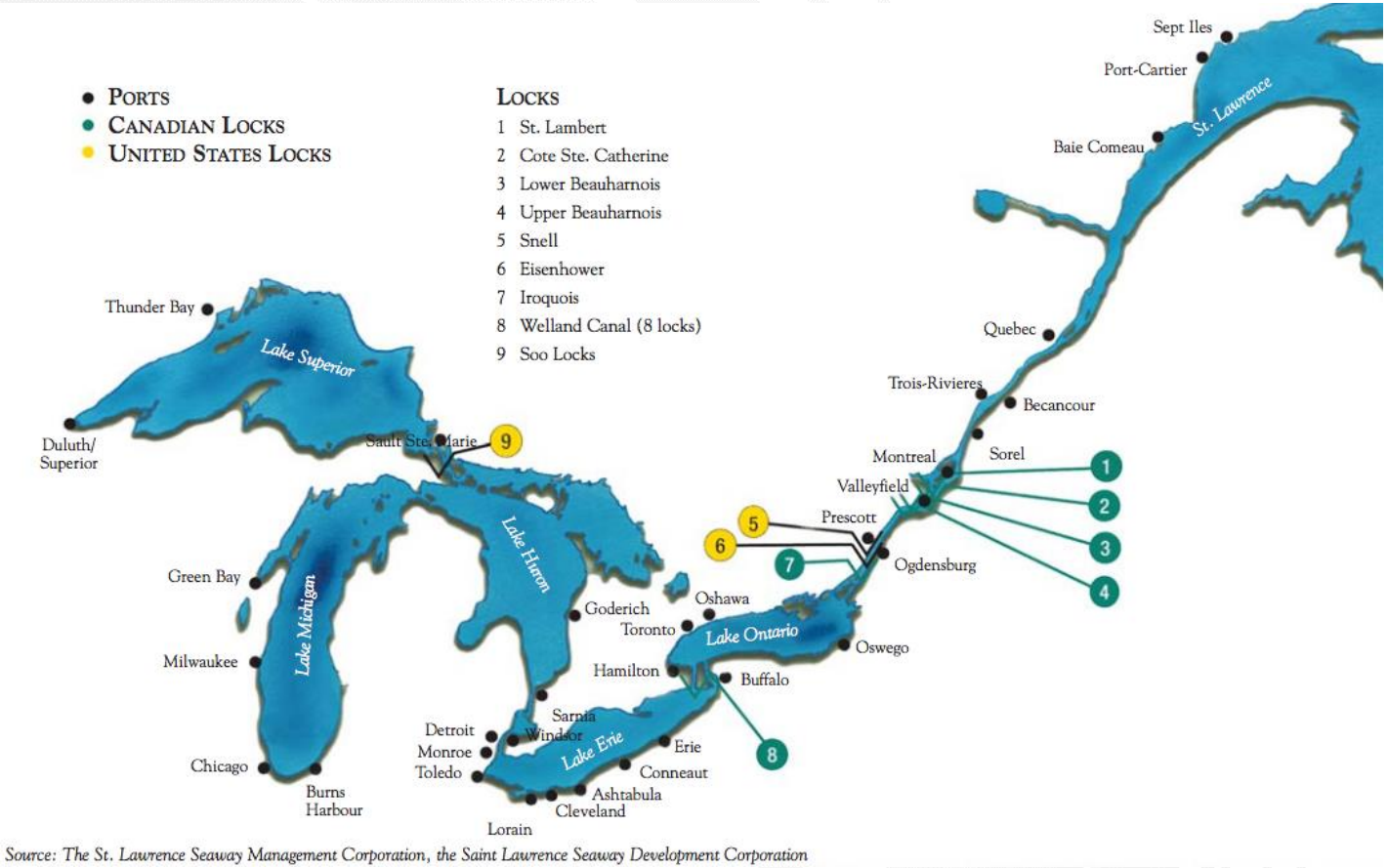
Draught Information System

UKC Management System at St. Lawrence Seaway

St. Lawrence Seaway

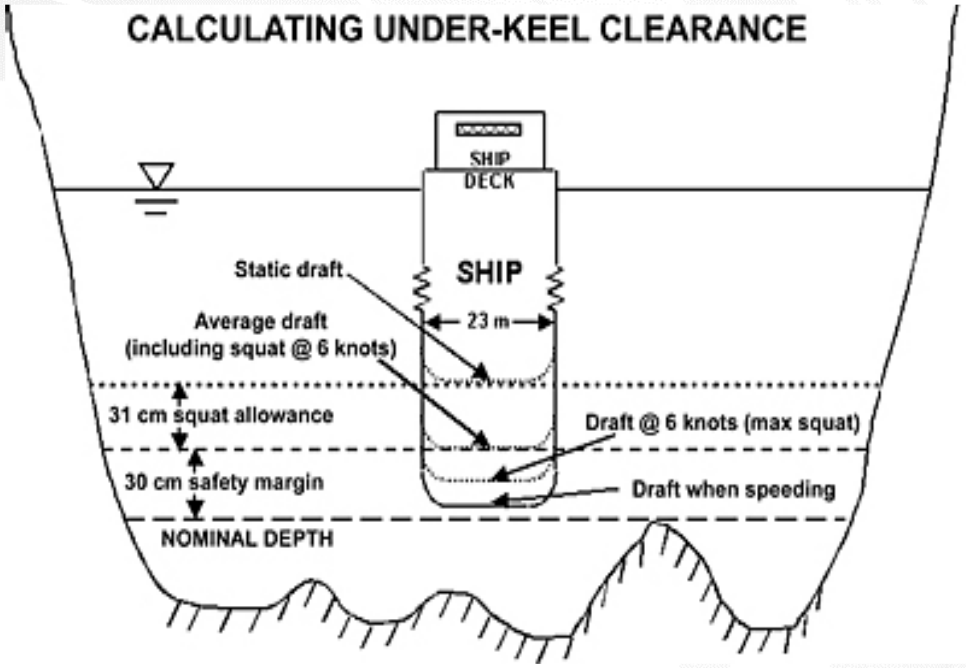


Source: *The St. Lawrence Seaway Management Corporation, the Saint Lawrence Seaway Development Corporation*

The Saint Lawrence Seaway is a system of locks, canals and channels in Canada and the United States that permit ocean-going vessels to travel from the Atlantic Ocean to the Great Lakes

1959 – max draft 6.85 m (22 feet 6 Inches)
2012 – 8 meters (26 feet 6 inches or 26 feet 9 inches With DIS)
10 cm gives 250-400 ton more cargo

