The potential impact of COCONet on the surveying community in the Caribbean

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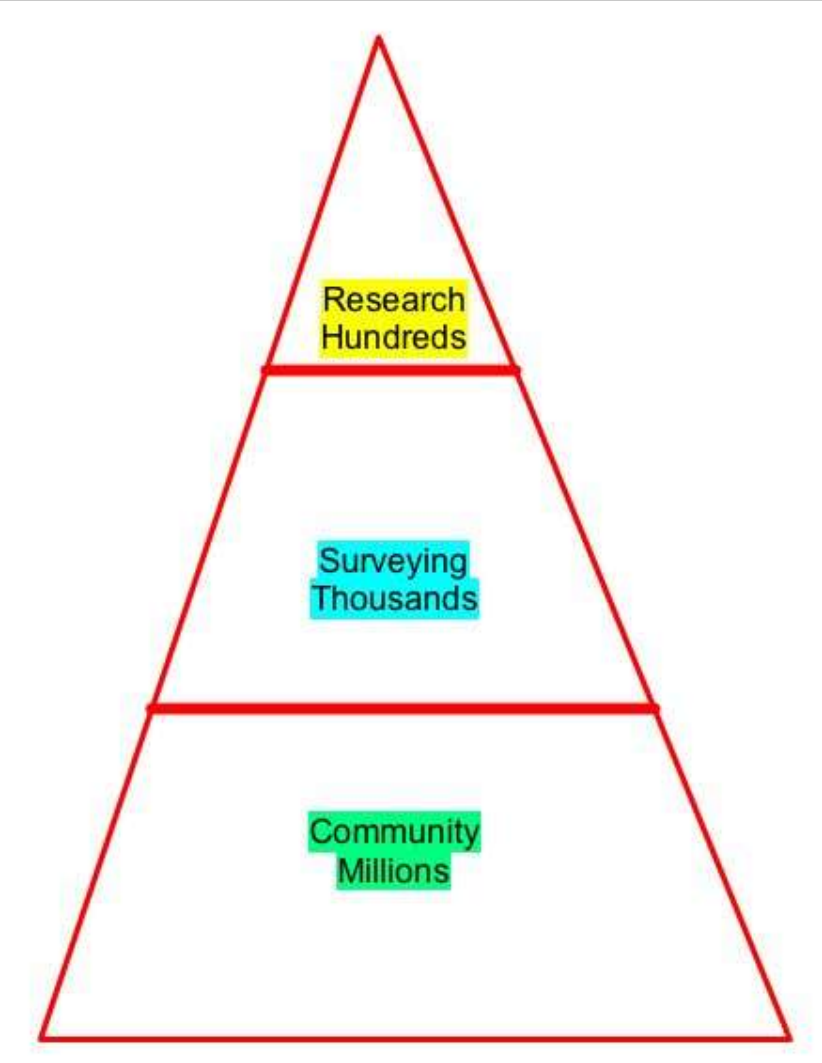
CORS use


Research
Hundreds
Surveying
Thousands
Community
Millions

The surveryor's problem

- Several datum in the Caribbean
  - WGS84, IGS05, SIRGAS, PZ90, NAD83….
- Several projections
  - Cylindrical, conical, oblique…
- Several geoid models
  - NGS Carib97, EGM2008 1'x1', ….
- Several tidal elevations
  - High, mean and low sea levels derived elevations
- Several accuracies for the same type of surveys

Benefits to the surveyors

- More GNSS post processed data files.
- Using more than one CORS station in Static Post Processing increase the solution accuracy and redundancy.
- Global ECEF Dynamic datum reference frame implementation becomes feasible.
- A Caribbean coordinated spatial data infrastructure can be established.

