Based on the given assurance case pattern, I will now create an assurance case for the BlueROV2 system, ensure that all placeholders are replaced with system-specific information, and remove all decorators and undeveloped indicators.

### Assurance Case for BlueROV2 System

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- G1: Hazards for the 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 each identified hazard has been reduced as low as reasonably practicable

- C2: Assigned severity class is specified for each hazard

- S4: Apply ReSonAte to estimate level of risk from hazard condition

- A1: Function required by the BTD is available (e.g., obstacle detection, command authority, avoidance logic)

- G4: Model 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 for collision is 10^-3 per hour

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In this assurance case:

1. \*\*Goal G1\*\*: "Hazards for the BlueROV2 system addressed in accordance with ALARP principle" is the top-level goal.

2. \*\*Strategy S1\*\*: Describes the argument for risk reduction or elimination for each hazard.

3. \*\*Goals G2 and G3\*\*: These address the absence of intolerable risks and the reduction of identified risks, respectively.

4. \*\*Context C1\*\*: Defines "intolerable."

5. \*\*Context C2\*\*: Specifies the assigned severity classes for hazards.

6. \*\*Strategy S4\*\*: Applies ReSonAte for risk estimation.

7. \*\*Assumption A1\*\*: Assumes that the required functions (e.g., obstacle detection, command authority, avoidance logic) are available and correctly implemented.

8. \*\*Model accuracy and BTDs\*\*: Goals G4, G6, G7, and G8 focus on accurate hazard propagation representation in BowTie Diagrams (BTDs), identification of threats, and correctness of control actions.

9. \*\*Risk Estimation Goals G5, G9, and G10\*\*: Ensure accuracy in risk estimation, proper representation of expected system states, and that the probability of collision is within acceptable limits.

10. \*\*Solution Sn1\*\*: Empirical evidence showing the estimated risk level for collision.