***Marine Weather Forecaster Competencies 1, 2 and 3: Simulation Information Note***

***C1 Analyse and monitor continuously the marine weather situation***

***C2 Forecast marine weather phenomena, variables and parameters***

***C3 Warn of hazardous marine meteorological phenomena***

***Competency Description:***

Continuously monitor the latest observations, advisories, forecasts and warnings of marine weather parameters and variables, and significant weather phenomena. Determine the need for issuance, cancellation or amendment/update of advisories, forecasts and warnings according to documented thresholds and regulations.

**Considerations on using Simulation**:

Weather forecast simulations are a valuable training tool used by weather services and training centres around the world. They offer one of the best ways to practice and evaluate, and, of course, to learn as well, the use of knowledge and skill in a holistic context. But they can also be valuable components of a competency assessment programme. Some meteorological services even use them as the primary method for competency assessment, which places a lot of demands on the production of effective and immersive simulations in which the individual’s performance during the simulation can be judged as valid evidence of competency on the job as well. Ideally, as for any competency assessment programme, other methods of assessment should be used in combination to further validate competency.

The most effective simulations are those that recreate the work environment as realistically as possible. They call for performing analysis, diagnosis, and decision making using real data and, if possible, using real data display tools, recreating the job context as much as possible. When this is true, Simulation might meet well the Validity requirement of good competency assessment. However, simulations can also focus in on specific skills and forego recreating the full complexity of the work environment and still be valuable. They can take place in accelerated time (less than an hour versus an entire day, for example) and still require practice of all or most of the relevant skills.

Such realistic simulations can be costly to develop and administer, but for medium to large workforce numbers, they can actually save costs over lengthy Direct Assessment programmes. Simplified, less realistic simulations can still be valuable, but their validity might be closer to Experiential Questions and even Quiz Items assessment methods.

A key value of Simulations methods over Direct Assessment methods are that they can be used to assess performance during extreme, high-impact situations in which a simultaneous assessment activity would be an interference and potentially dangerous. These situations might also be rare, but they are the ones in which having competency is especially critical. Another unique value of Simulation method is that the assessments can be standardized for all forecasters, increasing Reliability of the assessment programme. Each forecaster assessed can be asked to work through the same simulation in the same conditions, also ensuring Fairness of the assessment.

**Recommendations**:

If an organization decides to implement Simulation for competency assessment, they must decide what level of fidelity to the job environment is required for the assessment results to be considered valid. Then they must invest the effort to develop the tools the forecaster will use to view data and, if included, to produce forecasts or warnings. Not all simulations need to use the same equipment used during the job of forecasting, but the data products viewed must be realistic enough such that decision making about the analysis, diagnosis and forecast involves similar skills as those used on the job. Simpler simulations can be produced using a simulation development software tool to reproduce the data products as realistically as possible, to using PowerPoint slides or paper data products following a protocol guided by the instructions of the assessor.

Tools for developing software-based simulations for weather forecasting are becoming openly available. These have many capabilities for data display and placing time limits on decision making, and options for capturing inputs of the forecaster. For example, see the [EUMETSAT Meteorological Simulation User Guide](https://vuser.eumetsat.int/resources/user-guides/meteorological-simulator-user-guide).

The development of a job performance simulation begins with defining the system within which that job takes place. To develop a simulation for assessment, one must first develop a thorough picture of the system being simulated, the one that requires the job performance as a central component. This includes:

* That data that must be analysed
* The products that must be issued
* The weather situations and evolutions that are possible in the locale
* The weather situations and phenomena for which forecasting performance are critical to be assessed
* The standard operating procedures in place for the job, such as forecast format
* The display and communication tools used on the job
* The customers whose decision-making needs must be met
* Time constraints

One must also decide what vulnerabilities of the system should be included in the simulation that may help to reveal the resilience of the forecaster:

* Missing data
* Technological breakdowns
* Limited personnel
* High or unrealistic communications demands
* Poorly followed procedures
* Inconsistencies across adjacent regions of responsibility
* Varying demands for support from a range of customers

Identifying each of these, and many other potentially important components of the system for the chosen weather event, defines the development requirements for the simulation and the forecasting decision-making steps that must be allowed, made visible and be assessed.