

Project: SoS-survey-QCA-replication

Code Report

◇ ○ INCOMPATIBLE_METHODS

1 Quotations:

☰ 7:1 Structured Analysis and Design used for System Requirements, and Objec..... (16:147) - D 7: R7

2 Codes:

● 21-REQ-PROBLEMS / ○ INCOMPATIBLE_METHODS

◇ ○ CHANGES_COST_ASSESSMENT

1 Quotations:

☰ 60:8 Context was a product line development used by several projects, with..... (2402:2733) - D 60: R60

3 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ○ CHANGES_COST_ASSESSMENT / ○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE

◇ ○ ECONOMICAL

1 Quotations:

☰ 8:3 Cultural, methodological, semantic, economical, social, etc. problems..... (439:574) - D 8: R8

5 Codes:

● 23-ARCH-DEC-PROBLEMS / ○ CULTURAL / ○ ECONOMICAL / ○ INTERDISCIPLINARY_CONCEPTS_INTERPRETATION / ○ METHODOLOGICAL

◇ ○ **VERSIONING_INCOMPATIBILITIES**

1 Quotations:

☰ 2:13 backwards/forward compatibility issues between systems at different ve..... (955:1030) - D 2: R2

1 Codes:

○ VERSIONING_INCOMPATIBILITIES

◇ ○ **RAPID_PROTOTYPING**

1 Quotations:

☰ 5:3 Emergent behavior was addressed during the conception process through..... (344:538) - D 5: R5

2 Codes:

● 27-EMERGENCE-ADDRESS-OTHER / ○ RAPID_PROTOTYPING

◇ ○ **ORGANIZATION_CONSTRAINTS**

1 Quotations:

☰ 31:5 Documentation was a problem. Notably, our organization assumes that P..... (1798:2102) - D 31: R31

3 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ INTERDISCIPLINARY_CONCEPTS_INTERPRETATION / ○ ORGANIZATION_CONSTRAINTS

◇ ○ **NO-QA-TRENDING**

1 Quotations:

☰ 50:6 Overall insufficient evaluation. No trending of quality attributes. (1059:1125) - D 50: R50

3 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ INSUFFICIENT_EVALUATION / ○ NO-QA-TRENDING

◇ ○ CHANGES_COMMUNICATION

1 Quotations:

☰ 31:9 Relatedly, communication of changes was difficult. (2418:2467) - D 31: R31

1 Codes:

○ CHANGES_COMMUNICATION

◇ ○ INSUFFICIENT_ELEMENTS_FOR_GOOD_SOFTWARE

1 Quotations:

☰ 21:5 Additional mission thread, scenarios, workflows development were needed..... (612:753) - D 21: R21

2 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ○ INSUFFICIENT_ELEMENTS_FOR_GOOD_SOFTWARE

◇ ○ UNREVISITED-ARCHITECTURE

1 Quotations:

☰ 17:5 The architecture was not revisited. (776:810) - D 17: R17

2 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ○ UNREVISITED-ARCHITECTURE

◇ ○ OPS.CON-EMERGENCE_CORRESPONDENCE

1 Quotations:

 **8:7 Emergent behavior has to be analyzed with regards to the operational c..... (1205:1367) - D 8: R8**

2 Codes:

● 28-EMERGENCE-ADD-PROBLEMS / ○ OPS.CON-EMERGENCE_CORRESPONDENCE

 ○ **NEW_SYSTEMS_AS_INTEGRATION_BRIDGES**

1 Quotations:

 **12:4 Added systems to act as integration bridges. Cannot solve all in softw..... (343:442) - D 12: R12**

3 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● HARDWARE-SOFTWARE-CHANGES-BALANCE / ○ NEW_SYSTEMS_AS_INTEGRATION_BRIDGES

 ○ **ARCH-PROBLEMS-DISCOVERED-AT-IMPLEMENTATION**

1 Quotations:

 **17:3 Flaws in the architecture were discovered deep into implementation, an..... (488:642) - D 17: R17**

3 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ ARCH-PROBLEMS-DISCOVERED-AT-IMPLEMENTATION

 ○ **BUGS/ISSUES CAUSED BY UNDERSCRUTINIZED COMPLEX INTERACTIONS**

1 Quotations:

 **42:3 Underscrutinized complex interactions gave rise to many bugs and secur..... (184:263) - D 42: R42**

3 Codes:

● 23-ARCH-DEC-PROBLEMS / ○ BUGS/ISSUES CAUSED BY UNDERSCRUTINIZED COMPLEX INTERACTIONS / ○ MODELLING_AND_SIMULATION LIMITATIONS

