To create a security case for ACAS Xu based on the given security case pattern, we will instantiate the placeholders with information specific to ACAS Xu. Here, the hierarchical tree structure represents the organization of goals, strategies, contexts, justifications, and assumptions in the security case.

#### Security Case for ACAS Xu

- \*\*Goal (G0, "ACAS Xu satisfies security requirements")\*\*

- \*Context (C0, "Description of ACAS Xu")\*

- \*Context (C1, "SR are requirements about protecting the system from malicious entities")\*

- \*Justification (J0, "The argumentation is based on satisfaction of SRs")\*

- \*Assumption (A0, "System SRS are complete, adequate, and consistent")\*

- \*\*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")\*

- \*\*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")\*

- \*\*Strategy (S2, "Argue through deriving security threats (STs) from SRs")\*\*

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

- \*Assumption (A2, "All relevant threats have been identified")\*

- \*\*Strategy (S3, "Argue over each security threat")\*\*

- \*\*Goal (G0.1, "ACAS Xu architecture is protected against ST1: Tampering")\*\*

- \*\*Goal (G0.2, "ACAS Xu architecture is protected against ST2: Spoofing")\*\*

- \*\*Goal (G0.3, "ACAS Xu architecture is protected against ST3: Elevation of Privileges")\*\*

- \*IncontextOf (G0.1, J1, 8)\*

- \*IncontextOf (G0.2, J1, 8)\*

- \*IncontextOf (G0.3, J1, 8)\*

- \*\*Goal (G6, "ACAS Xu architecture is validated")\*\* (undeveloped and uninstantiated)

- \*Context (C3, "Description of ACAS Xu architecture model")\*

- \*IncontextOf (S2, J1, 6)\*

- \*\*Goal (G4, "Asset protection requirements are met during other phases of ACAS Xu development")\*\* (undeveloped)

- \*\*Goal (G2, "ACAS Xu satisfies secure development requirements")\*\* (undeveloped and uninstantiated)

In this hierarchical security case diagram, each level of the tree uses increased indentation to denote a deeper level in the hierarchical structure. Contexts, justifications, and other support elements are noted under their respective goals or strategies. The elements such as goals (G0.1, G0.2, G0.3) related to specific security threats identified in the ACAS Xu system are instantiated as per the given threat categories. Also, elements mentioned to be undeveloped and/or uninstantiated are marked accordingly showing that these parts of the case are placeholders for further development. This structure provides a comprehensive and clear presentation of how various goals and strategies are interconnected in ensuring the security of ACAS Xu.