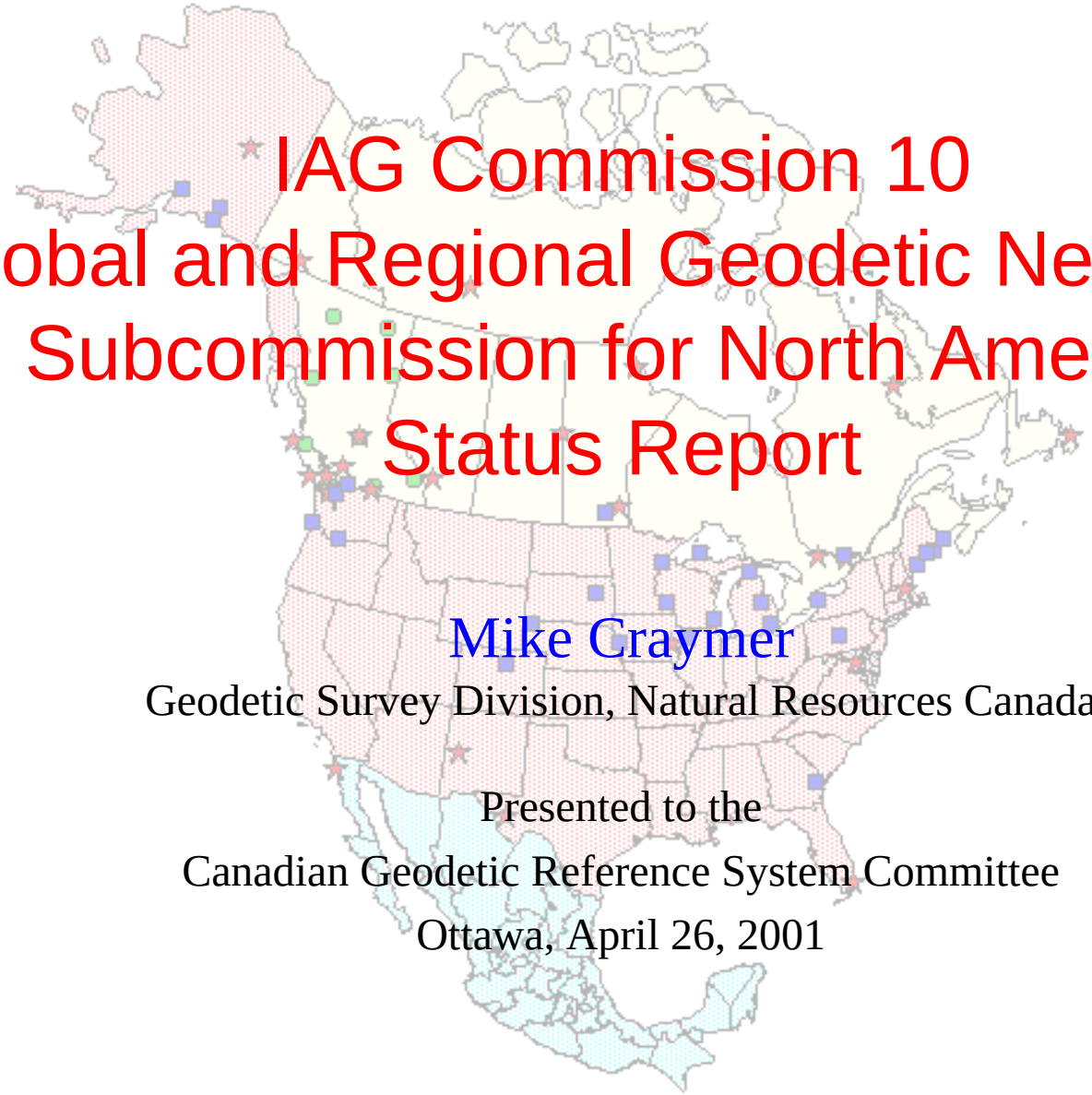
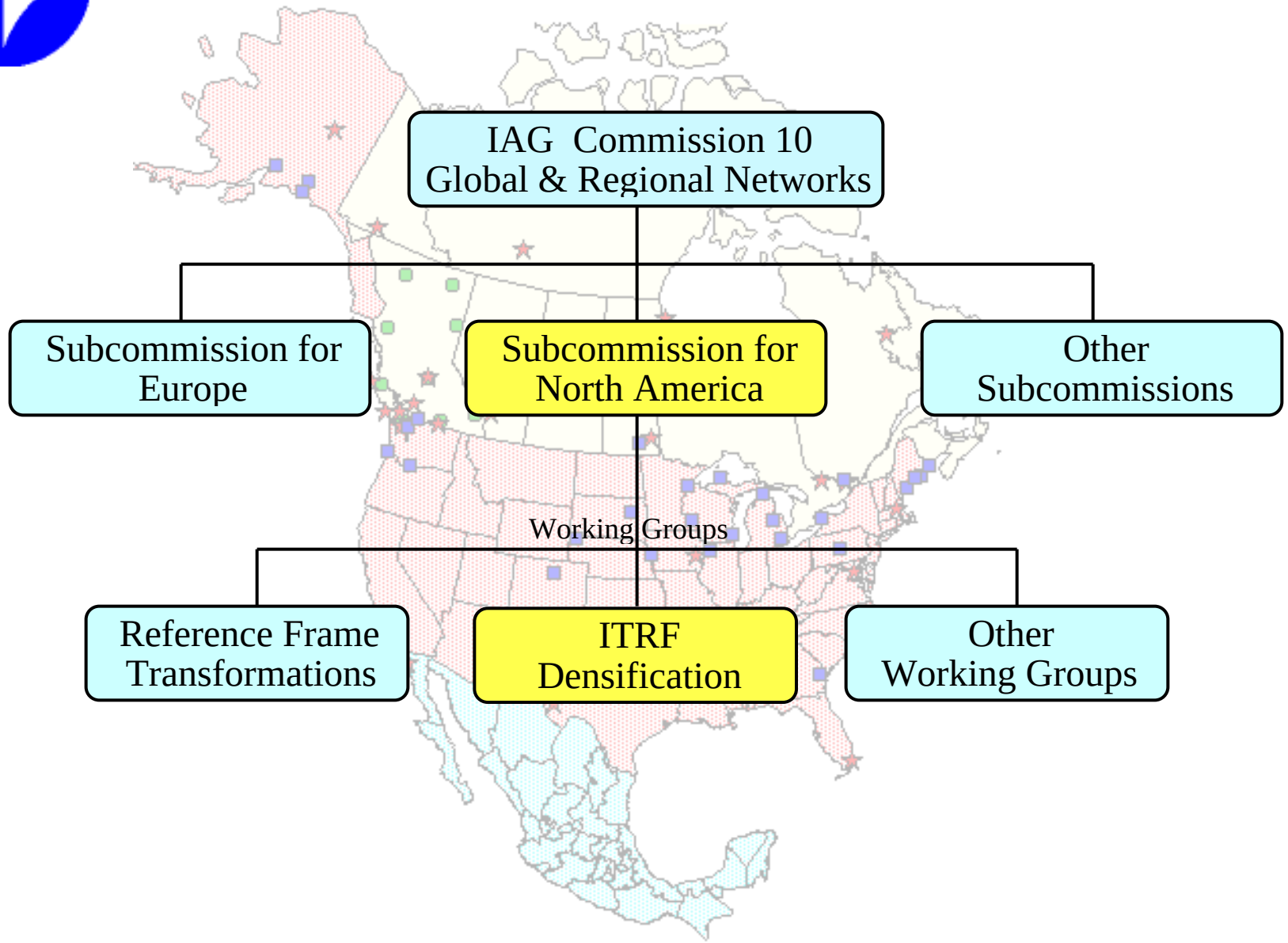


