F4 R&D Team – ERS Focus

Vision: All NOAA field units have robust access to three-dimensional ellipsoid based positioning to meet applicable mapping standards.

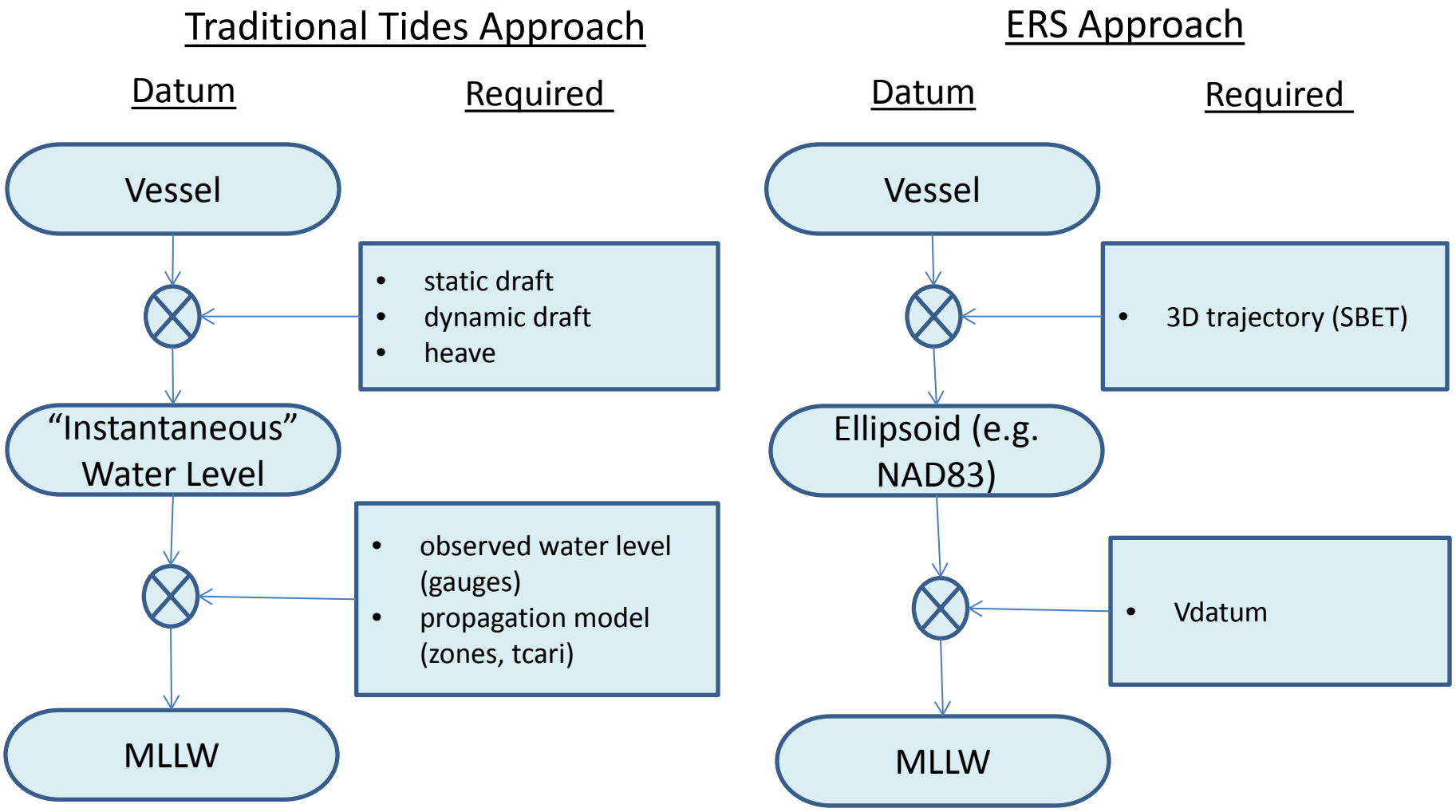
What

1. Coordinate GNSS reference station deployments
2. Look at existing government and commercial correctors sources
3. Engineer new generation of GNSS base stations
4. Streamline and automate process

