CMAR COASTAL MONITORING PROGRAM REFERENCE SHEET
WATER QUALITY SENSOR VALIDATION

The Centre for Marine Applied Research (CMAR) collects high-resolution ocean data through the Coastal Monitoring Program. To collect this data, CMAR deploys several hundred oceanographic sensors around coastal Nova Scotia each year. This document outlines CMAR's sensor validation procedures, which are a component of CMAR's Data Governance initiatives. Sensor validation ensures each sensor is measuring within an acceptable range prior to deployment in the field and after retrieval.

Step 1: Initiate sensors
Follow sensor manuals to initiate sensor recording. Include a mix of sensor types and at least 4 sensors capable of measuring each variable.

Step 2: Fill out metadata log
The log must include a row for each sensor validated, and the following columns: deployment_date, retrieval_date, sensor_type, and sensor_serial_number. The log must be saved as a csv, or excel file in a folder named "log".

Step 3: Prepare the validation tank
Fill a large, insulated tank (e.g. cooler) with water. Use sea water if salinity sensors are included. Conduct the test indoors away from windows, heaters, or vents, which may cause temperature differences within the validation tank.

Option: Add an aquarium bubbler to help keep the water circulating and prevent stratification.

Step 4: Add sensors to the tank
Ensure sensors are fully submerged. Allow the sensors to record in the tank for at least 24 hours.

24ʰ
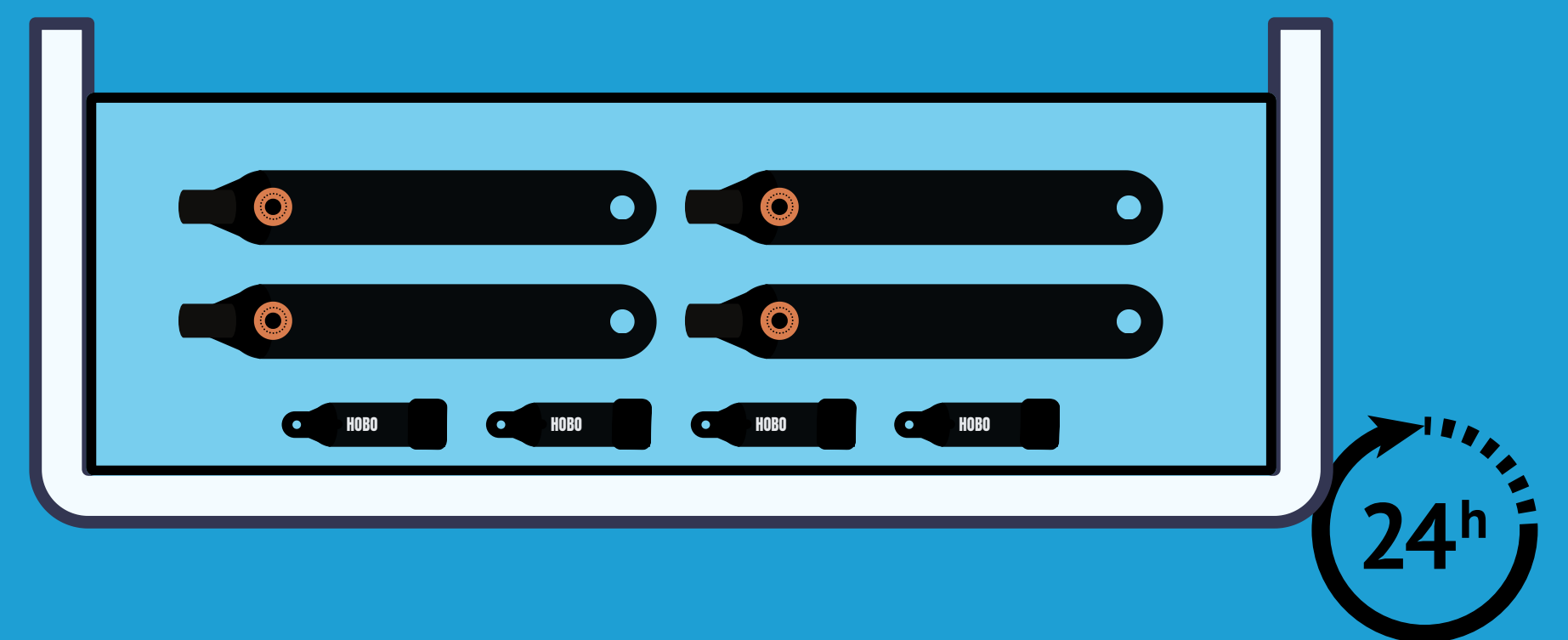
Step 5: Offload & save data
The data from a single validation must be saved with a specific folder structure. Data files must be in csv format and saved in sub-folders based on the sensor type. For example, hobo data must be saved in a folder called "hobo", and aquameasure data must be saved in a folder called "aquameasure." All data folders and the log folder from Step 2 must be saved in the same folder.

