

GEODETTIC DATUMS OF THE U.S. VIRIGN ISLANDS

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National Spatial Reference System (NSRS)

Consistent National Coordinate System

- **Latitude**
- **Longitude**
- **Height**
- **Scale**
- **Gravity**
- **Orientation**

and how these values change with time.



NSRS Components

- **National Shoreline**
 - **Consistent, accurate, and up-to-date**
- **National CORS**
 - **A network of GPS Continuously Operating Reference Stations**
- **Networks of geodetic control points**
 - **Permanently marked survey monuments (HPGN/HARN)**
- **Tools**
 - **Geoid model, coordinate conversion & transformations etc.**

NATIONAL SPATIAL REFERENCE SYSTEM

ACCURATE -- cm accuracy on a global scale

MULTIPURPOSE -- Supports Geodesy, Geophysics, Land Surveying, Navigation, Mapping, Charting and GIS activities

ACTIVE -- Accessible through Continuously Operating Reference Stations (CORS) and derived products

INTEGRATED -- Related to International services and standards (e.g. International Earth Rotation and Reference Systems Service, International GPS Service etc.)

FEDERAL GEODETIC SURVEYS

COAST & GEODETIC SURVEY NATIONAL GEODETIC SURVEY



- 1900 - Astronomical observations & tie to Puerto Rico
- 1918 -1919 - Triangulation w/base-lines
- 1959 – Airport Surveys
- 1980 - Hydro Surveys
- 1993 & 2000 - Airport Surveys



U.S. GEOLOGICAL SURVEY

- 1954 - Leveling of St. Thomas
- 1957 - Leveling of St. Croix



GEODETIC DATUMS

Classical

Horizontal – 2 D (Latitude and Longitude)

Vertical – 1 D (Orthometric Height)

Contemporary

Practical – 3 D (Latitude, Longitude and Ellipsoid Height)

Fixed and Stable – Coordinates seldom change

Scientific – 4 D (Latitude, Longitude, Ellipsoid Height, Velocities) – Coordinates change with time