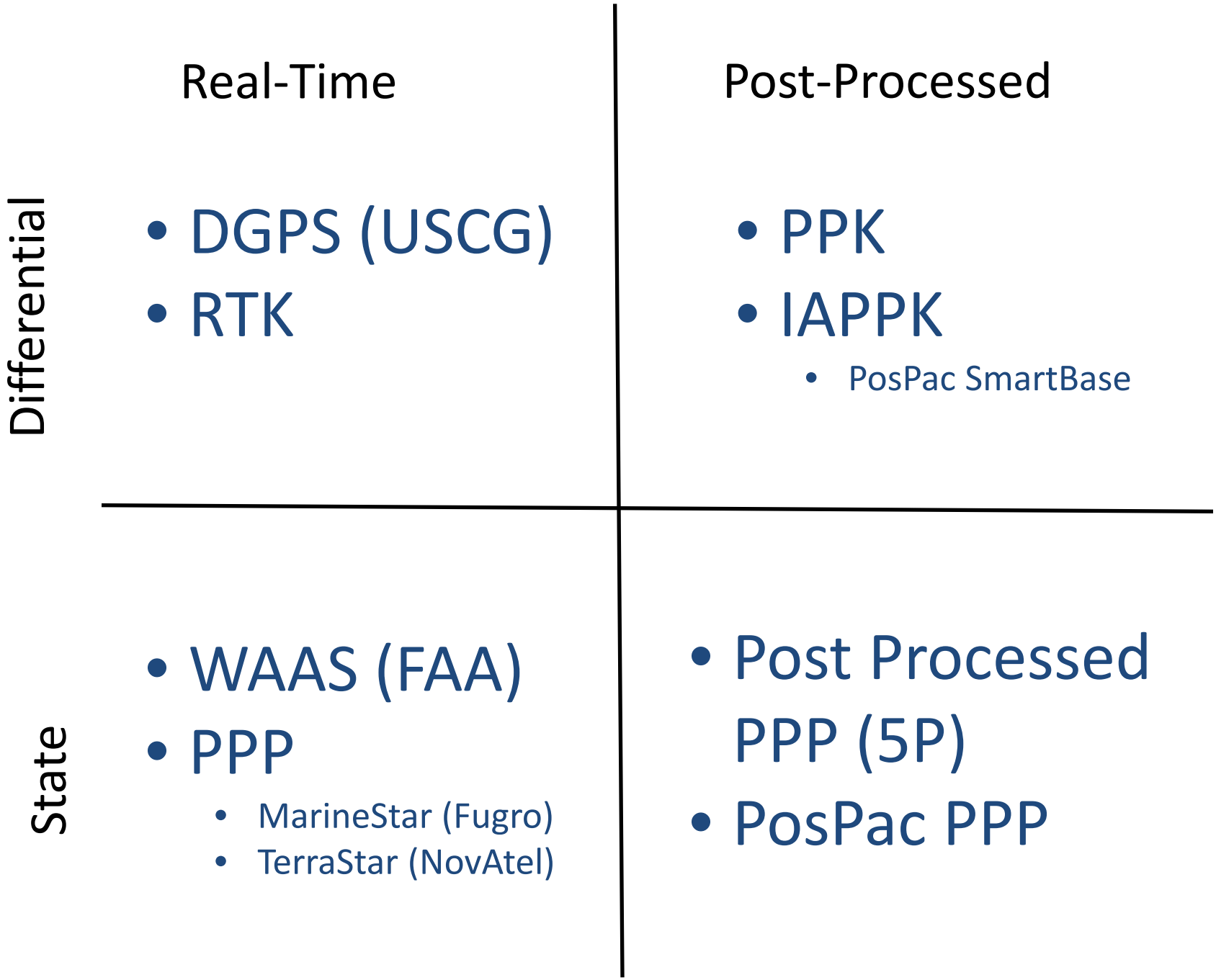
Who

- NOS – LCDR Sam Greenaway
- NGS – Neil Weston/ TBD
- CO-OPS – Greg Dusek, Peter Stone
- IOOS – LCDR Eric Johnson

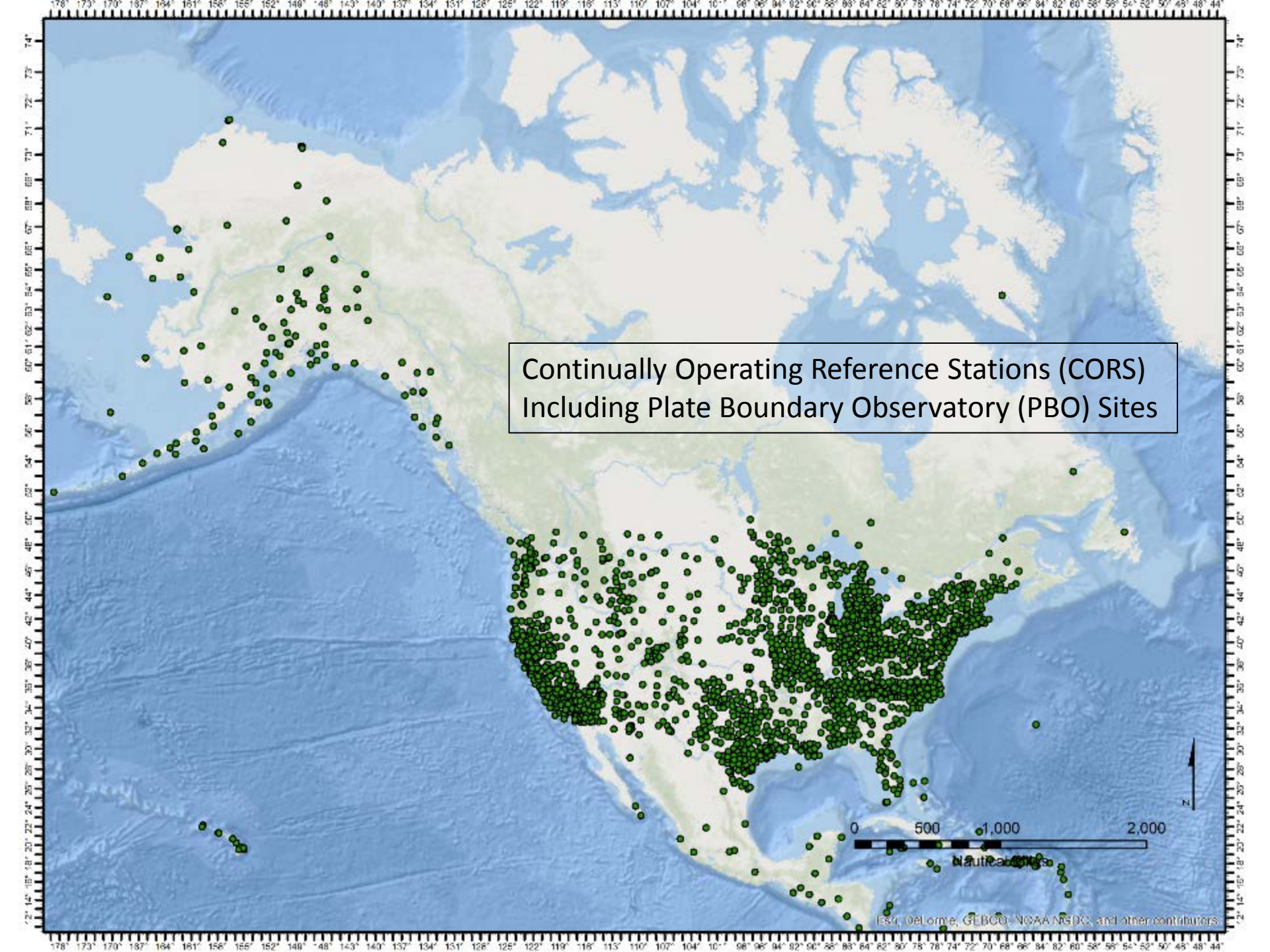
Vertical Datum of Vessel Reference Point