◇ ○ **COTS_SUBSYSTEMS_LIMITATIONS**

1 Quotations:

☰ 23:1 COTS selected for subsystems too ridged and did not support emerging n..... (26:148) - D 23: R23

3 Codes:

● 28-EMERGENCE-ADD-PROBLEMS / ○ COTS_SUBSYSTEMS_LIMITATIONS / ○ SUBSYSTEMS-RELATED EMERGENCE CAUSES

◇ ☰ ○ **SYSTEM-PHENOMENA-DIFFICULT-TO-CHARACTERIZE**

1 Quotations:

☰ 60:6 System uses wireless communication that has important error rate, link..... (1748:2076) - D 60: R60

3 Codes:

● 28-EMERGENCE-ADD-PROBLEMS / ○ MODELLING_AND_SIMULATION_LIMITATIONS / ○ SYSTEM-PHENOMENA-DIFFICULT-TO-CHARACTERIZE

◇ ○ **DESIGN_CANDIDATES_COMPARISON_APPROACHES_LIMITATIONS**

1 Quotations:

☰ 11:4 Different architectural drivers by hidden weighting's in Pugh matrix b..... (211:308) - D 11: R11

2 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ DESIGN_CANDIDATES_COMPARISON_APPROACHES_LIMITATIONS

◇ ○ **RIPPLE_EFFECT**

1 Quotations:

 **23:2 Changes that could have been easier were not easy. Ripple effect. (178:242) - D 23: R23**

2 Codes:

31-INDEP-CONS-EVOL-PROBLEMS / RIPPLE_EFFECT

ARCHITECTURAL_DRIVERS_ANALYSIS

1 Quotations:

 **11:3 Decisions were evaluated against architectural drivers (134:187) - D 11: R11**

3 Codes:

24-ARCH-EVAL / ARCH-EVALUATION-CRITERIA / ARCHITECTURAL_DRIVERS_ANALYSIS

INTERFACE_BLOATING

1 Quotations:

 **3:4 Interface bloating (355:372) - D 3: R3**

2 Codes:

31-INDEP-CONS-EVOL-PROBLEMS / INTERFACE_BLOATING

DEPRECATED_FEATURES_PROBLEMS

1 Quotations:

 **2:14 new or deprecated features creating unexpected issues (1089:1142) - D 2: R2**

1 Codes:

DEPRECATED_FEATURES_PROBLEMS

NEED_TO_REWORK_WORKING_SUBSYSTEMS

1 Quotations:

 **9:6 Rework often on the subsystem not in error when another subsystem fail..... (843:999) - D 9: R9**

3 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● HARDWARE-SOFTWARE-CHANGES-BALANCE / ○ NEED_TO_REWORK_WORKING_SUBSYSTEMS

○ SOFTWARE-LEVEL-INTERFACES-BELOW-SYSTEM-RADAR

1 Quotations:

 **60:7 Interfaces generally defined at system level as message exchanges betw..... (2105:2372) - D 60: R60**

3 Codes:

● 30-INDEP-CONS-INT-PROBLEMS / ○ SOFTWARE-LEVEL-INTERFACES-BELOW-SYSTEM-RADAR / ○ SUBSYSTEMS-RELATED EMERGENCE CAUSES

○ 21-REQUIREMENTS_MANAGEMENT-RELATED-PROBLEM

1 Quotations:

 **50:2 Scarce description of requirements on system level. Change Management..... (496:673) - D 50: R50**

3 Codes:

● 21-REQ-PROBLEMS / ○ 21-REQUIREMENTS_MANAGEMENT-RELATED-PROBLEM / ○ INCOMPLETE SYSTEM REQUIREMENTS

○ MANY-REQ-ABSTRACTION-LAYERS

1 Quotations:

 **12:1 Many layers of abstraction needed (16:48) - D 12: R12**

2 Codes:

● 21-REQ-PROBLEMS / ○ MANY-REQ-ABSTRACTION-LAYERS

◇ ○ **INFORMAL_EVALUATION**

1 Quotations:

☰ 19:1 Evaluation seemed to be informal. The chief architect would be notified..... (22:179) - D 19: R19

