To create a security case for ACAS Xu using the provided security case pattern, I will replace the placeholders with specific elements related to ACAS Xu and instantiate undeveloped goals and strategies as required. Here is the hierarchical tree structure representing the security case for ACAS Xu:

\*\*Goal G0: ACAS Xu satisfies security requirements\*\*

- \*\*Context C0: Description of ACAS Xu\*\*

- \*\*Context C1: Security Requirements (SRs) are requirements about protecting ACAS Xu from malicious entities\*\*

- \*\*Justification J0: The argumentation is based on satisfaction of SRs\*\*

- \*\*Assumption A0: System SRS are complete, adequate, and consistent\*\*

- \*\*Supported by Strategy S0: Argue through asset protection and secure development requirements\*\*

- \*\*Goal G1: ACAS Xu satisfies the asset protection requirements\*\*

- \*\*Assumption A1: Asset inventory is established\*\*

- \*\*Supported by Strategy S1: Argue through the different stages of the system development life cycle\*\*

- \*\*Goal G3: Asset protection requirements are met during the architecture design phase of ACAS Xu\*\*

- \*\*Context C2: Description of the ACAS Xu architecture\*\*

- \*\*Supported by Strategy S2: Argue through deriving security threats from SRs\*\*

- \*\*Goal G5: ACAS Xu architecture is protected against identified security threats (STs)\*\*

- \*\*Assumption A2: All relevant threats have been identified\*\*

- \*\*Supported by Strategy S3: Argue over each security threat\*\*

- \*\*Goal G0.1: ACAS Xu architecture is protected against ST1 (Tampering of GPS sensors and processor)\*\*

- \*\*Goal G0.2: ACAS Xu architecture is protected against ST2 (Spoofing sensors and processor)\*\*

- \*\*Goal G0.3: ACAS Xu architecture is protected against ST3 (Elevation of privileges in the planning system)\*\*

- \*\*Goal G6: ACAS Xu architecture is validated\*\*

- \*\*Context C3: Description of ACAS Xu architecture model\*\*

- \*\*Assumption A3: ACAS Xu architecture model is well defined in formal method\*\*

- \*\*(Undeveloped) Goal G4: Asset protection requirements are met during other phases\*\*

- \*\*(UndevelopStantiated) Goal G2: ACAS Xu satisfies secure development requirements\*\*

This security case structure details how ACAS Xu's security needs are addressed through a structured argumentation, focusing on asset protection, confrontation of security threats, and the validation of its architecture. Key assumptions, contexts, and justifications support the security case, establishing a comprehensive assurance argument.