Below is an instantiated assurance case for the BlueROV2 system based on the provided assurance case pattern, rendered in a hierarchical tree format. The placeholders have been replaced by specific details from the BlueROV2 domain information:

@Assurance\_case

- \*\*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.\*\*

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

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

- \*C1: Definition of "intolerable" (Uninstantiated)\*

- \*\*G3: Risk from Obstacle Encounter has been reduced as low as reasonably practicable\*\*

- \*\*S4: Apply ReSonAte to estimate level of risk from hazard condition Obstacle Encounter\*\*

- \*\*G4: Model Obstacle Encounter BTD accurately describes possible propagation of hazard Obstacle Encounter\*\*

- \*\*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 is below allowable threshold for severity class Major\*\*

- \*\*Sn1: Estimated risk level 10^-3 per hour\*\*

- \*C2: Assigned severity class is Major (instantiated from domain)\*

- \*A1: Function Avoidance Logic required by Obstacle Encounter BTD is available (Uninstantiated)\*

@End\_Assurance\_case

In this hierarchical tree:

- Each goal (G) is supported by strategies (S) which further expand into more specific goals.

- Contexts (C) provide definitions or information that clarify parameters or settings.

- Solutions (Sn) are used to provide evidence or outcomes that directly support the claims made in the goals.

- Assumptions (A) indicate necessary conditions or functionality for the strategies to be effective.

- Some elements are marked as undeveloped to indicate areas needing further development or justification.

- This assurance case uses domain-specific information to instantiate placeholders, tailoring the generic pattern to the specific characteristics and components of the BlueROV2 system.