Here’s the instantiated assurance case for the BlueROV2 system based on the assurance case pattern provided:

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- G1: Hazards for BlueROV2 system addressed in accordance with ALARP principle.

- S1: Argument by risk reduction/elimination of each hazard

- G2: No intolerable risks present in the system.

- C1: Definition of "intolerable"

- S2: Argue that risk posed by any remaining hazards is negligible (undeveloped)

- S3: Argue that no other risks have been identified (undeveloped)

- G3: Risk from obstacle encounter has been reduced as low as reasonably practicable.

- C2: Assigned severity class is Major (uninstantiated)

- S4: Apply ReSonAte to estimate level of risk from hazard condition of obstacle encounter (uninstantiated)

- A1: Function such as avoidance logic required by BTD is available (uninstantiated)

- G4: Model obstacle encounter BTD accurately describes possible propagation of hazard Obstacle encounter (uninstantiated)

- G6: Possible hazard propagation paths correctly captured in BTD (undeveloped)

- G7: Barriers in the BTD correctly describe their respective control action including any required system functions (undeveloped)

- G8: All non-negligible threats have been identified (undeveloped)

- G5: Quantitative risk estimates are accurate and below acceptable threshold

- G9: State probability distribution used for risk estimation is an accurate representation of expected system states (undeveloped)

- G10: Estimated probability of collision (as a consequence) is below allowable threshold for severity class of Major (uninstantiated)

- Sn1: Estimated risk level of 10^-3 per hour (uninstantiated)

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Explanation of the tree:

- \*\*G1\*\* is the top-level goal explaining that all hazards associated with the BlueROV2 system are handled according to the ALARP principle. It is supported by the strategy \*\*S1\*\*.

- \*\*S1\*\* supports two sub-goals, \*\*G2\*\* and \*\*G3\*\*, dealing respectively with ensuring no intolerable risks and specific risk reduction.

- \*\*G2\*\* has two strategies \*\*S2\*\* and \*\*S3\*\*, which are both undeveloped. This reflects areas where further development is needed in the assurance case.

- \*\*G3\*\* relates to a specific hazard (obstacle encounter) and is supported by the strategy \*\*S4\*\*, which also requires further instantiation and development.

- The function required (avoidance logic) in strategy \*\*S4\*\* is noted as uninstantiated and needs to be connected with specific evidence from system implementation.

- \*\*G4\*\* through \*\*G8\*\* are linked to \*\*S4\*\* and outline the need for modeling reliability and other safety measures, which include barriers and threat identification, all requiring further development or instantiation.

- Sub-goals \*\*G5\*\*, \*\*G9\*\*, and \*\*G10\*\* under \*\*G5\*\* focus on quantitative and probabilistic risk estimation aspects.

- \*\*Sn1\*\* provides the specific risk estimate that needs instantiation with actual system data.

This tree structure represents the hierarchical relationships in the assurance case, with each goal, strategy, context, and solution appropriately nested, labeled, and marked for further development or instantiation as required by the current state of the assurance case.