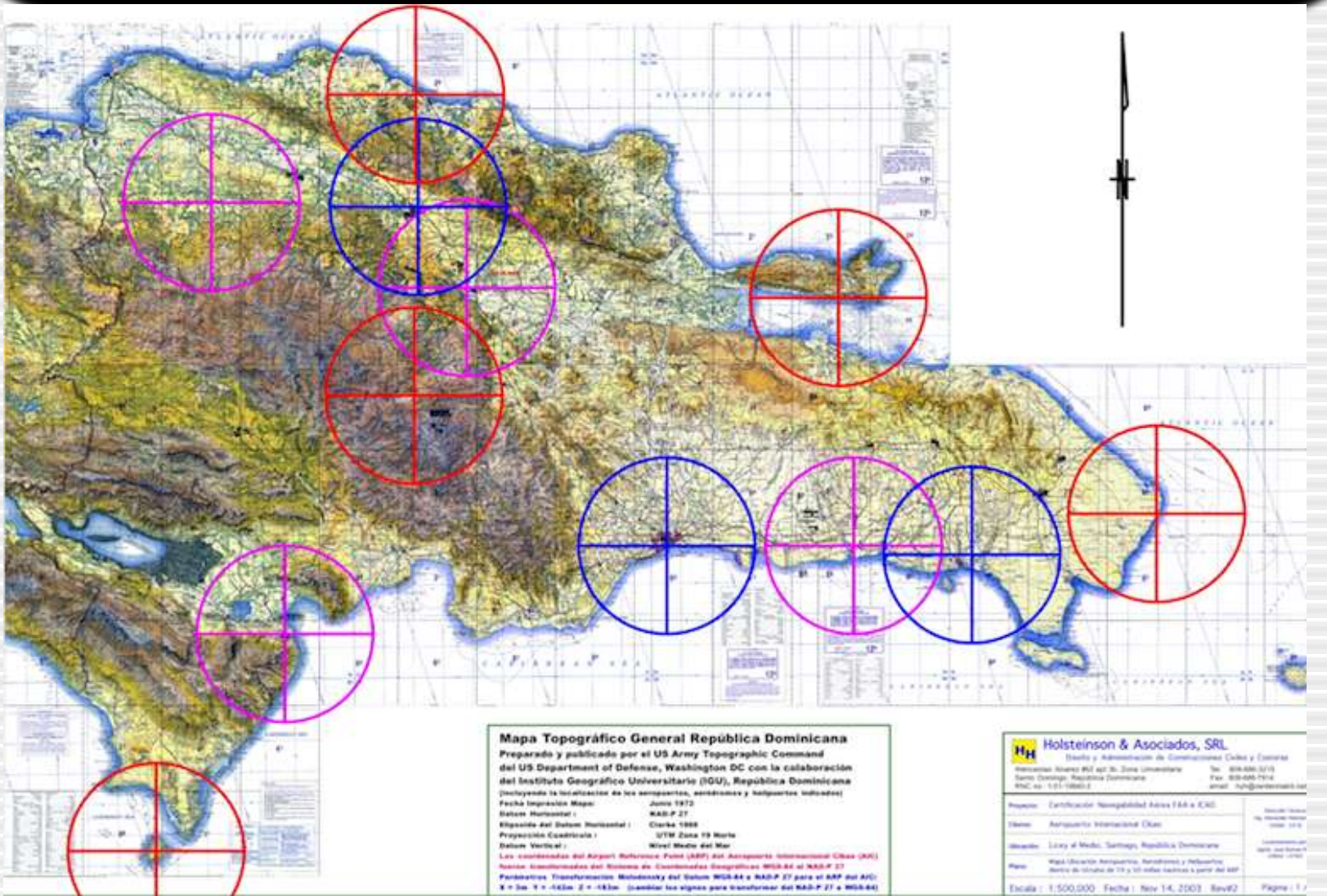
Benefits to the surveyors

- Improved ground control link for all LIDAR and Aerial Geospatial Data flights.
- If a DGPS radio beacon is added to each CORS users and surveyors will benefit huge from this feature.
- On all coastal CORS, this DGPS radio beacon would benefit boat navigation users and sounding surveys.
- Tectonic plates monitoring will save lives.

