top of hill and station. Due to timber in the area the published lines cannot now be obberved from height of instrument.

FORM C&GS-526 (1-68)
USCOMM-DC 18809-P68

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAILIU
STATE: HAWAII YEAR: 1927 THIRD ORDER
SOURCE: G-SP156

GEODETIC LATITUDE:	22 °13 ′35.379	ELEVATION:	10 METERS
GEODETIC LONGITUDE:	159 35 00.216	SCALED	FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	φ FOR Δ α ANGLE
HI 4	5104	471,792.41	142,830.42	- 0 01 54

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ FOR Δ α FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH* (From south) ° ′ ″	CODE

QI 158

JUN 1978

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY , NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 221593 STATION 1050

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

KAILIU (continued)

FORM 526a
(9-10-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAILIU
ESTABLISHED BY: F.G.E. YEAR: 1927 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Kauai
Island: Kauai

HEIGHT OF TELESCOPE ABOVE STATION MARK METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	° ′ ″ (AZIMUTH)
R.M. No. 1	SSW	155.066	(47.264)	24 29
R.M. No. 3	WSW	25.092	7.648	88 27 36

Station mark and RM No. 1 were recovered in good condition. Reference mark number two was found destroyed. A new reference mark, number 3, was established. A complete description follows:

Station is located about 5 miles west-northwest of Hanalei, at Kailiu Point, along the shoreline ridge, about 40 feet above sea level, at the east side of the highest dune in the vicinity, which sets in a fence corner.

To reach station from the post office in Hanalei go westerly on main road for 7.6 miles to side road right, 50 yards before end of road. Take side road and go 0.2 mile to fork. Take left fork, passing through wire gate to left of board gate, and go north along fence line for 0.05 mile to base of dune and station up on sand ridge.

Station mark is a standard disk stamped "KAILIU 1927", cemented in a drill hole in a boulder 1-1/2 feet beneath sand surface. It is 58.3 feet east of the fence corner, 17.7 feet south of east-west fence line, 18 feet east-northeast of a triangle blaze on ironwood tree, 25 feet east of high point of dune and 6-1/2 feet lower, 5 feet north of ridge line and 3 feet lower, and about 175 yards north of a house.

Reference mark number one is a standard disk stamped "KAILIU NO 1", cemented in a drill hole in a 14 x 20-inch rock projecting 4 inches. It is located in brushy area, 24.3 feet west of fence line, about midway between two large ironwood trees, 3 feet west of a higher, pointed, black rock of about the same size, and 16 feet lower than station mark.

Reference mark number three is a standard disk stamped "KAILIU 1927 NO 3 1966", set in the top of a concrete-filled, cast-iron pipe that projects 4 inches. It is located on the east end of the high part of the dune, 34 feet east of the fence corner, 17.3 feet south of the east-west fence line, and 6.4 feet higher than station mark.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27173-P69

USCOMM-NOAA-ASHEVILLE