IAG Commission 10
Global and Regional Geodetic Networks
Subcommission for North America
Status Report

Mike Craymer
Geodetic Survey Division, Natural Resources Canada

Presented to the
Canadian Geodetic Reference System Committee
Ottawa, April 26, 2001

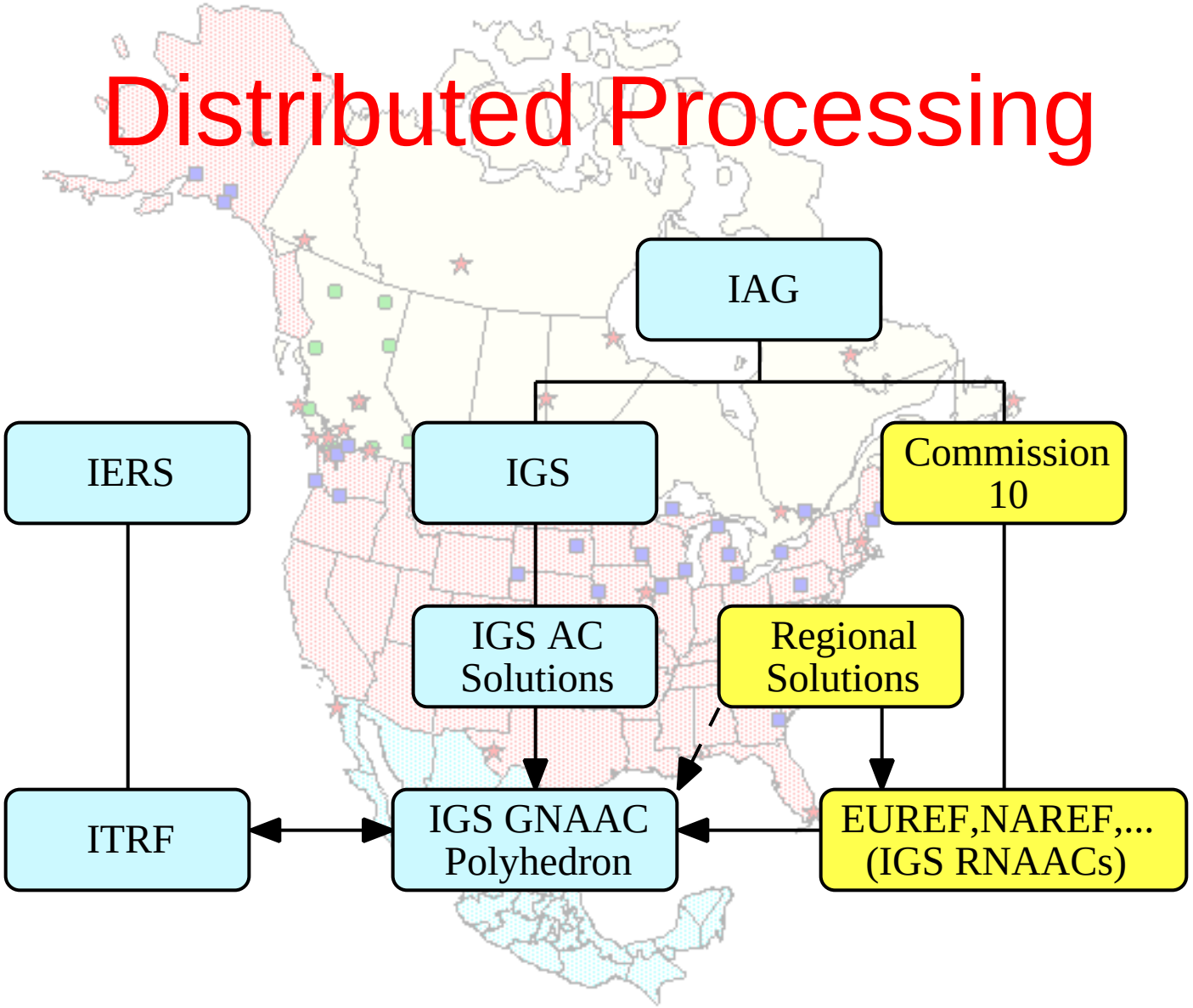
IAG Commission 10 – N.A. Subcommission



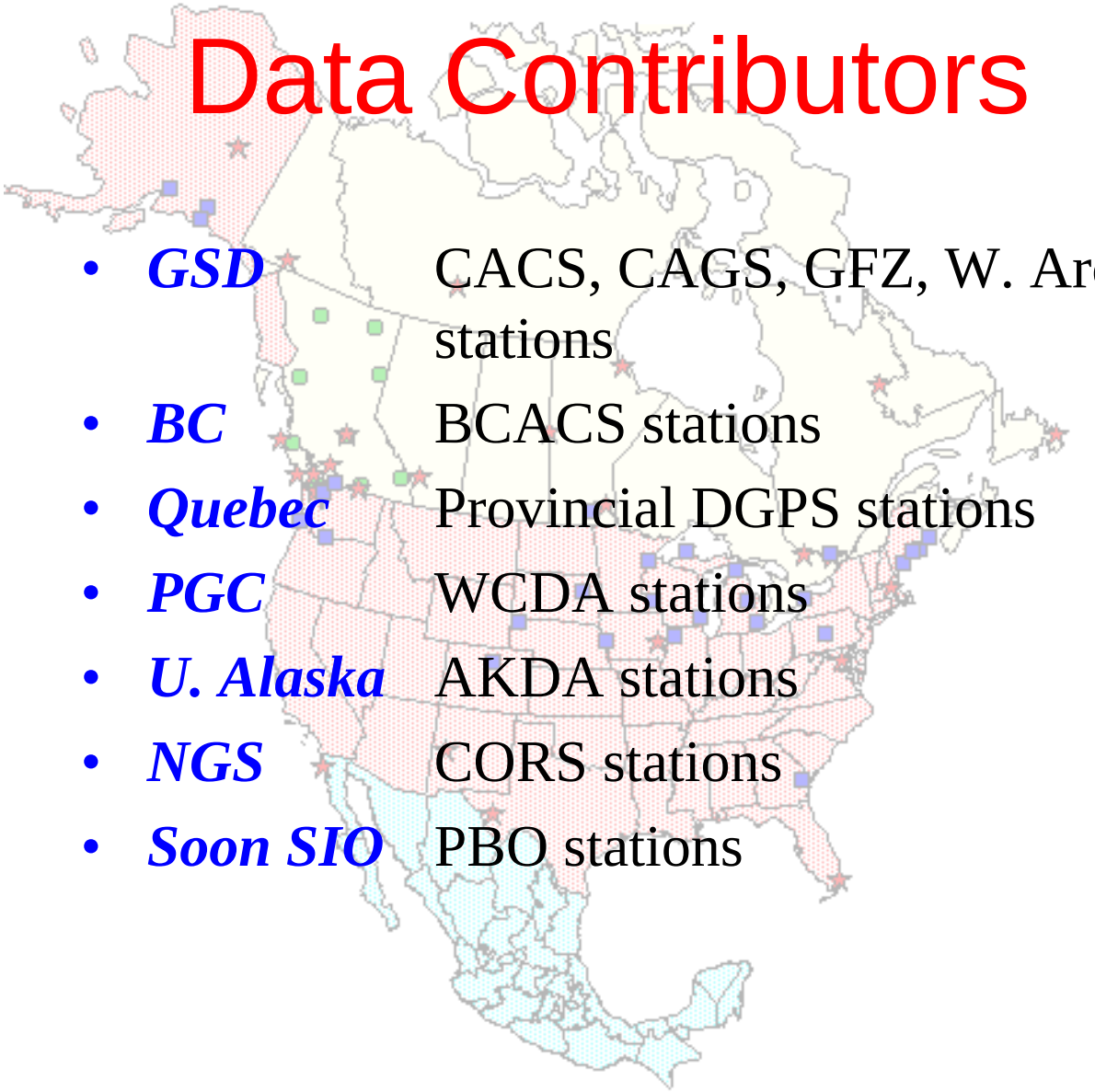
NAREF Working Group

- *Objectives*
  - Densify the ITRF reference frame in NA
  - Combine regional networks into a continental one
  - Integrate into ITRF via IGS global network
- *Produce coordinate solutions*
  - Weekly regional solutions
  - Weekly combinations of regional solutions
  - Cumulative solutions with velocity estimates
- *Web site: <http://www.naref.org/>*

