Requirement Analysis

Smart Sonar Surveillance System (4S)

Interview Questions

- What is the Main Purpose of this System?
- What Specific Features it has?
- What is the performance in terms of range, accuracy you need?
- What will be the limitations?
- What improvements can be done based on existing systems?

System Administrator:

- Purpose: “I need to make sure the system is properly deployed and calibrated.”
- Features: “Diagnostics, logs, and calibration tools.”
- Performance: “System should run continuously with minimal downtime.”
- Constraints: “Maintenance must be simple, and setup should not require advanced tools.”
- Future: “Remote monitoring for multiple sites would be very useful.”

Security Operator

- Purpose: “I need a simple interface to detect intruders quickly.”
- Features: “Radar-style visualization + alarm sound when object is close.”
- Performance: “Fast refresh (every 1–2 seconds) so I don’t miss movement.”
- Constraints: “Interface must be easy for non-technical guards.”
- Future: “Maybe add camera integration for confirmation.

Project Team (Developer)

- Purpose: “We must build a reliable, low-cost prototype.”
- Features: “Access to sensor data, debugging tools.”
- Performance: “System should be robust, not crash during demo.”
- Constraints: “Budget is limited, so only affordable components.”
- Future: “Upgrade from SONAR prototype to real radar (signal processing).”

Defence and Security Organizations (End Users)

- Purpose: “We want affordable surveillance for bases, borders, and coastal sites.”
- Features: “Adaptability to different domains (land, sea, civilian).”
- Performance: “Reliable detection up to at least 2 meters for prototype.”
- Constraints: “System must be portable, rapidly deployable, and scalable.”

- Future: “AI-based detection and networking for centralized command centers.”

Requirements Derived From the Survey:

1. The system SHALL detect objects within at least 2 meters range.
2. The system SHALL scan a semi-circular arc of 0–180° continuously.
3. The system SHALL provide both visual feedback (radar display) and audible alerts.
4. The system SHALL refresh detection results at least every 1–2 seconds.
5. The system SHALL include diagnostics and calibration tools for administrators.
6. The system SHALL be simple to use for non-technical operators.
7. The system SHALL be designed using low-cost, off-the-shelf components.
8. The system SHALL be portable and rapidly deployable.
9. The system SHALL allow for future upgrades (AI detection, camera integration, networking).