Based on the given assurance case pattern and the domain information about the BlueROV2 system, we'll instantiate the pattern to create an assurance case for the system and depict it in a hierarchical tree structure.

### Assurance Case for BlueROV2

- \*\*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 obstacle encounter has been reduced as low as reasonably practicable.\*\*

- \*\*C2: Assigned severity class is Major\*\*

- \*\*S4: Apply ReSonAte to estimate level of risk from hazard condition obstacle encounter.\*\*

- \*\*A1: Function avoidance logic required by obstacle encounter BTD is available.\*\*

- \*\*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.\*\*

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

This hierarchical structure captures the relationship between various elements of the assurance case based on the provided pattern and instantiated with specifics relevant to the BlueROV2 system.