Distributed Processing



Data Contributors

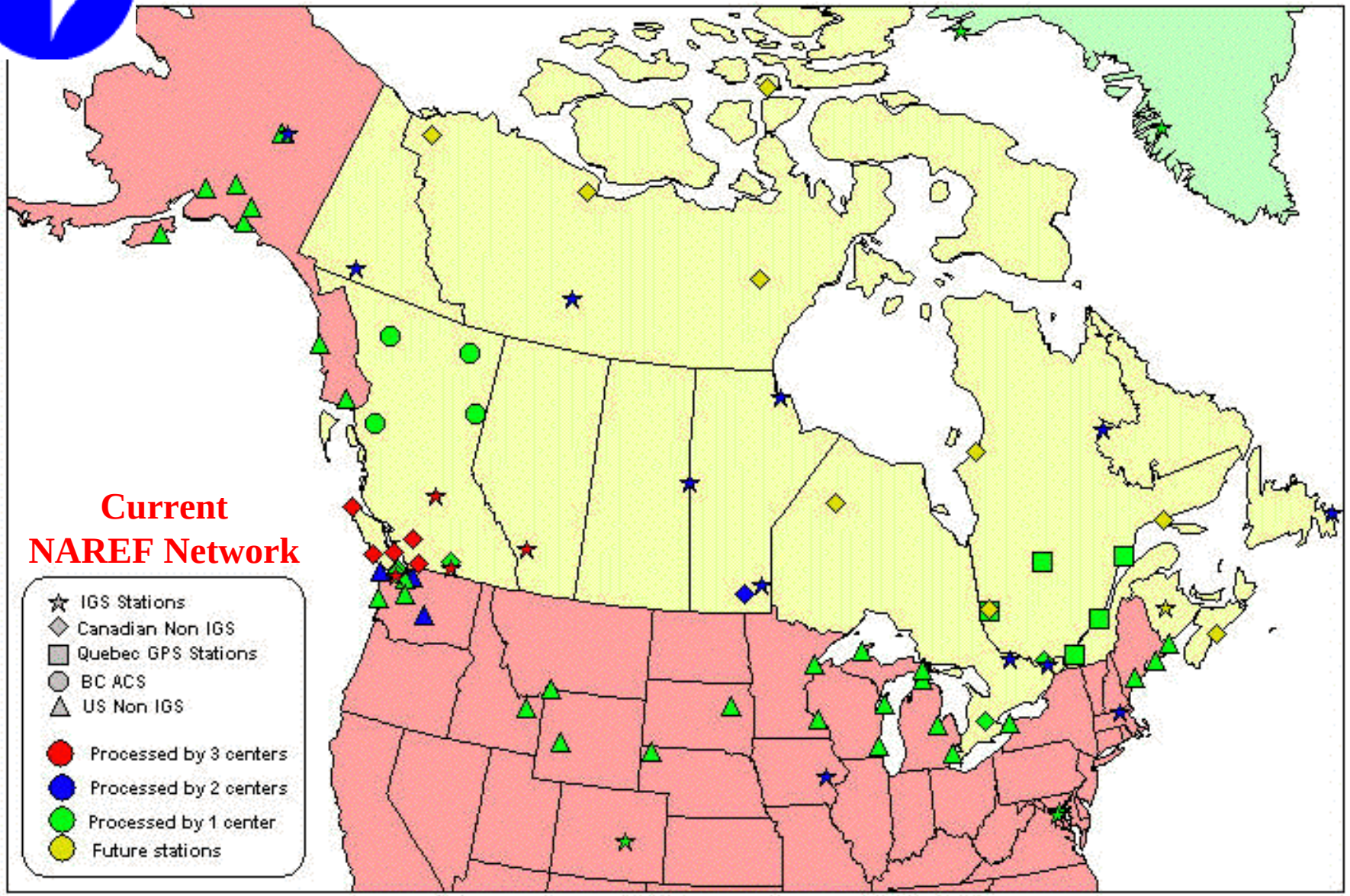


- ***GSD*** CACS, CAGS, GFZ, W. Arctic stations
- ***BC*** BCACS stations
- ***Quebec*** Provincial DGPS stations
- ***PGC*** WCDA stations
- ***U. Alaska*** AKDA stations
- ***NGS*** CORS stations
- ***Soon SIO*** PBO stations