CORS Integration Benefits to the surveyors

- If NGS integrates some or all of these new 50 CORS into OPUS, possibility of OPUS Rapid Static PP in the Caribbean is viable.
- Improve CORS baseline geometry for static and rapid-station solutions.
- Improve NGS HTDP model input and accuracy for the Caribbean region.

DR Existing and new CORS



CORS density impact in surveying

- Static post processed L1/L2 point requires:

  20 minutes + 2 min/km per session x 2

- Daily point productivity/cost is dependent of distance between CORS and rover.
- Having more CORS lowers the survey cost to the community.

How to increase surveyor's use of the COCOnet CORS?

- Second Phase:
  - DGPS radio beacons
  - Single Base RTK corrections from each CORS
- Third Phase:
  - RTK VRS network with real time deformation monitoring

CORS integration into a RTK VRS

CORS position monitoring

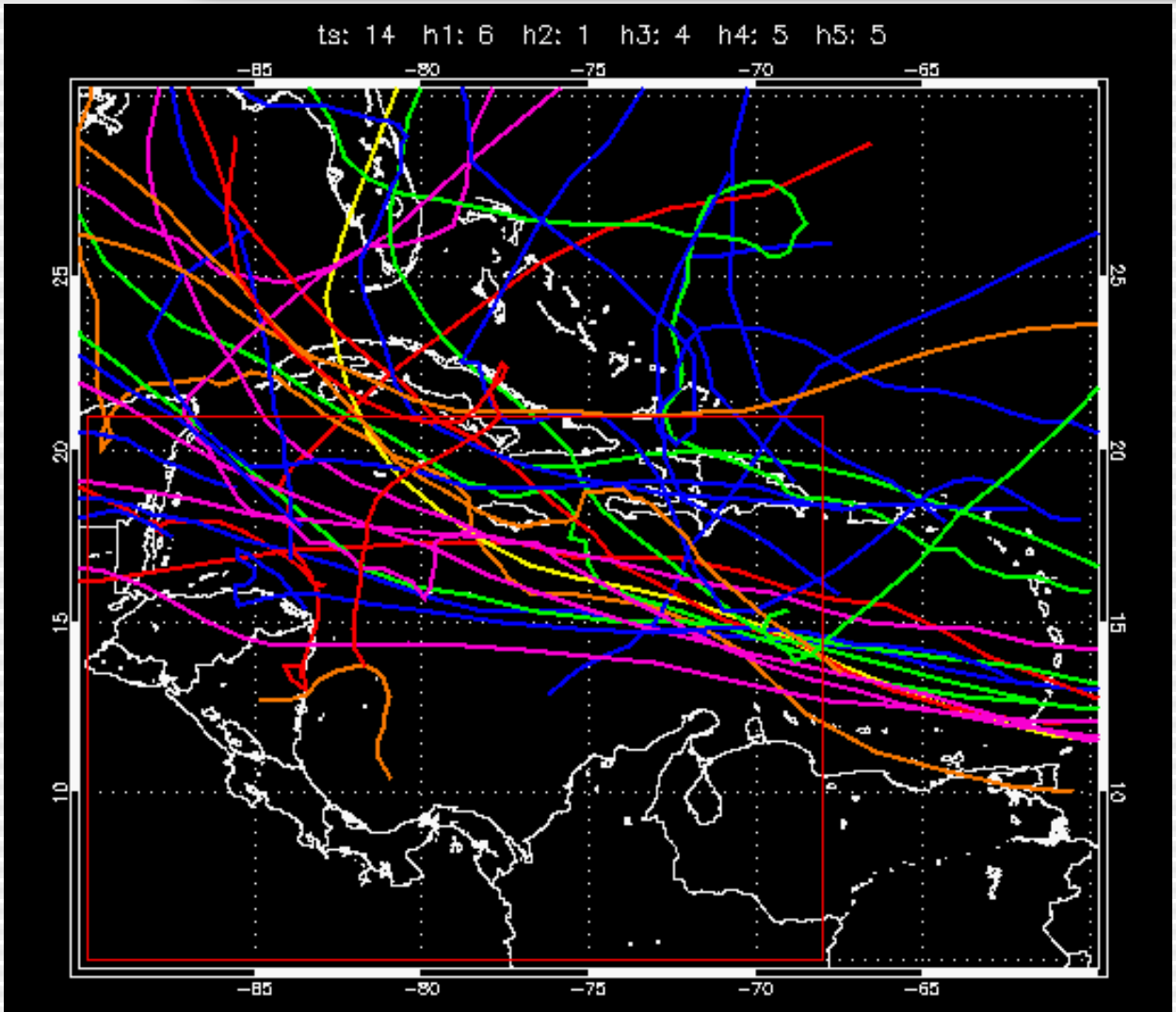
- How will you know if a CORS has moved?
- How will you know if the antenna tilted?
- How long would it take to identify a problem?
- How many surveys and users would be affected before it is detected?
- How large was the displacement?
- An automatic real time monitoring and warning solution should be used as part of COCOnet network to alert the surveying community as soon as there is a CORS deformation.