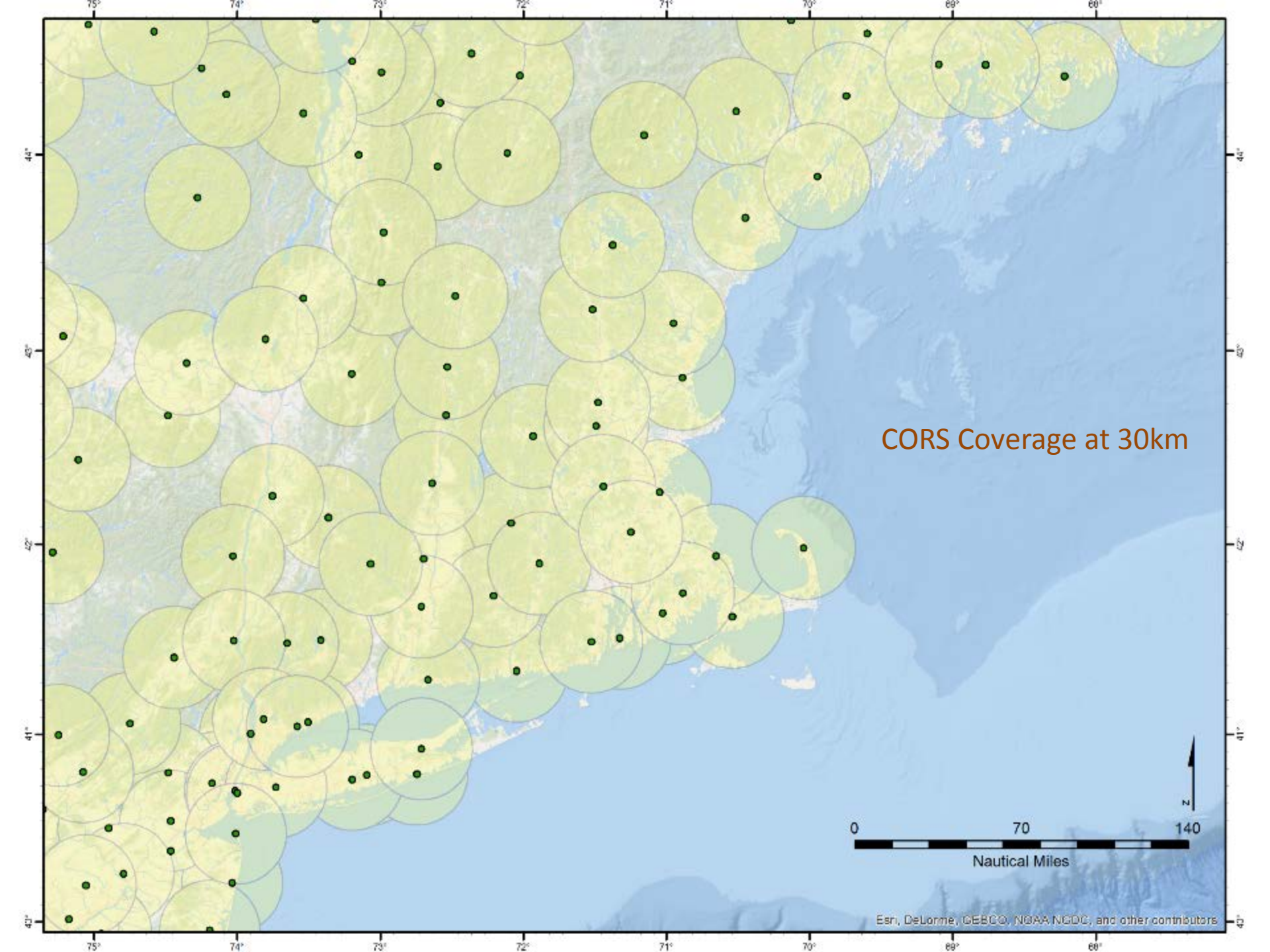


Note: Reference point to sonar and seafloor computations are identical between approaches and can be neglected from this analysis