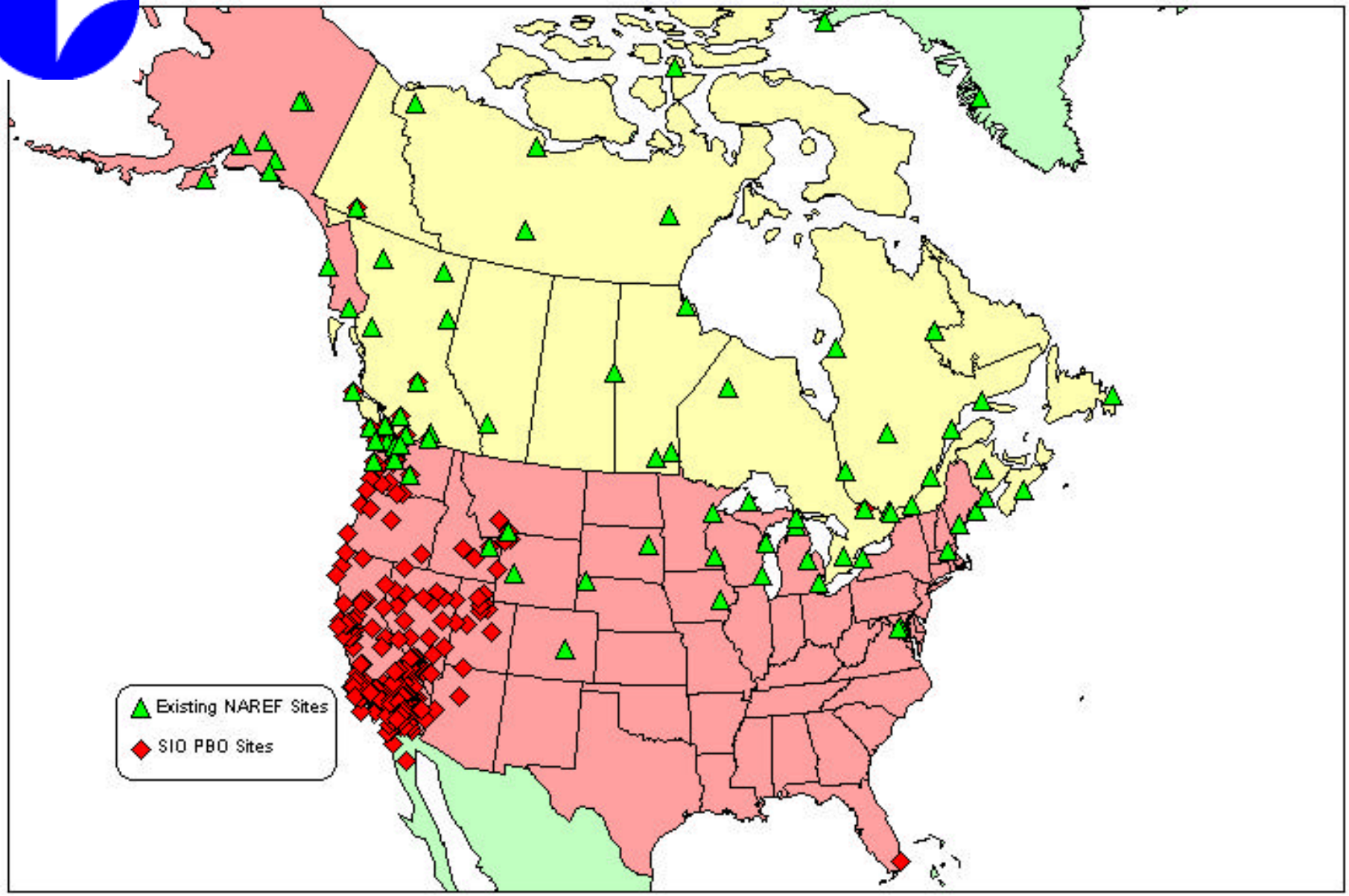
Regional Solutions

- Weekly solutions:
  - ✓ GSD (Bernese) solutions – 62 pts
  - ✓ GSD (GIPSY) solutions – 27 pts
  - ✓ PGC WCDA (Bernese) solutions – 17 pts
  - ✓ SIO PBO (GAMIT) solutions – over 100? pts
  - ✗ U. Alaska (GIPSY) solutions – about 10 pts (unable to contribute due to lack of resources)
  - ✗ NGS CORS (PAGES) solution?? – over 100 pts (haven't contributed anything yet!)

★ Need more solutions for US & Mexico


Current
NAREF Network
IGS Stations
Canadian Non IGS
Quebec GPS Stations
BC ACS
US Non IGS
Processed by 3 centers
Processed by 2 centers
Processed by 1 center
Future stations