GEODETIC CONTROL

NETWORK OF MONUMENTED POINTS

**PRECISELY MEASURED IN ACCORDANCE
WITH STANDARD PROCEDURES**

MEET ACCURACY SPECIFICATIONS

ADJUSTED TO TIE TOGETHER

DOCUMENTED FOR MULTIPLE USE



**Stainless steel rod
driven to refusal**

**Poured in place
concrete post**



CORS SITES



HORIZONTAL DATUMS

PUERTO RICO DATUM

Origin – Cardona Lighthouse

Ellipsoid – Clarke 1866

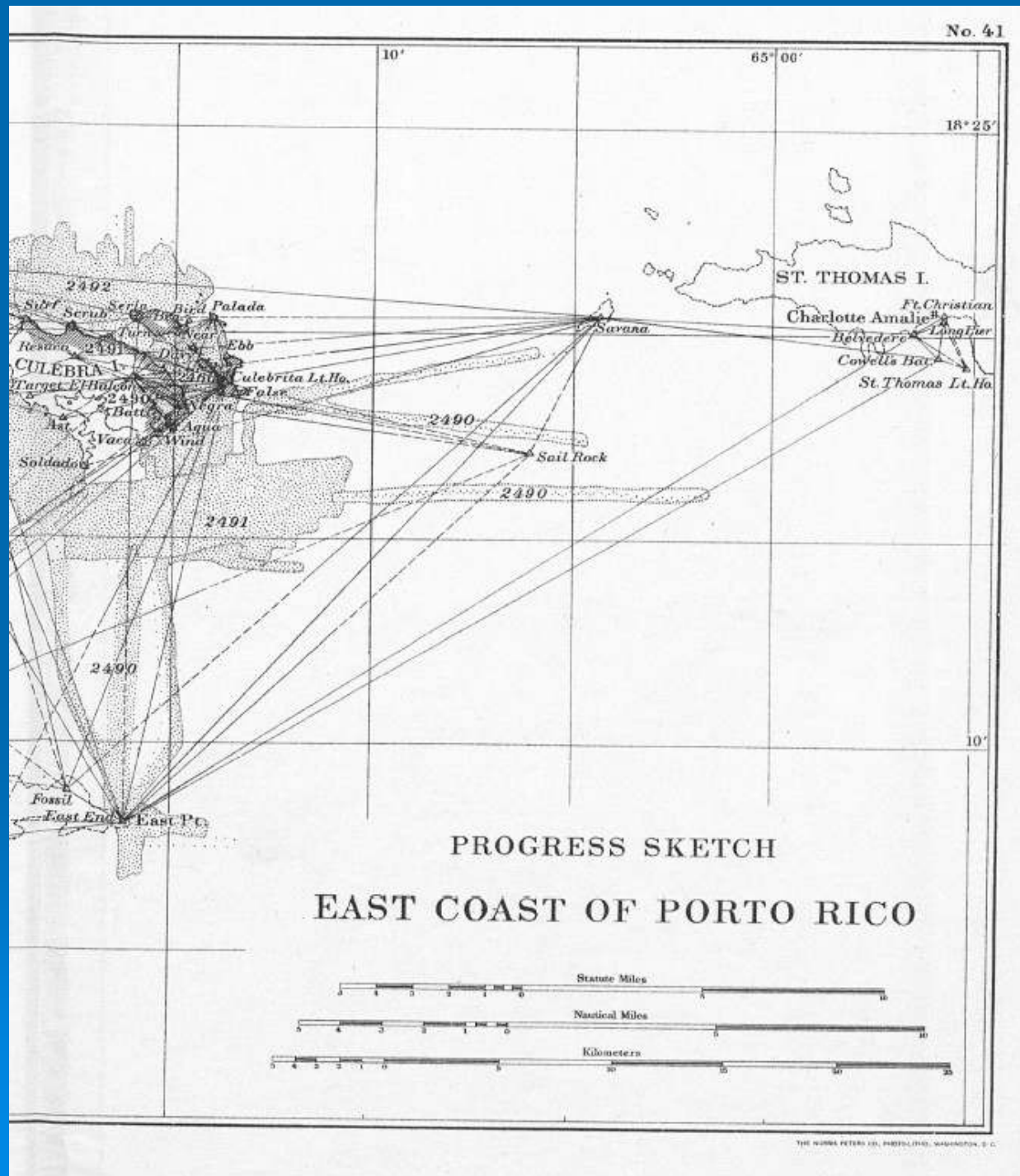
NORTH AMERICAN DATUM 1983

Origin – Earth Mass Center

Ellipsoid – Geodetic Reference System 1980

NOTE: North American Datum of 1927 (NAD 27) was never valid for VI & PR

HORIZONTAL DATUMS



VERTICAL DATUMS

ST. THOMAS

1954 USGS Leveling
Mean Low Water at Hassel Island

ST. CROIX

1957 USGS Leveling
Mean Sea Level at Fredericksted

NOTE: National Geodetic Vertical Datum of 1929 (NGVD 29) was never valid for VI
North American Vertical Datum of 1988 (NAVD 88) is not and will not be valid
for VI

