# UNSG work in between HSWG6 and HSWG7

**Identifying the most relevant standard related to measurement uncertainty:**
Three standards were identified in relation to which approach to measurement **Uncertainty** is most suitable for the hydrographic context:

1. ISO 19157-1:2023 Geographic information Data quality Part 1: General requirements
2. ISO 5725-1:2023 Accuracy (trueness and precision) of measurement methods and results Part 1: General principles and definitions
3. ISO GUM: Guide to the expression of uncertainty in measurement

GUM has been the dominant reference in S-44 development since 1995. While GUM is publicly available, both ISO standards are limited in access. As such, it has not been possible to conduct a full review of the ISO standards. In S-100 documents, the relevant ISO standard seems to be ISO 19157. It may be desirable to lean towards that ISO standard in future work on S-44/C-13. However, a review of ISO 19157 in relation to GUM would be required.

**Product (grid/raster) uncertainty:**
While there is general consensus that grids should not be addressed in S-44, a need has been identified as to how gridding influences the THU of the survey data representation as grids. A UNSG action is ongoing to produce a draft for possible inclusion in C-13.

**Quality of measurement definitions:**
Definitions and descriptive concepts related to measurement **Uncertainty** within the hydrographic community need to be revised and updated. This has been demonstrated by the current terminology related to quality metrics in the IHO S-32 publication and by the lack of information related to **Uncertainty** in the IHO C-13 publication. A UNSG action to produce a draft about the concept of **Uncertainty** for inclusion in C-13 is ongoing. To remedy both issues (i.e. terminology and concepts), a direct alignment with the GUM (Guide on Uncertainty in Measurement) had been proposed (HSWG6 Action 12). However, recent discussions with expert contributors (UNSG5) tampered the need for this alignment. Instead, a review of existing terminology used in standards and references of related disciplines (e.g. GUM, ASPRS, ISO) should be conducted in order to choose the most suitable definitions.

**IHO Reference Uncertainty Model:**
Today's dominant TPU models were developed in a bottom-up approach focused on hydroacoustic bathymetric measurement systems. Expert contributors from the LiDAR community have pointed out the difficulties in introducing novel improvements to these TPU models, because of 1) the false belief that the existing TPU models fully address measurement uncertainty and 2) because of the closed-source nature of these TPU models (each software manufacturer may have its own TPU model). Moreover, other expert contributors have highlighted the existence of misunderstandings and misuses of TPU within the hydrographic community. Finally, given S-44's objective of being technology agnostic, it is proposed that a sensor independent, platform independent core TPU model could be developed, which would serve as the *de facto* IHO TPU refence model. At its core, the model could be applied to any mobile mapping platform, thus making it technology agnostic, but would be parametrizable with specific uncertainty contributions such that case specific model realizations could be derived.