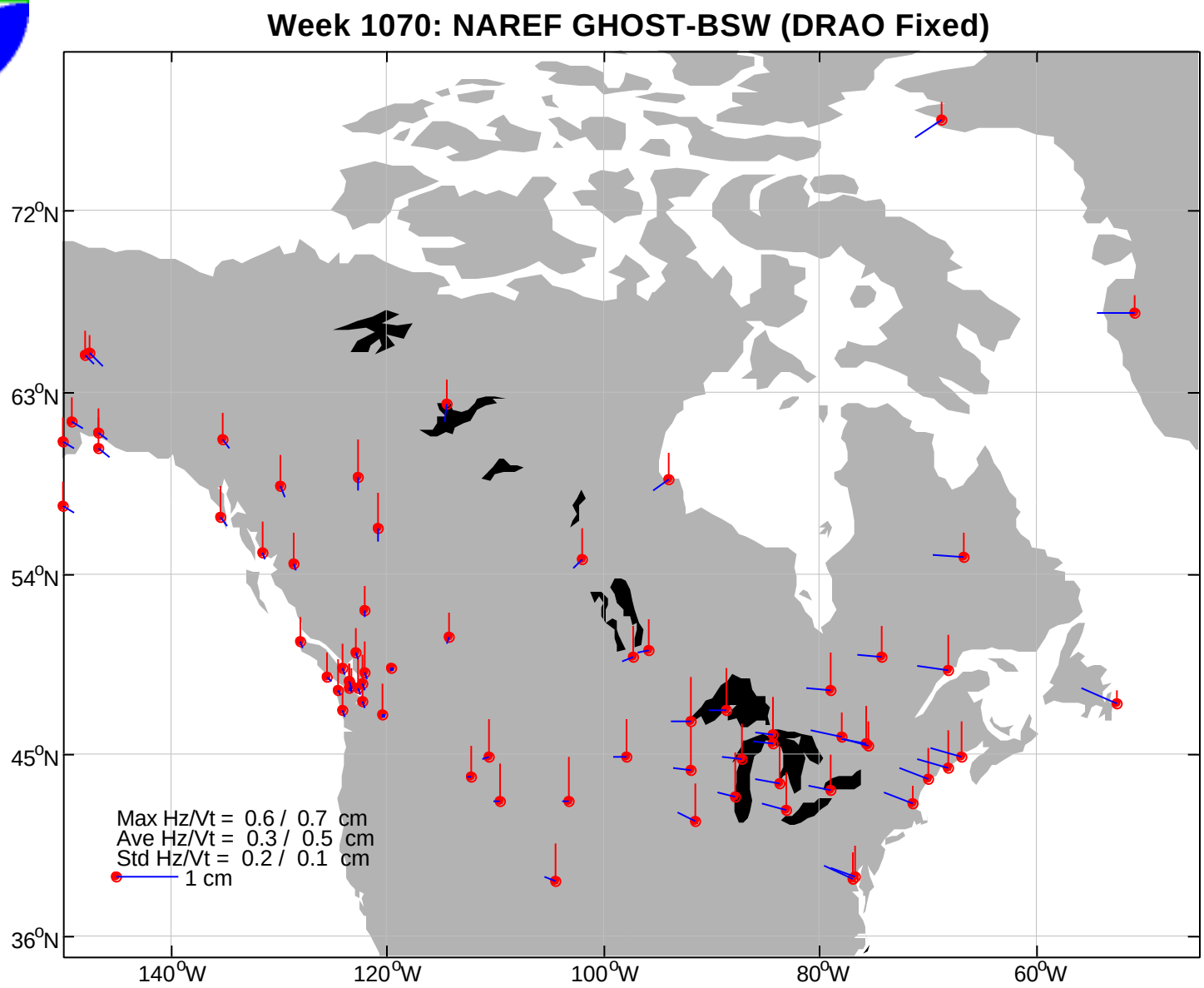
IAG Commission 10 – N.A. Subcommission



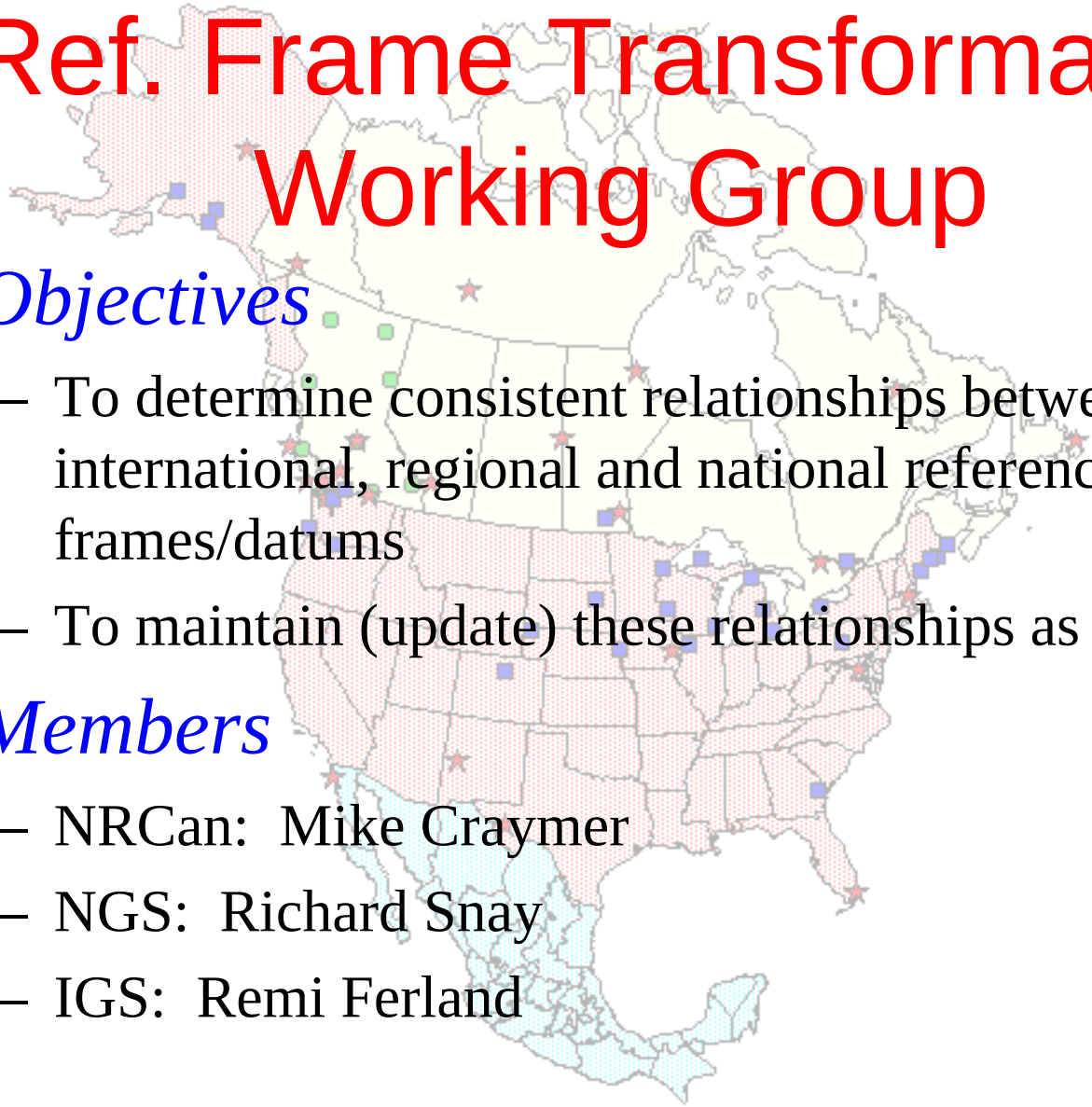
Natural Resources Canada | Ressources naturelles Canada

