To instantiate the given safety case pattern for a GPCA (General-Purpose Computing on Acceleration) system and display it in a hierarchical tree format, we can replace the placeholders with specific information relevant to the GPCA system. Here is the instantiated safety case:

### Instantiated Safety Case

- \*\*Goal (G1):\*\* Operational safety is verified in the GPCA system.

- \*\*Context (C1):\*\* All specs are given by spec.allInstances()

- \*\*Strategy (S1):\*\* Argument over the satisfaction of all specs over the GPCA system

- \*\*Goal (G2):\*\* All operational hazards are mitigated

- \*\*Strategy (S3):\*\* Argument over operational hazards

- \*\*Context (C2):\*\* Operational hazards are given by operational hazard.allInstances()

- \*\*Goal (G3):\*\* Shock hazard is mitigated

- \*\*Strategy (S4):\*\* Argument over the applied scenarios of shock hazard

- \*\*Context (C3):\*\* All related scenarios are given by shock hazard

- \*\*Goal (G4):\*\* Shock hazard is mitigated under wet environment

- \*\*Strategy (S5):\*\* Argument over all specs related to wet environment

- \*\*Context (C4):\*\* All related specs are given by wet environment.spec.allInstances()

- \*\*Goal (G5):\*\* Waterproof specification is appropriate for wet environment

- \*\*Strategy (S6):\*\* Argument the appropriateness of waterproof spec over properties

- \*\*Context (C5):\*\* Properties are given by waterproof spec.property.allInstances()

- \*\*Goal (G6):\*\* Material properties are appropriate for waterproof specification

- \*\*Strategy (S7):\*\* Argument over the source of the material property definition

- \*\*Context (C6):\*\* Source is given by property.source

- \*\*Goal (G7):\*\* Material source is appropriate and trustworthy

- \*\*Solution (Sn1):\*\* Material source document verification

- \*\*Goal (G8):\*\* Material property definition is sufficient

- \*\*Solution (Sn2):\*\* Material property analysis report

### Hierarchical Tree Format

- G1: Operational safety is verified in the GPCA system

- C1: All specs are given by spec.allInstances()

- S1: Argument over the satisfaction of all specs over the GPCA system

- G2: All operational hazards are mitigated

- S3: Argument over operational hazards

- C2: Operational hazards are given by operational hazard.allInstances()

- G3: Shock hazard is mitigated

- S4: Argument over the applied scenarios of shock hazard

- C3: All related scenarios are given by shock hazard

- G4: Shock hazard is mitigated under wet environment

- S5: Argument over all specs related to wet environment

- C4: All related specs are given by wet environment.spec.allInstances()

- G5: Waterproof specification is appropriate for wet environment

- S6: Argument the appropriateness of waterproof spec over properties

- C5: Properties are given by waterproof spec.property.allInstances()

- G6: Material properties are appropriate for waterproof specification

- S7: Argument over the source of the material property definition

- C6: Source is given by property.source

- G7: Material source is appropriate and trustworthy

- Sn1: Material source document verification

- G8: Material property definition is sufficient

- Sn2: Material property analysis report

This hierarchical tree representation captures the instantiated safety case for the GPCA system, verifying operational safety by systematically ensuring that all potential shock hazards, especially in a wet environment, are appropriately mitigated according to verified specifications, properties, and sources.