ST CROIX GEODETIC CONTROL



ST THOMAS GEODETIC CONTROL



ST JOHN GEODETIC CONTROL



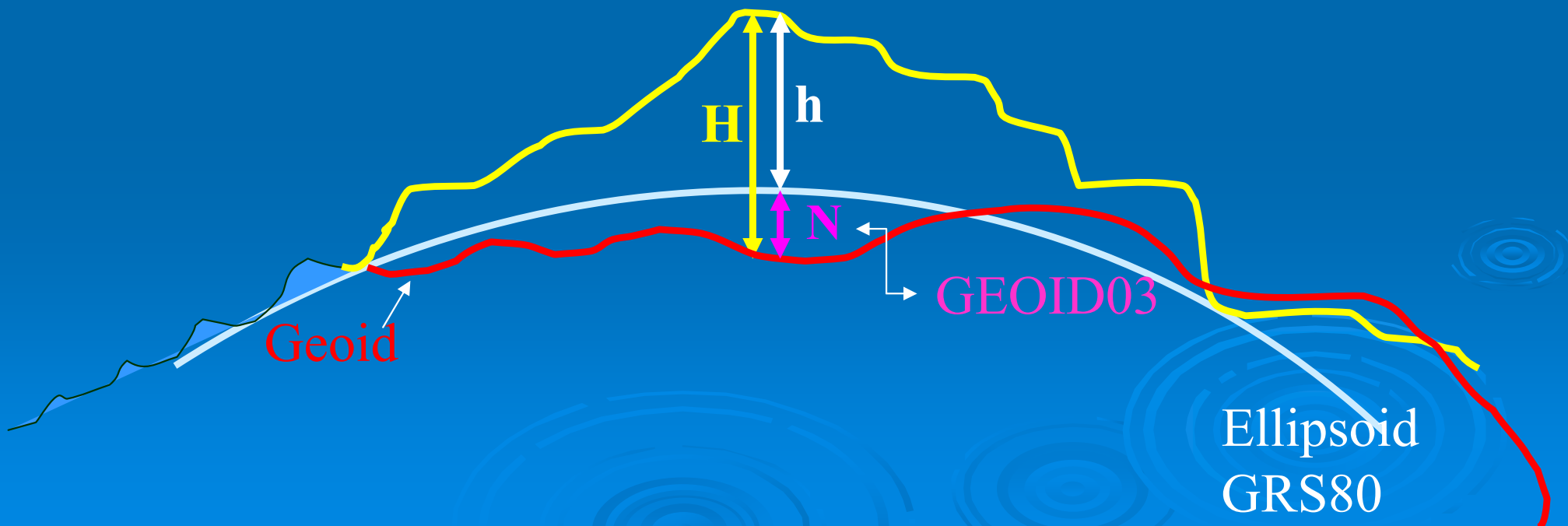
ELLIPSOID - GEOID RELATIONSHIP

H = Orthometric Height (VIVD)

h = Ellipsoidal Height (NAD 83)

N = Geoid Height (GEOID 03)

$$H = h - N$$



HORIZONTAL DATUMS

National Geodetic Survey, Retrieval Date = JUNE 19, 2006

TV1548 *****

TV1548 TIDAL BM - This is a Tidal Bench Mark.

TV1548 DESIGNATION - TIDAL BM 1639 M

TV1548 PID - TV1548

TV1548 STATE/COUNTY- VQ/VIRGIN ISLANDS

TV1548 USGS QUAD - CENTRAL SAINT THOMAS (1982)

TV1548

TV1548 *CURRENT SURVEY CONTROL

TV1548

TV1548* NAD 83(1997)- 18 20 01.30211(N) 064 55 15.34597(W) ADJUSTED

TV1548* LOCAL TIDAL - 2.358 (meters) 7.74 (feet) GPS OBS

TV1548

TV1548 X - 2,567,098.806 (meters) COMP

TV1548 Y - -5,485,384.394 (meters) COMP

TV1548 Z - 1,993,464.947 (meters) COMP

TV1548 LAPLACE CORR- 0.71 (seconds) DEFLEC99

TV1548 ELLIP HEIGHT- -39.87 (meters) (05/22/97) GPS OBS

TV1548 GEOID HEIGHT- -42.64 (meters) GEOID03

TV1548

TV1548 HORZ ORDER - SECOND

TV1548 ELLP ORDER - FOURTH CLASS I

TV1548

TV1548.The horizontal coordinates were established by GPS observations

TV1548.and adjusted by the National Geodetic Survey in May 1997..