3 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ INFORMAL_EVALUATION / ○ INSUFFICIENT_EVALUATION

◇ ○ **CULTURAL**

1 Quotations:

☰ 8:3 Cultural, methodological, semantic, economical, social, etc. problems..... (439:574) - D 8: R8

5 Codes:

● 23-ARCH-DEC-PROBLEMS / ○ CULTURAL / ○ ECONOMICAL / ○ INTERDISCIPLINARY_CONCEPTS_INTERPRETATION / ○ METHODOLOGICAL

◇ ○ **RESTRICTIVE_INTERFACES**

1 Quotations:

☰ 30:5 Some interfaces posed an architectural limit to the future evolution of..... (1215:1380) - D 30: R30

2 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ○ RESTRICTIVE_INTERFACES

◇ ○ **DATA_MODEL_CHANGES**

1 Quotations:

☰ 2:12 Data model/schema changes (928:952) - D 2: R2

1 Codes:

- DATA_MODEL_CHANGES
-

◇ ○ SOFTWARE_CONSTRAINTS

1 Quotations:

- ☰ 14:2 SW constraints, continious patches... (76:112) - D 14: R14

3 Codes:

- 21-REQ-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ SOFTWARE_CONSTRAINTS
-

◇ ○ CHANGES_DERIVED_FROM_EVALUATION

1 Quotations:

- ☰ 30:3 There was no clear separation between software-level and system-level..... (643:979) - D 30: R30

3 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ CHANGES_DERIVED_FROM_EVALUATION
-

◇ ○ GROUPS_CONFLICTS_OF_INTEREST

1 Quotations:

- ☰ 42:1 Constant conflicts of interests between different groups (16:71) - D 42: R42

2 Codes:

- 21-REQ-PROBLEMS / ○ GROUPS_CONFLICTS_OF_INTEREST
-

◇ ○ ARCHITECTURE_DRIFT

1 Quotations:

 **3:2 Problems caused by suppliers (inconsistencies in descriptions)**
Architec..... (97:246) - D 3: R3

4 Codes:

- 23-ARCH-DEC-PROBLEMS / ○ ARCHITECTURE_DRIFT / ○ THIRD_PARTY_COMPONENTS_INCONSISTENCIES / ○ TIME_AND_RESOURCES_PROBLEM
-

 ○ **METHODOLOGICAL**

1 Quotations:

 **8:3 Cultural, methodological, semantic, economical, social, etc. problems..... (439:574) - D 8: R8**

5 Codes:

- 23-ARCH-DEC-PROBLEMS / ○ CULTURAL / ○ ECONOMICAL / ○ INTERDISCIPLINARY_CONCEPTS_INTERPRETATION / ○ METHODOLOGICAL
-

 ○ **DEFICIENT_BUSINESS_REQ**

1 Quotations:

 **2:2 Inconsistent design. Incomplete requirements leading to long re-work c..... (116:330) - D 2: R2**

4 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ DEFICIENT_BUSINESS_REQ / ○ INCOMPLETE_SYSTEM_REQUIREMENTS
-

 ○ **FUNCTIONS_DISCIPLINES_MAPPING**

1 Quotations:

 **3:5 Mapping of functions to disciplines (16:50) - D 3: R3**

1 Codes:

- FUNCTIONS_DISCIPLINES_MAPPING

◇ ○ **SUBSYSTEMS_CREATED_BEFORE_SYSREQS**

1 Quotations:

☰ 9:5 Contracts for Independent Constituent/Subsystems were awarded in the n..... (569:813) - D 9: R9

3 Codes:

● 30-INDEP-CONS-INT-PROBLEMS / ○ COST_OVER_REQUIREMENTS / ○ SUBSYSTEMS_CREATED_BEFORE_SYSREQS

◇ ● **31-OTHER**

1 Quotations:

☰ 2:6 Data model/schema changes, backwards/forward compatibility issues betw..... (928:1314) - D 2: R2

2 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● 31-OTHER

◇ ○ **ARCH-DECISIONS-NO-TEAMWORK**

1 Quotations:

☰ 14:3 Decisión were taken by System level depending on feasibility and after..... (132:259) - D 14: R14