Combination of Solutions

- *Still testing combination procedure*
  - Trying to use Bernese/ADDNEQ software
  - Has automated covariance martrix scaling
- *Problems*
  - Difficulties with ADDNEQ software (constraints & combination of non-Bernese solutions)
  - Presently trying GHOST
  - Initial comparisons show agreement at few mm level
  - Will also try Remi Ferland's SINEX Software


Week 1070: NAREF GHOST-BSW (DRAO Fixed)
72°N
63°N
54°N
45°N
36°N
140°W
120°W
100°W
80°W
60°W
Max Hz/Vt = 0.6 / 0.7 cm
Ave Hz/Vt = 0.3 / 0.5 cm
Std Hz/Vt = 0.2 / 0.1 cm
1 cm

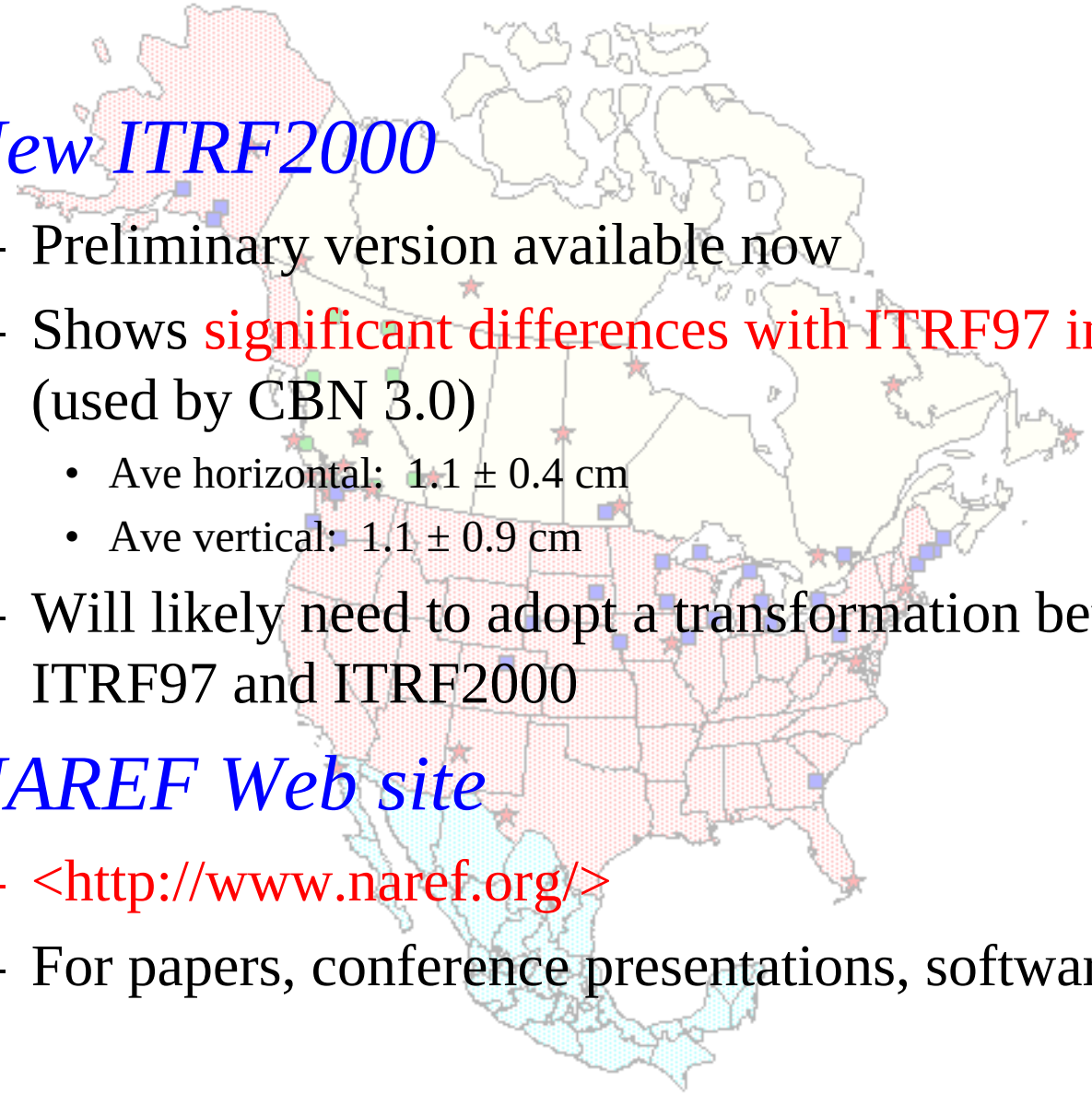
Ref. Frame Transformations Working Group