TV1548

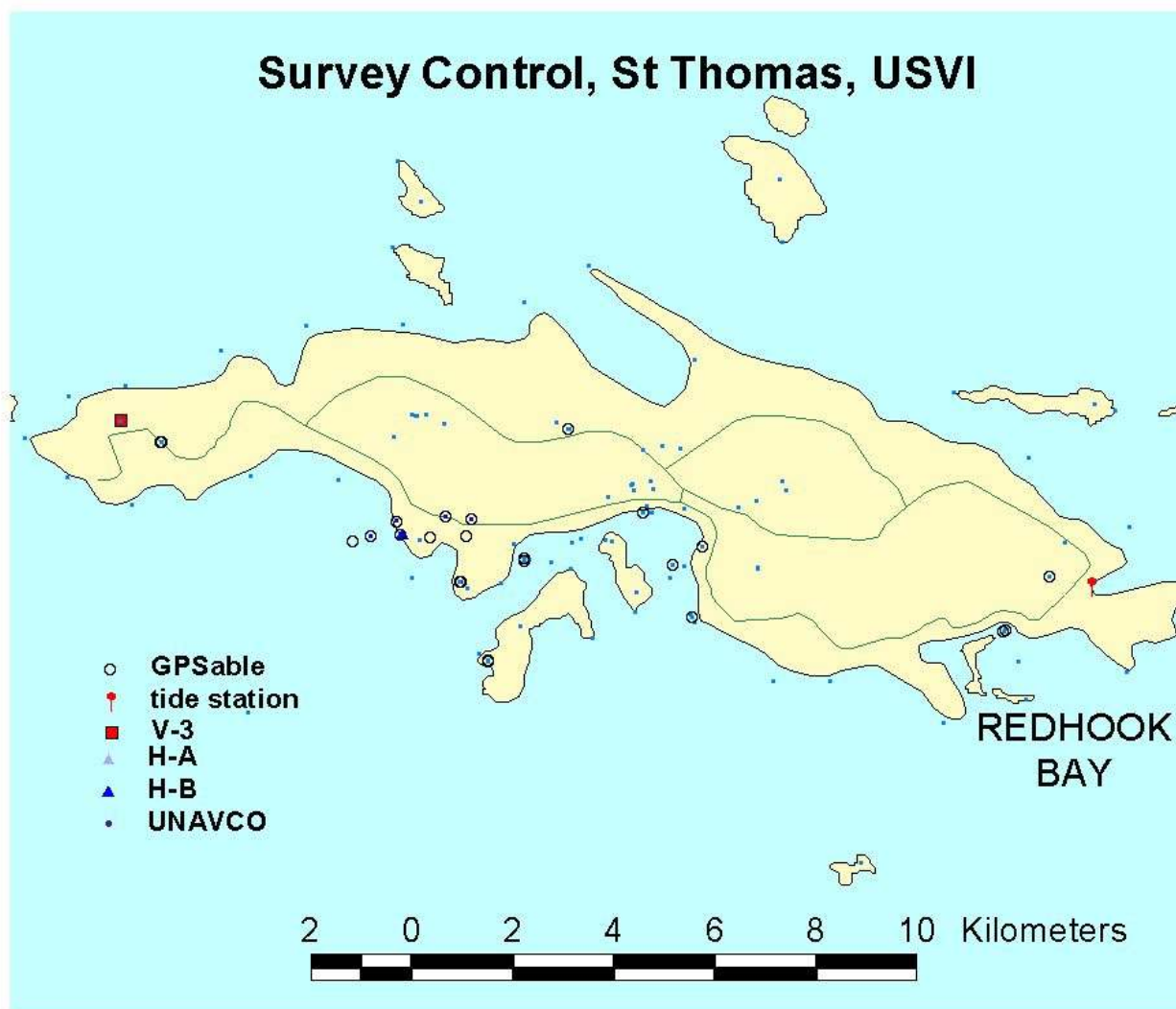
TV1548.The orthometric height was determined by GPS observations and a

TV1548.high-resolution geoid model.

Ellipsoid Height = - 39.87 m
Geoid Height = -42.64 m
Orthometric Hgt = 2.77 m

VIRGIN ISLAND VERTICAL DATUM OF 200?