Real-Time
Post-Processed
Differential
State
• DGPS (USCG)
• RTK
• PPK
• IAPPK
• PosPac SmartBase
• WAAS (FAA)
• PPP
• MarineStar (Fugro)
• TerraStar (NovAtel)
• Post Processed PPP (5P)
• PosPac PPP

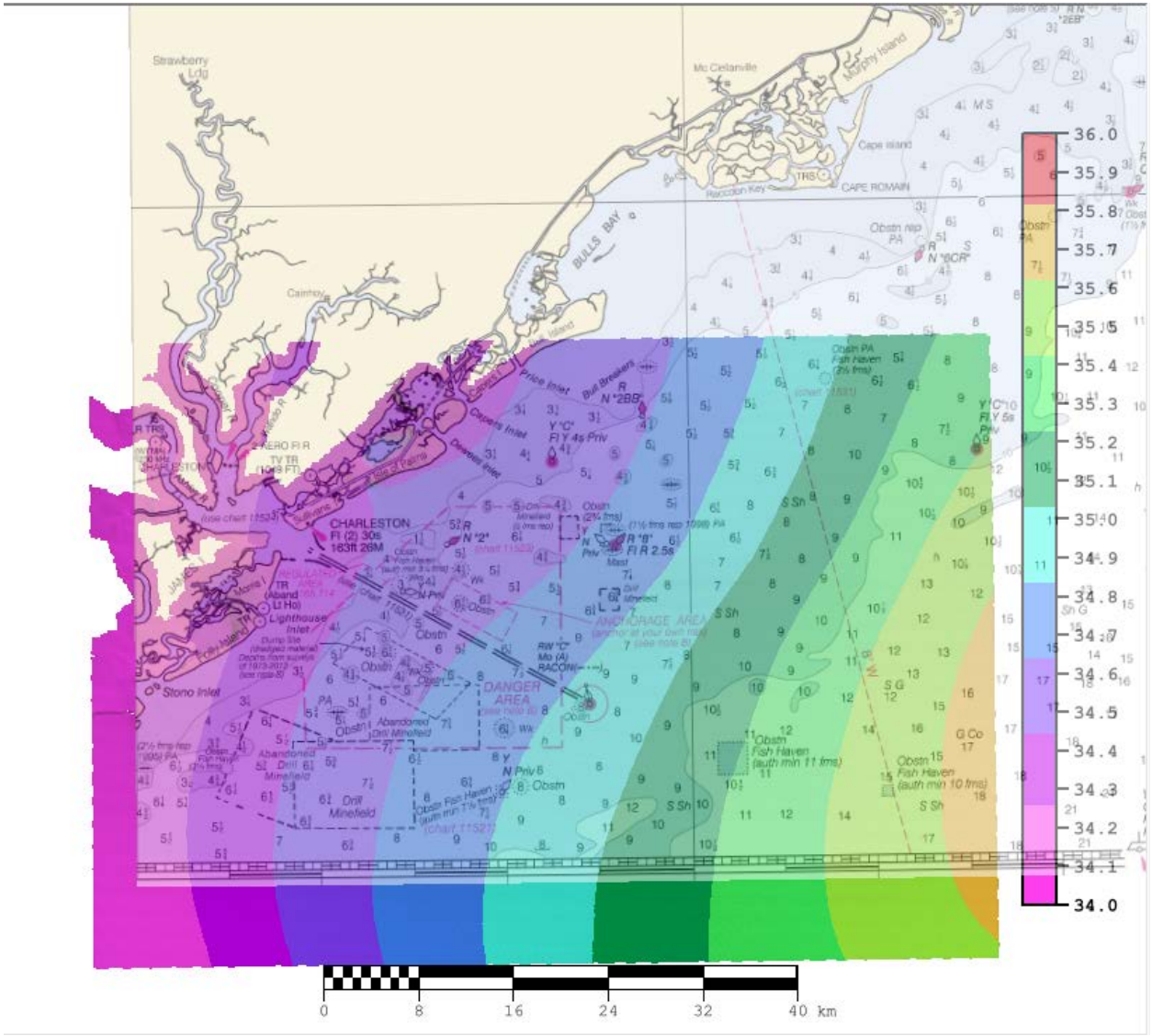
http://www.allied-associates.co.uk/assets/maintenance_clip_image002.jpg


Continually Operating Reference Stations (CORS)
Including Plate Boundary Observatory (PBO) Sites
0
500
1,000
2,000
N
Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors

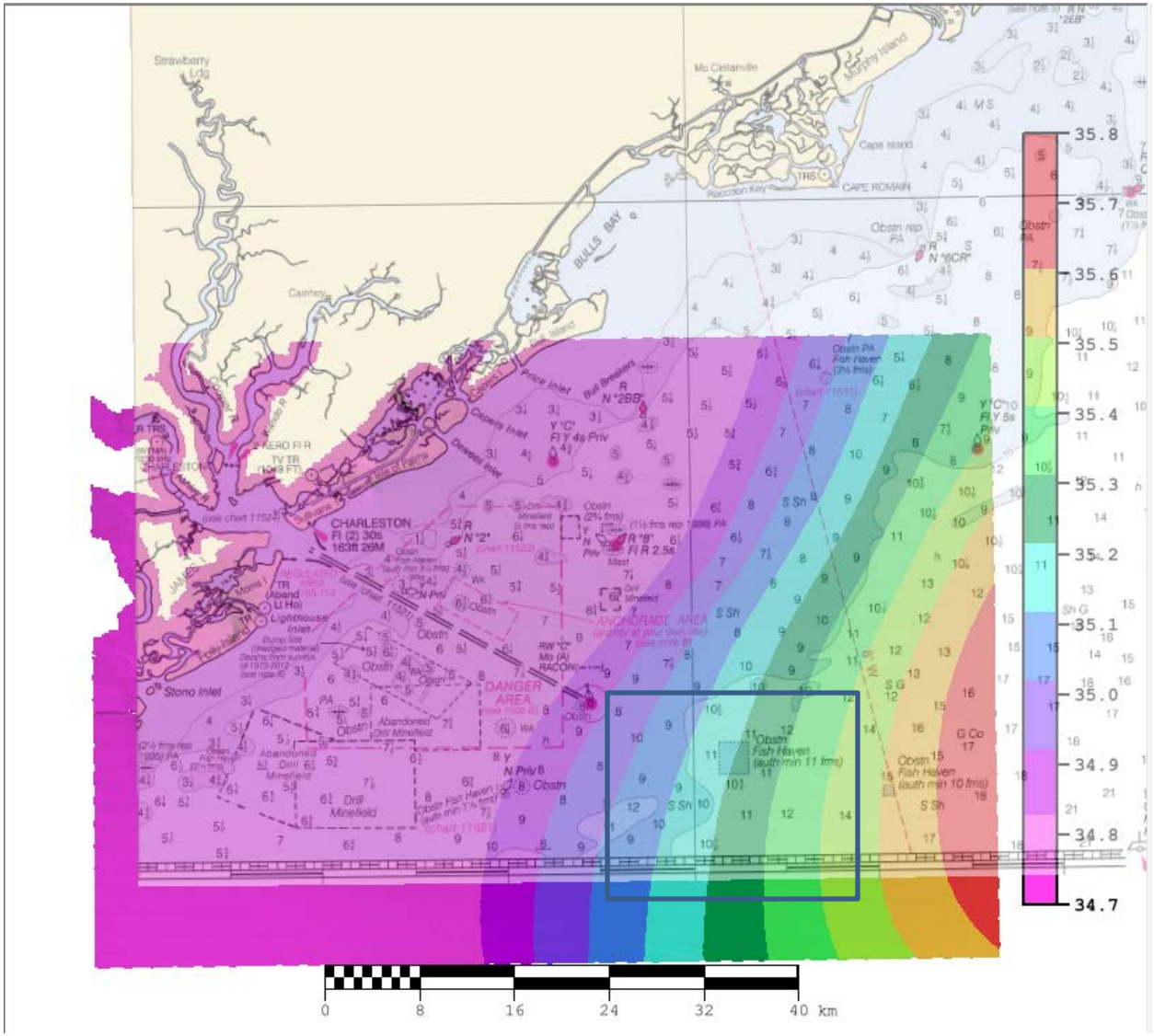

CORS Coverage at 30km
0
70
140
Nautical Miles
Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors


Deployed location
N

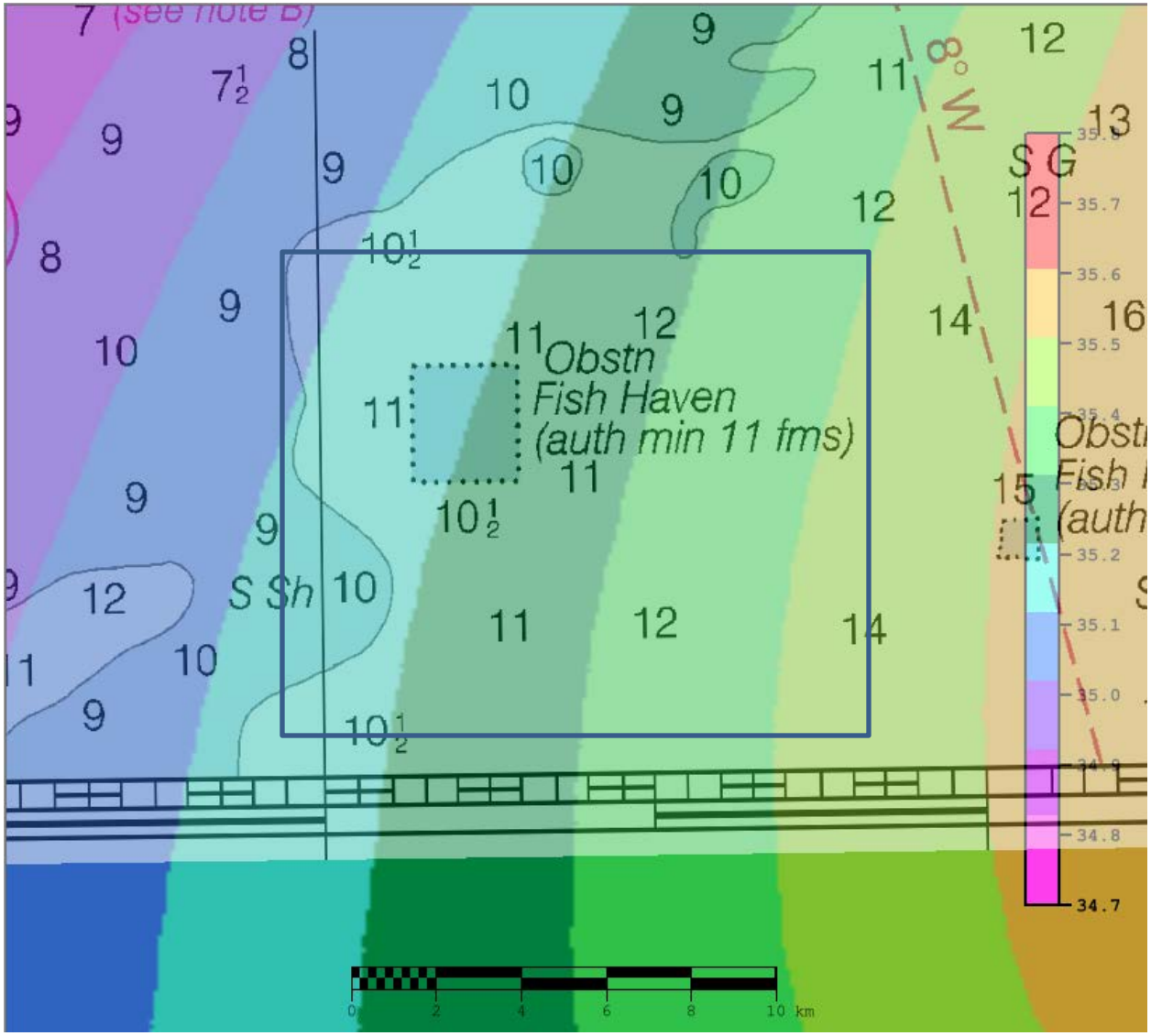
VDATUM MLLW to Ellipsoid Separation



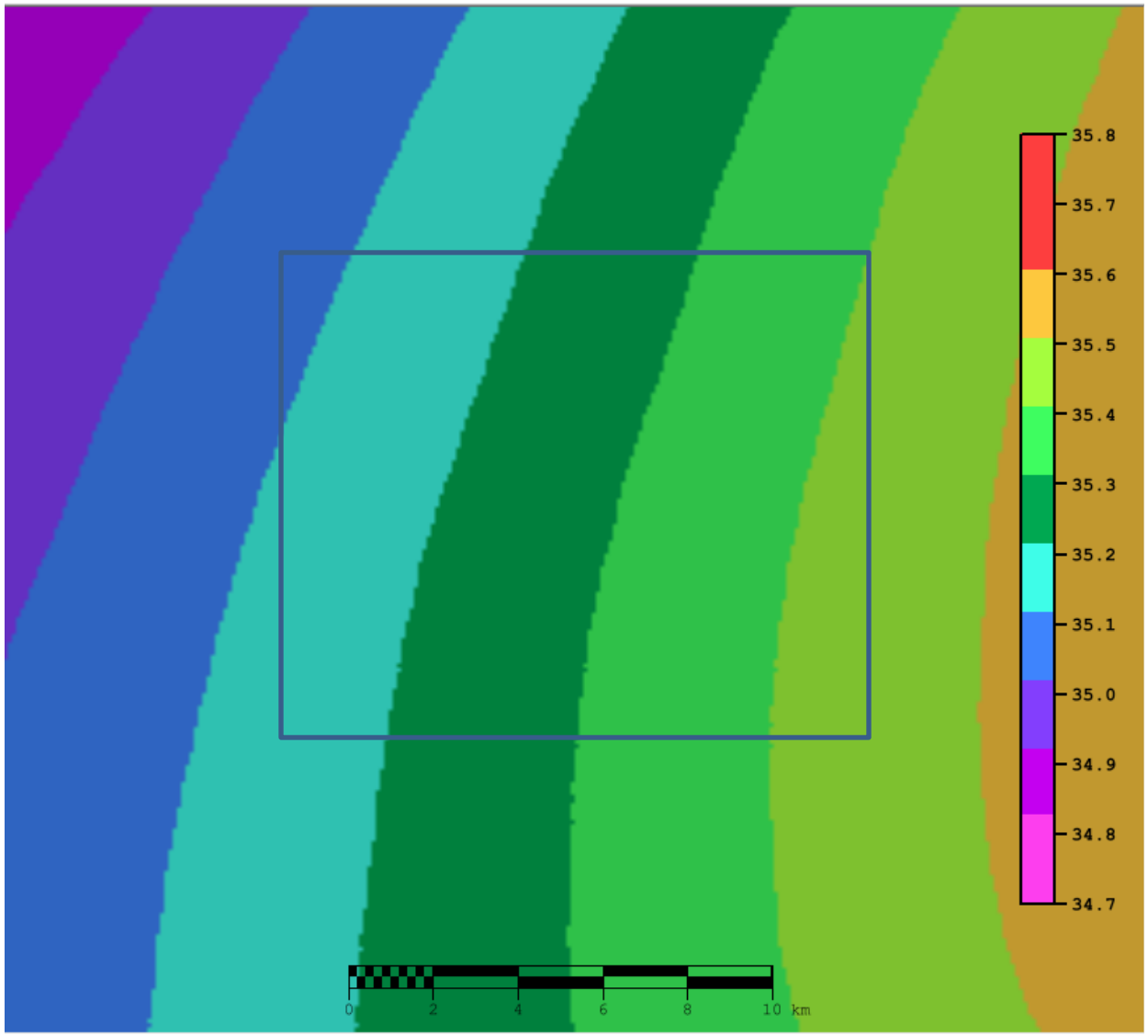
VDATUM MLLW to Ellipsoid Separation



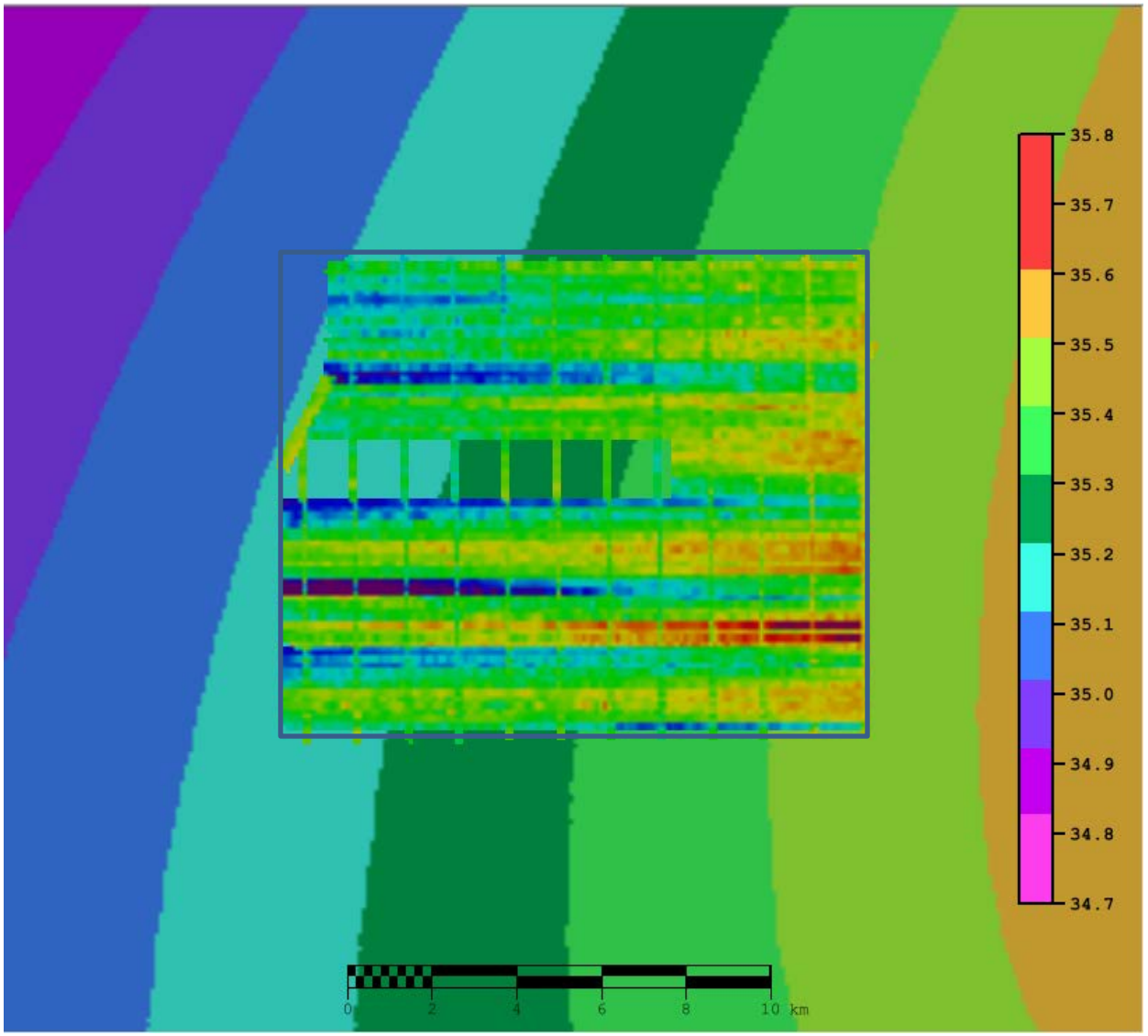
VDATUM MLLW to Ellipsoid Separation



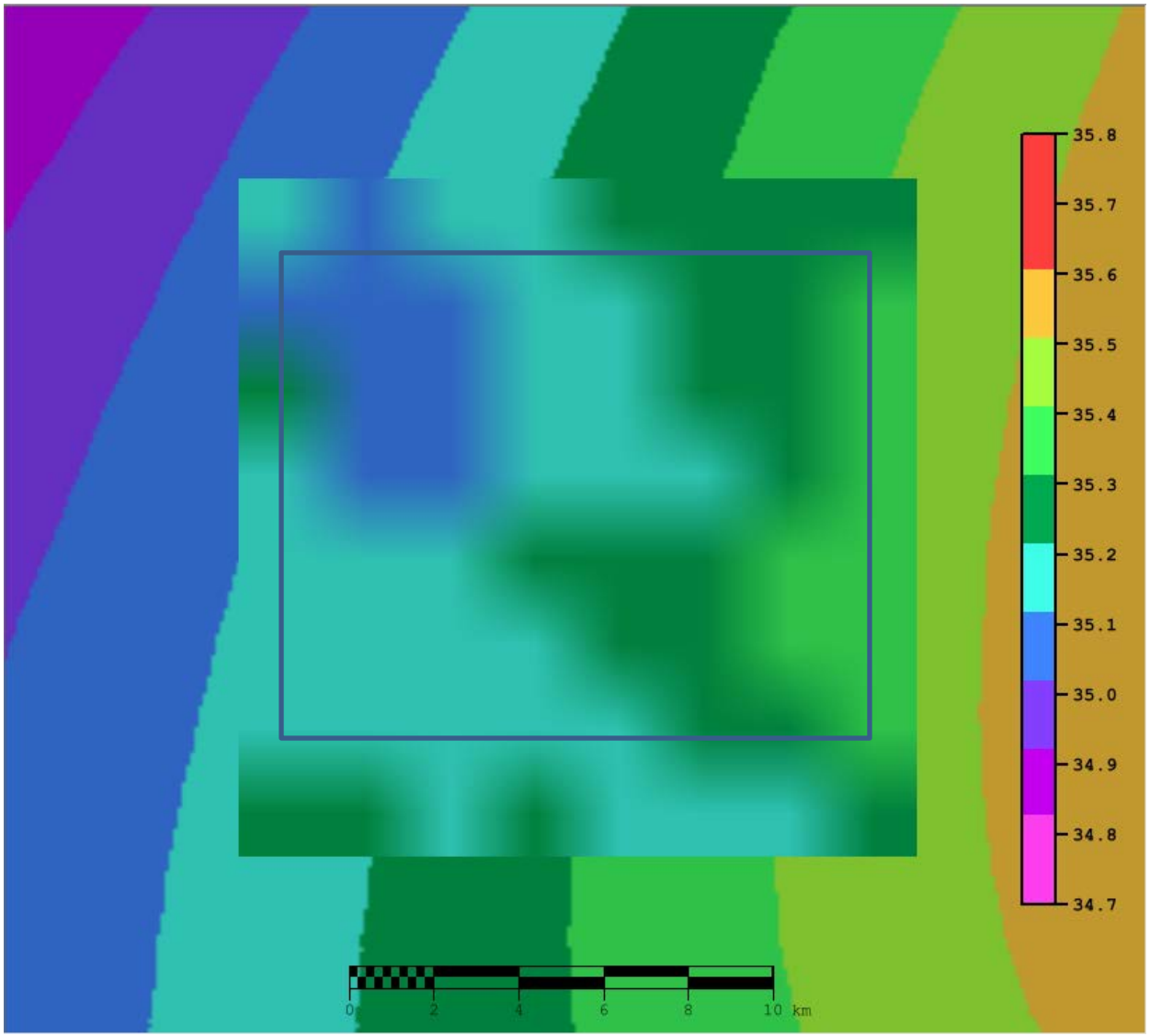
VDATUM MLLW to Ellipsoid Separation



VDATUM MLLW to Ellipsoid Separation
Measured (ERZT) at 100 meter resolution



VDATUM MLLW to Ellipsoid Separation
Measured (ERZT) at 2,000 meter resolution




NOAA
CORPS

3D GPS Positioning Methods

- **RTK**: Real Time Kinematic- in widespread use for real-time positioning using reference stations
- **NTRIP**: Networked Transport of RTCM via Internet Protocol, used for RTK via the internet.
- **PPK**: Post Processed Kinematic: Just like RTK, but done after the fact.
- **IAPPK**: PPK with inertial aiding thrown in- this is what Applanix PosPac mainly trafficks in.
- **PPP**: Precise Point Positioning, “GPS done right”, uses better estimates of satellite orbits, clocks and often a model of atmospheric errors. Can be done in real time (e.g. WAAS, MarineStar) or in post-processing (PPPPP)