Calculating under-keel clearance at SLSW



Input data

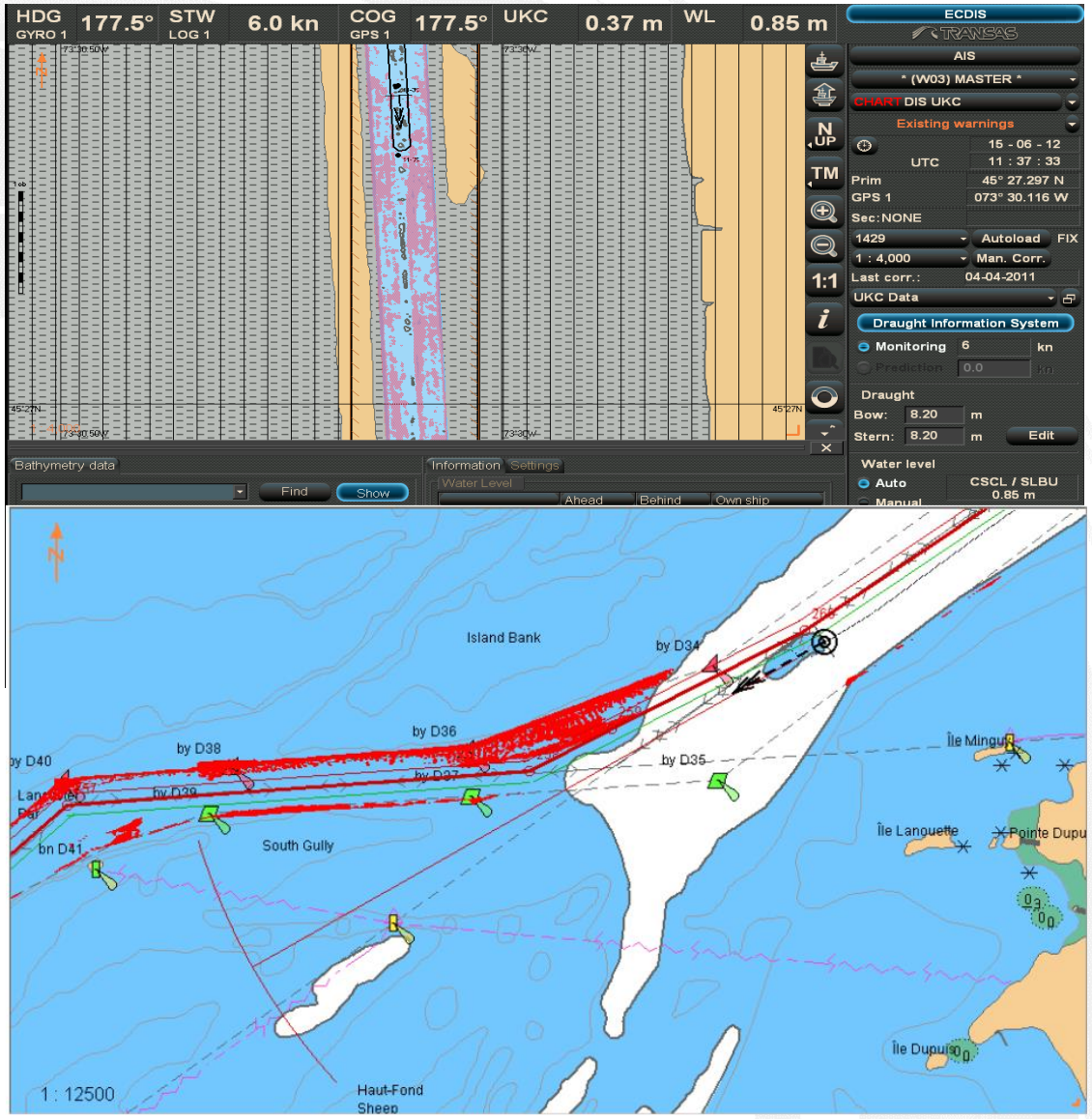
Coastal AIS stations collect and transmit information to ships
- Current water level
- Status of lock gates

High resolution Bathymetry charts issued by CHS
- High density depth areas and depth contours through 0.1 m
- Spot soundings
- All data are encoded as S-57 ENC.

Research study of vessel squat effect resulted in empirical formula for squat – specific for SLSW canals and vessel type

Vessel specific data – static draft at bow and aft, block coefficient, speed, etc

Transas Draught Information system



UKC is defined as Water depth + water level - static draught - squat (calculated real-time) - safety margin

Dangerous areas are highlighted on DIS screen

DIS is available on separate work station, standard ECDIS configuration does not show UKC areas

System has been tested at STSW and approved by a representative of Lloyds Register

Issues, faced and resolved during the DIS development

- Different chart datums, used in the HD bathymetry S-57 files and AIS water level
- Squat calculation could be incorrect is there is another vessel moving opposite or the same direction
- Availability and up-to-dateness of high density bathymetry S-57 charts from CHS
- Use S-57 depth areas only or consider spot soundings and re-build 3D bottom model in real time
- Method of water level interpolation
  - The same water level could be applied in area between locks
  - Water levels received from two closest coastal AIS stations, could be interpolated
- UKC areas presentation
  - Only dangerous areas or all areas are to be displayed, depending on UKC value.
  - UKC areas should overlap ENC depth areas however all other ENC objects are shown on top of the UKC area