Origin – MSL at NOAA Tides Gauges on each island



VERTICAL DATUMS

Survey Control, St Croix, USVI

- GPSable
- ↑ tide station
- V-3
- ★ H-A
- ▲ H-B
- UNAVCO

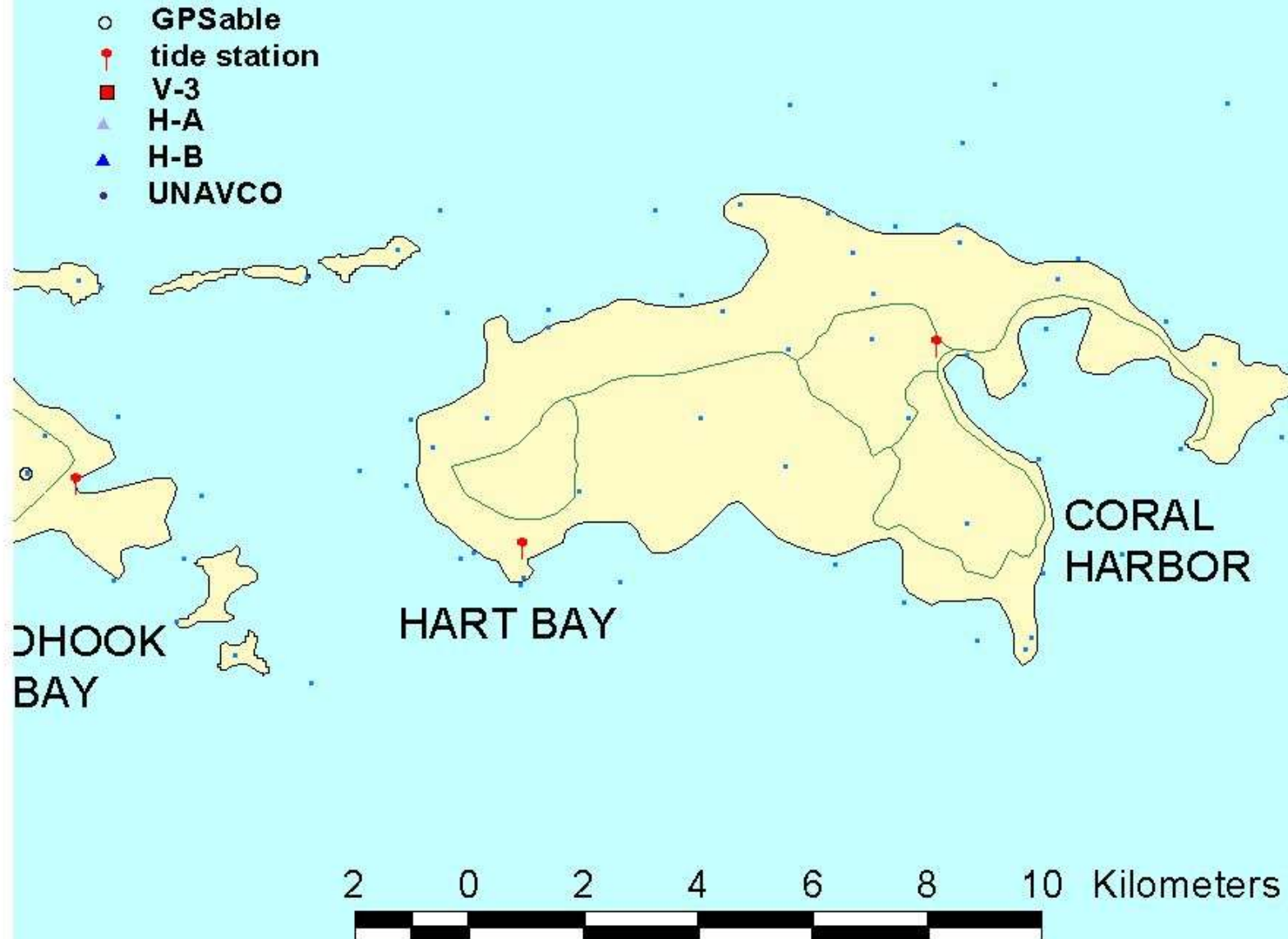


2 0 2 4 6 8 10 Kilometers



VERTICAL DATUMS

Survey Control, St Johns, USVI