Early warning systems

- As a direct result integrating these new CORS in the Caribbean coupled with atmospheric, tidal, oceanographic and space weather sensors better global early warning systems can be implemented to serve the community, such as:

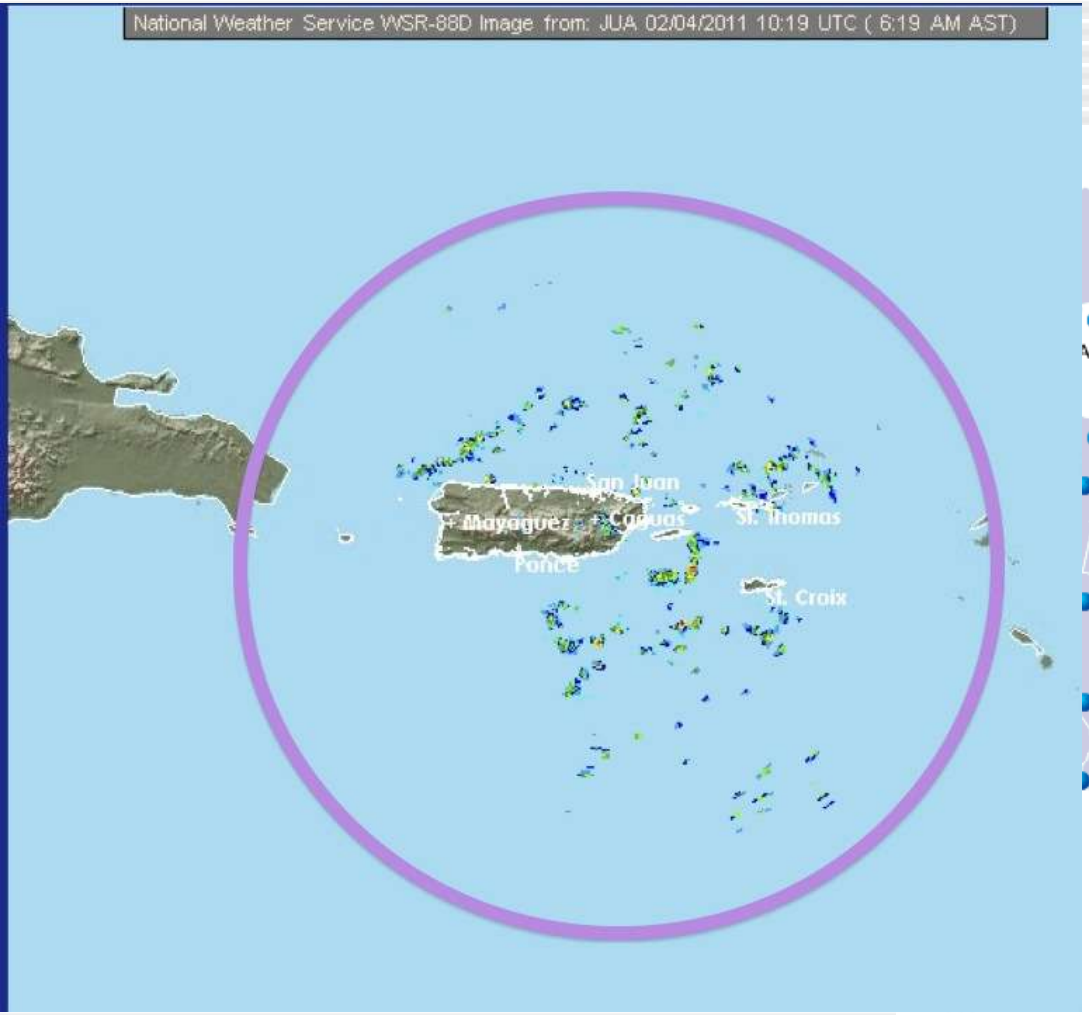
- Tsunami flooding maps and faster warnings
- Hurricane tracking and prediction improvements
- Volcano activity tracking.
- Seismic plates displacement monitoring
- Sea level changes monitoring
- Climate changes monitoring