2 Codes:

● 22-ARCH-DECISIONS / ○ ARCH-DECISIONS-NO-TEAMWORK

◇ ○ **CONOPS**

1 Quotations:

☰ 8:8 Definition of concepts of operation, concepts of usage and concepts of..... (1393:1534) - D 8: R8

3 Codes:

- 29-INDEPENDENT-CONS-INT / ○ CONOPS / ○ INDEPENDENT-CONST-INT-APPROACH
-

◇ ○ GROWING_COMPLEXITY

1 Quotations:

- ☰ 2:15 Growing complexity (1145:1162) - D 2: R2

1 Codes:

- GROWING_COMPLEXITY
-

◇ ○ POOR_DOCUMENTATION

2 Quotations:

- ☰ 2:1 Poorly documented or incomplete elicitation results and stakeholder an..... (16:92) - D 2: R2

3 Codes:

- 21-REQ-PROBLEMS / ○ INCOMPLETE SYSTEM REQUIREMENTS / ○ POOR_DOCUMENTATION

- ☰ 4:1 Architectural documents were not updated as the system evolves (21:82) - D 4: R4

2 Codes:

- 23-ARCH-DEC-PROBLEMS / ○ POOR_DOCUMENTATION
-

◇ ○ COST_OVER_REQUIREMENTS

2 Quotations:

- ☰ 9:5 Contracts for Independent Constituent/Subsystems were awarded in the n..... (569:813) - D 9: R9

3 Codes:

- 30-INDEP-CONS-INT-PROBLEMS / ○ COST_OVER_REQUIREMENTS / ○ SUBSYSTEMS_CREATED_BEFORE_SYSREQS

☰ 41:3 The architects were not taken serious. Instead management primarily li..... (331:464) - D 41: R41

2 Codes:

● 28-EMERGENCE-ADD-PROBLEMS / ○ COST_OVER_REQUIREMENTS

◇ ○ **EXPERIENCE-BASED-EVALUATION**

2 Quotations:

☰ 18:2 Architectural decisions were evaluated using informal experiential-bas..... (60:212) - D 18: R18

3 Codes:

● 24-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH / ○ EXPERIENCE-BASED-EVALUATION

☰ 38:2 Instead of simulations we also use estimations by experts, especially..... (377:525) - D 38: R38

3 Codes:

● 24-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH / ○ EXPERIENCE-BASED-EVALUATION

◇ ○ **COMPLEX_PROCESS_FOR_STAKEHOLDERS**

2 Quotations:

☰ 21:3 The system-level architecture evaluation required some training and go..... (333:511) - D 21: R21

3 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ COMPLEX_PROCESS_FOR_STAKEHOLDERS / ○ EVALUATION COMPLEXITY

☰ 53:2 Typically the end user finds it hard to think about the software / HMI..... (205:524) - D 53: R53

3 Codes:

● 21-REQ-PROBLEMS / ○ COMPLEX_PROCESS_FOR_STAKEHOLDERS / ○ REQUIREMENTS_ADDED_LATE

◇ ○ **THIRD_PARTY_COMPONENTS_INCONSISTENCIES**

2 Quotations:

☰ **3:2 Problems caused by suppliers (inconsistencies in descriptions)
Architec..... (97:246) - D 3: R3**

4 Codes:

● 23-ARCH-DEC-PROBLEMS / ○ ARCHITECTURE_DRIFT / ○
THIRD_PARTY_COMPONENTS_INCONSISTENCIES / ○ TIME_AND_RESOURCES_PROBLEM

☰ **34:7 '- The suppliers did not understand the specifications - The
specifica..... (1001:1279) - D 34: R34**

4 Codes:

● 30-INDEP-CONS-INT-PROBLEMS / ● INCOMPLETE_INTERFACE_SPECIFICATIONS / ○
LACK_OF_SKILLS_FOR_UNDERSTANDING_INTERFACES / ○
THIRD_PARTY_COMPONENTS_INCONSISTENCIES

◇ ○ **REQUIREMENTS_ADDED_LATE**

2 Quotations:

☰ **41:1 Quality of Customer Requirements not sufficient, Several NFRs
unclear/..... (16:144) - D 41: R41**

3 Codes:

● 21-REQ-PROBLEMS / ○ INCOMPLETE_SYSTEM_REQUIREMENTS / ○
REQUIREMENTS_ADDED_LATE

☰ **53:2 Typically the end user finds it hard to think about the software /
HMI..... (205:524) - D 53: R53**