Option: Name the root folder based on a validation ID, e.g. VAL001.

log
VAL001
CSV
aquameasure
hobo
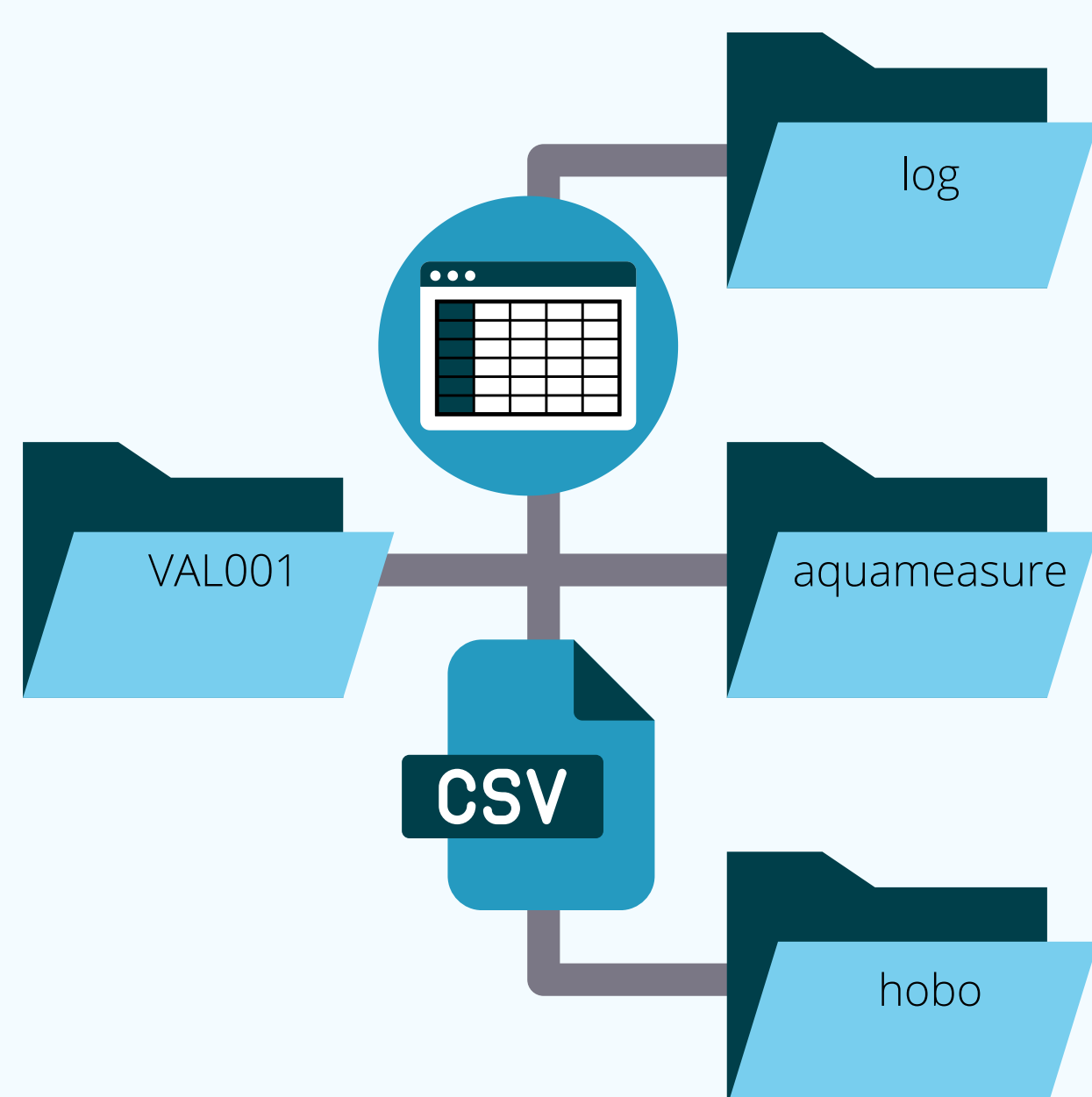
Step 6: Evaluate validation results
Follow the instructions in the CMAR Sensor Validation App to upload data and evaluate results. The acceptable measurement range for each variable is dictated by the manufacturer-specified accuracy range.

By CMAR standards, sensors that record outside of the acceptable range for > 10 % of the validation period fail the test. Only sensors that pass are deployed in the field. Any sensor that fails 2 consecutive validations is sent to the manufacturer for service.

calval

Note: CMAR code and validation procedures currently apply to the following loggers: Innovasea aquaMeasure SAL, DOT, and CHL, Innovasea VR2AR and VR2ARX, Onset Hobo DO U26 and Hobo Temp U22