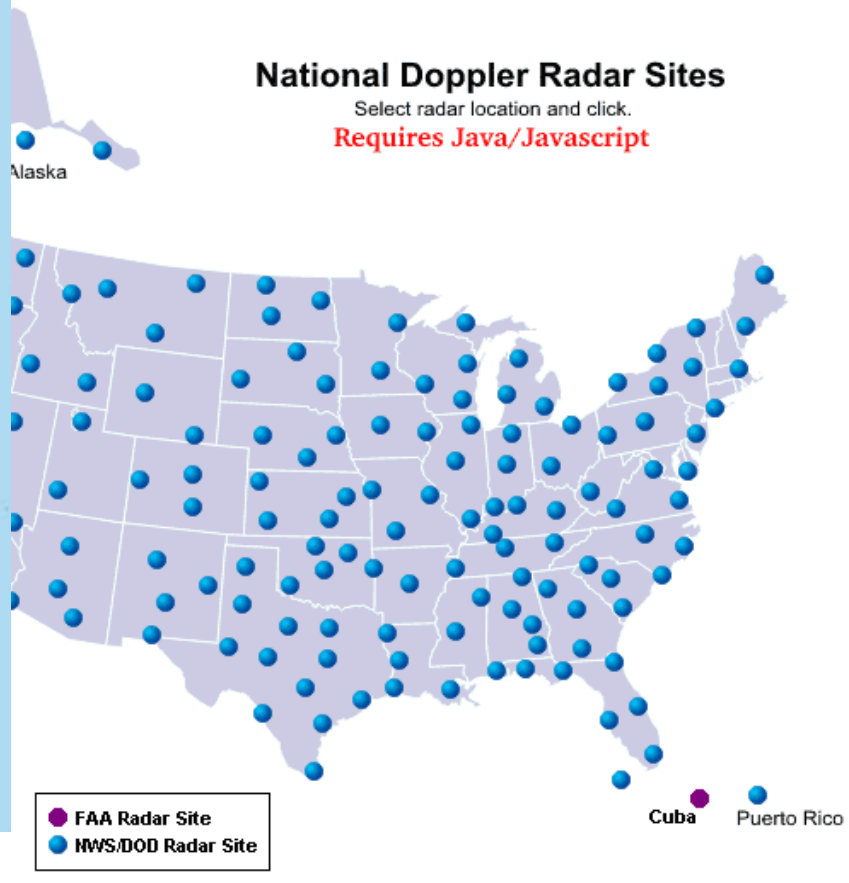
Storms 2000-2010



To complement weather satellite observations, a doopler radar should be installed in the south western tip of the Dominican Republic to improve hurricane data capture and modeling

Doppler Radar needed





Conclusions

- Geospatial Scientific community must make available as many user applications as possible to reduce the gap.
- One global reference frame must be used
- Data archive and sharing must open, preferably a clearing house web base.
- Integration of all possible weather sensors.
- Use all available CORS site to do QA/QC
- GNSS RTK VRS network future phase