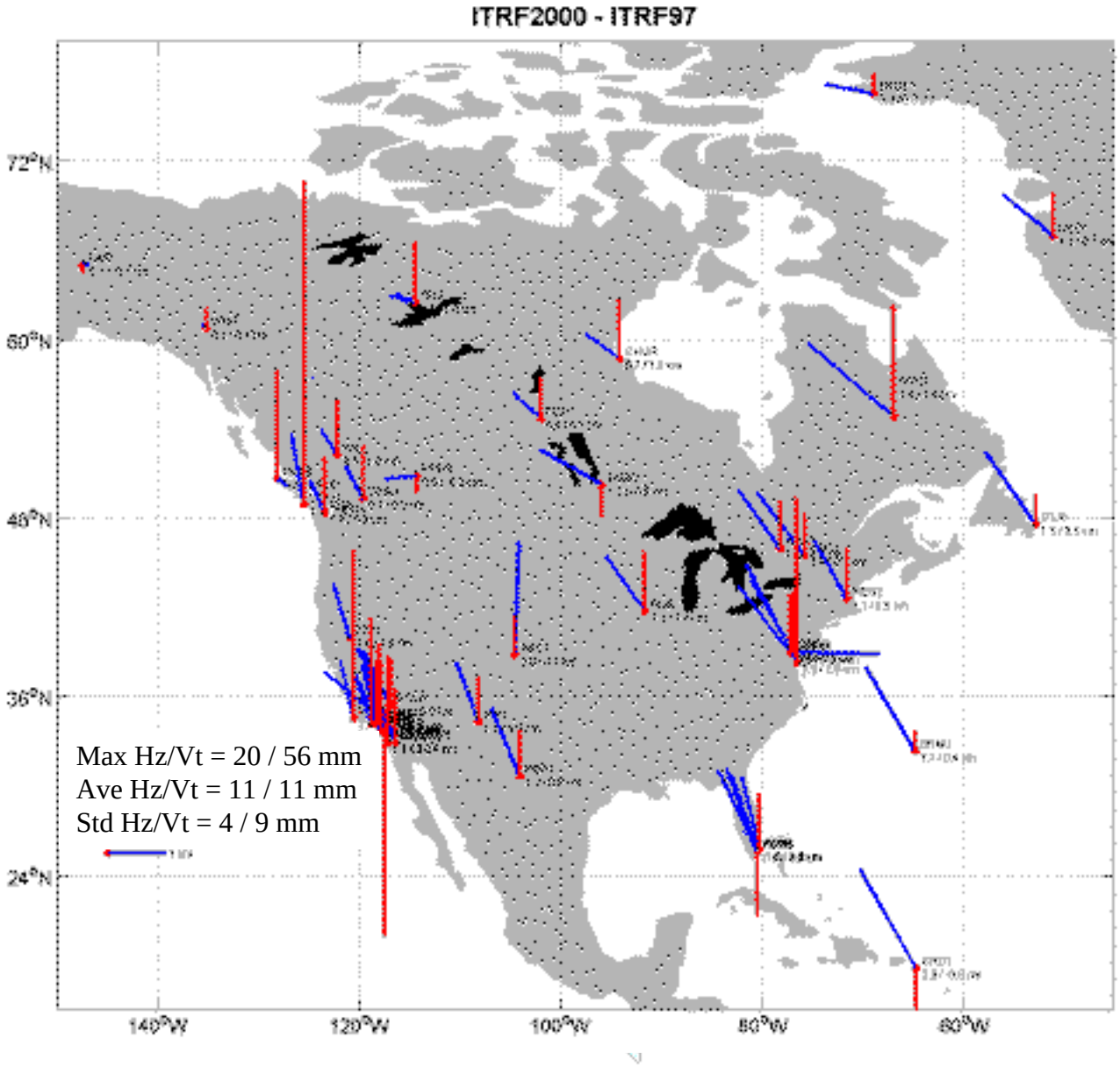
- *Objectives*
  - To determine consistent relationships between international, regional and national reference frames/datums
  - To maintain (update) these relationships as needed
- *Members*
  - NRCan: Mike Craymer
  - NGS: Richard Snay
  - IGS: Remi Ferland

NAD83-ITRF Transformations

- *NAD83-ITRF96(1997.0) transformation*
  - Defines NAD83 since 1998; referred to as:
  - NAD83(CSRS[98]) in Canada
  - NAD83(NSRS) in US
- *Transformations from/to other ITRFs*
  - Use incremental transformations between ITRFs
  - Use NUVEL-1A plate motion model for points without reliable velocity estimates
- *Software*
  - TRNOBS (GSD) – Uses GHOST or GeoLab input format
  - HTDP (NGS) – Uses Blue Book format; Web version available



- *New ITRF2000*
  - Preliminary version available now
  - Shows significant differences with ITRF97 in N.A. (used by CBN 3.0)
    - Ave horizontal: 1.1 ± 0.4 cm
    - Ave vertical: 1.1 ± 0.9 cm
  - Will likely need to adopt a transformation between ITRF97 and ITRF2000
- *NAREF Web site*
  - <http://www.naref.org/>
  - For papers, conference presentations, software


ITRF2000 - ITRF97
72°N
60°N
48°N
36°N
24°N
140°W
120°W
100°W
80°W
60°W
Max Hz/Vt = 20 / 56 mm
Ave Hz/Vt = 11 / 11 mm
Std Hz/Vt = 4 / 9 mm