CRO1
Christiansted,
St. Croix

**Continuously Operating
Reference Station
(CORS)**

NDGPS STATION

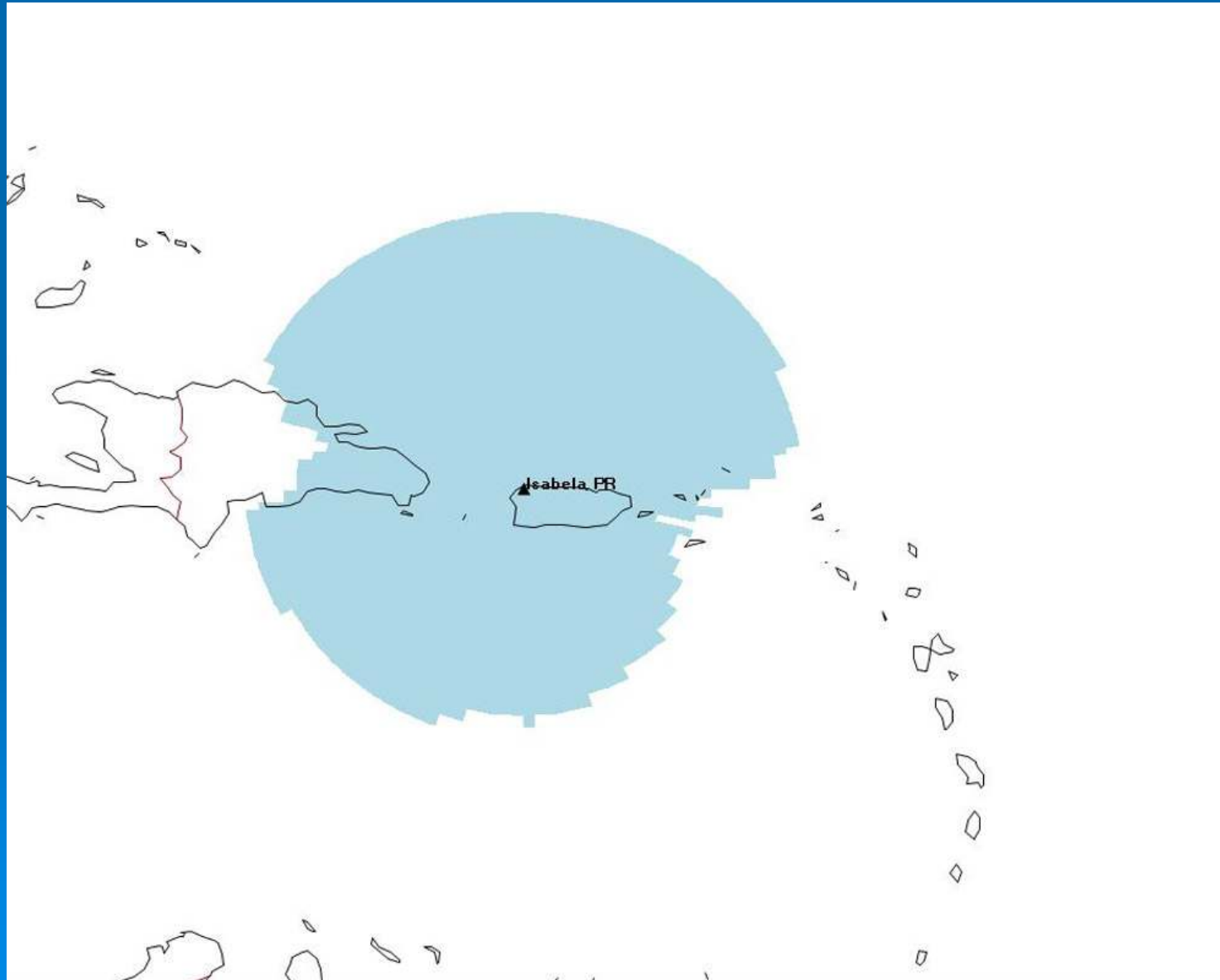
Proposed – Roosevelt Roads, PR



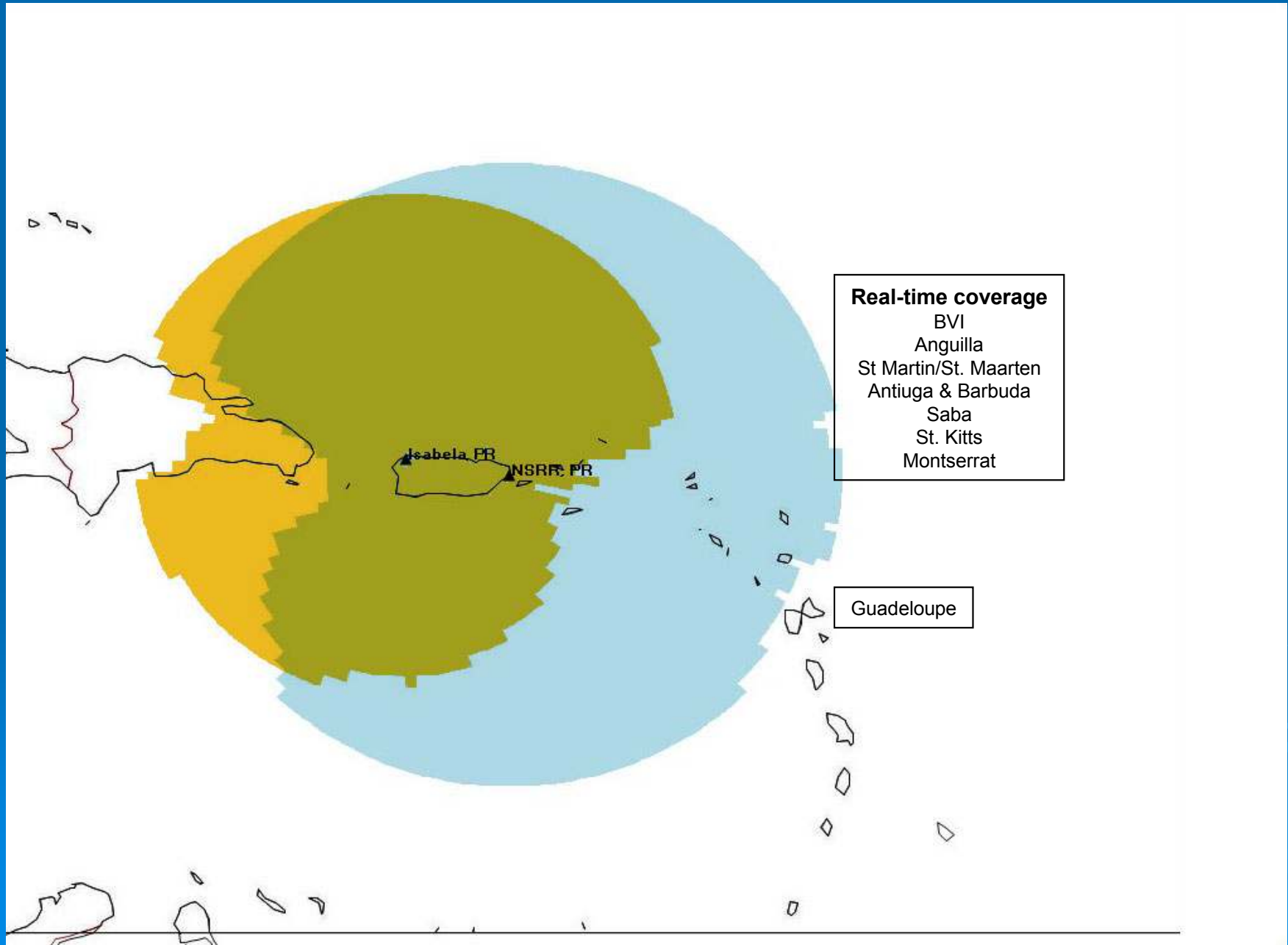
CORS ANT, ISABELA, SE, 07MAY02

Caribbean Coverage

