To instantiate the provided assurance case pattern for the BlueROV2 system, I will replace placeholders and uninstantiated elements with specific information relevant to BlueROV2. The assurance case will include goals, strategies, solutions, assumptions, contexts, and will address undeveloped elements. Here's the instantiated assurance case structured hierarchically:

@Assurance\_case\_BlueROV2

- \*\*G1: Hazards for BlueROV2 addressed in accordance with As Low As Reasonably Practicable (ALARP) principle.\*\*

- \*\*S1: Argument by risk reduction/elimination of each hazard for BlueROV2\*\*

- \*\*G2: No intolerable risks present in the BlueROV2 system.\*\*

- \*\*Context (C1): Definition of "intolerable" as unacceptable risk levels that cannot be mitigated or justified under any circumstance in underwater operations.\*\*

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

- \*\*Strategy (S3): Argue that no other risks have been identified for BlueROV2.\*\* (undeveloped)

- \*\*G3: Risk from pressure hazards has been reduced as low as reasonably practicable.\*\*

- \*\*Context (C2): Assigned severity class is high due to potential for rapid pressure changes affecting operational integrity.\*\* (Uninstantiated)

- \*\*Strategy (S4: Apply ReSonAte to estimate level of risk from hazard condition related to pressure.\*\*

- \*\*Assumption (A1: Depth control system functionality required by bowtie diagram (BTD) is available and operational.\*\* (Uninstantiated)

- \*\*G4: Model BTD accurately describes possible propagation of pressure-related hazards.\*\* (Undeveloped, Uninstantiated)

- \*\*G6: All possible hazard propagation paths related to pressure are correctly captured in BTD.\*\* (Undeveloped)

- \*\*G7: All barriers in the BTD correctly describe their respective control actions including those preventing rapid pressure changes.\*\* (Undeveloped)

- \*\*G8: All non-negligible threats related to pressure changes have been identified.\*\* (Undeveloped)

- \*\*G5: Quantitative risk estimates related to pressure are accurate and below the acceptable threshold.\*\*

- \*\*G9: State probability distribution used for risk estimation accurately reflects expected system states under varied pressure conditions.\*\* (Undeveloped)

- \*\*G10: Estimated probability of structural failure due to pressure is below the allowable threshold for high severity class.\*\*

- \*\*Solution (Sn1: Estimated risk level from depth-related data and pressure sensors.\*\* (Uninstantiated)

This instantiated assurance case for the BlueROV2 system is designed to demonstrate how each identified hazard is mitigated according to the ALARP principle. The assurance case starts with a broad goal (G1) of addressing all hazards and then supports this with specific strategies and goals that deal with individual aspects such as risk, hazard propagation, and quantification of risks. The undeveloped and uninstantiated elements highlight areas needing further analysis or information before the assurance case is fully developed.