Current Estimated Coverage



Proposed Caribbean Coverage



PROPOSED USVI CORS

Proposed Installation – last week in July '06

UVI – St. Croix



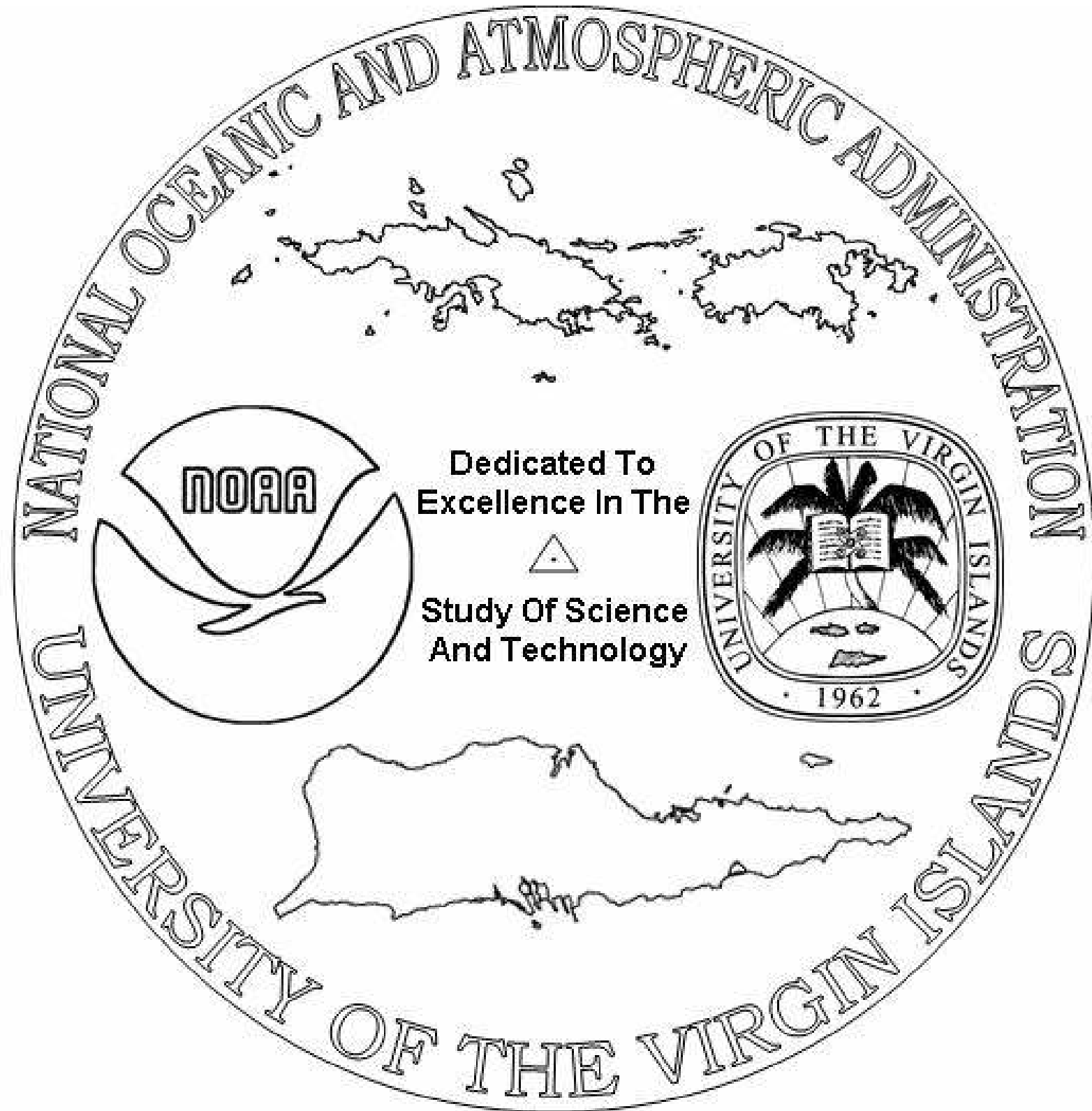
UVI – St. Thomas



PROPOSED BVI CORS

Vicinity of Fort Charlotte





NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NOAA

Dedicated To
Excellence In The

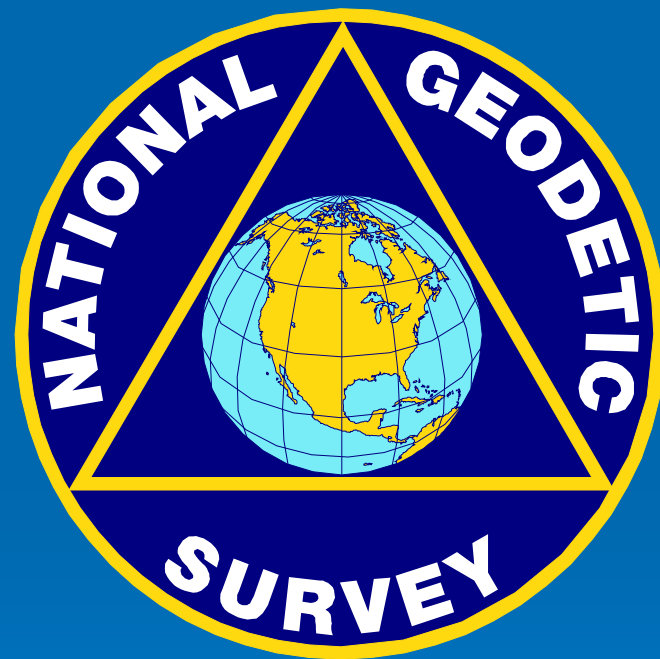


Study Of Science
And Technology



UNIVERSITY OF THE VIRGIN ISLANDS

GOOD COORDINATION BEGINS WITH GOOD COORDINATES



GEOGRAPHY WITHOUT GEODESY IS A FELONY