3 Codes:

● 21-REQ-PROBLEMS / ○ COMPLEX_PROCESS_FOR_STAKEHOLDERS / ○
REQUIREMENTS_ADDED_LATE

◇ ○ **SYSTEM-LEVEL-SOFTWARE-LEVEL-REQS-TRADEOFF**

2 Quotations:

☰ 25:4 Development complexity - complexity of software design/code due to sub..... (1121:1366) - D 25: R25

2 Codes:

● 23-ARCH-DEC-PROBLEMS / ○ SYSTEM-LEVEL-SOFTWARE-LEVEL-REQS-TRADEOFF

☰ 30:1 System Level requirements posed significant limits on the software and..... (16:392) - D 30: R30

4 Codes:

● 21-REQ-PROBLEMS / ● 23-INTERDISCIPLINARY_DIFFERENCES_RELATED / ○ ASSUMPTIONS_ABOUT_THE_OTHER_DISCIPLINE / ○ SYSTEM-LEVEL-SOFTWARE-LEVEL-REQS-TRADEOFF

◇ ● HARDWARE-SOFTWARE-CHANGES-BALANCE

2 Quotations:

☰ 9:6 Rework often on the subsystem not in error when another subsystem fail..... (843:999) - D 9: R9

3 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● HARDWARE-SOFTWARE-CHANGES-BALANCE / ○ NEED_TO_REWORK_WORKING_SUBSYSTEMS

☰ 12:4 Added systems to act as integration bridges. Cannot solve all in softw..... (343:442) - D 12: R12

3 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● HARDWARE-SOFTWARE-CHANGES-BALANCE / ○ NEW_SYSTEMS_AS_INTEGRATION_BRIDGES

◇ ○ COST_PATCHING_SW_ARCH_HOLES

2 Quotations:

☰ 9:4 On-going rework. Defect growth extending post repeated projection ov..... (372:540) - D 9: R9

2 Codes:

- 28-EMERGENCE-ADD-PROBLEMS / ○ COST_PATCHING_SW_ARCH_HOLES

 **12:3 Added cost - for systems to patch sw arch holes. (265:313) - D 12: R12**

2 Codes:

- 28-EMERGENCE-ADD-PROBLEMS / ○ COST_PATCHING_SW_ARCH_HOLES
-

 ○ **LACK_OF_SKILLS_FOR_UNDERSTANDING_INTERFACES**

2 Quotations:

 **10:4 Lack of knowledge on understanding interfaces (188:232) - D 10: R10**

2 Codes:

- 30-INDEP-CONS-INT-PROBLEMS / ○ LACK_OF_SKILLS_FOR_UNDERSTANDING_INTERFACES

 **34:7 '- The suppliers did not understand the specifications - The specifica..... (1001:1279) - D 34: R34**

4 Codes:

- 30-INDEP-CONS-INT-PROBLEMS / ● INCOMPLETE_INTERFACE_SPECIFICATIONS / ○ LACK_OF_SKILLS_FOR_UNDERSTANDING_INTERFACES / ○ THIRD_PARTY_COMPONENTS_INCONSISTENCIES
-

 ○ **NO_EVALUATION**

2 Quotations:

 **31:4 Same answer as 3.4: We were driven more by user stories and use cases..... (1302:1774) - D 31: R31**

2 Codes:

- 25-SW-LEVEL-ARCH-EVAL / ○ NO_EVALUATION

 **56:3 Evaluations were done, but ad-hoc. There was not a formally defined re..... (167:276) - D 56: R56**

2 Codes:

- 25-SW-LEVEL-ARCH-EVAL / ○ NO_EVALUATION

◇ ○ UNREALISTIC-TESTING-ENVIRONMENTS

3 Quotations:

☰ 19:2 Lab testing was much less likely to show any emergent behavior due to..... (207:376) - D 19: R19

2 Codes:

- 28-EMERGENCE-ADD-PROBLEMS / ○ UNREALISTIC-TESTING-ENVIRONMENTS

☰ 19:3 very few problems showed up until the system was stressed at the syste..... (406:483) - D 19: R19

2 Codes:

- 31-INDEP-CONS-EVOL-PROBLEMS / ○ UNREALISTIC-TESTING-ENVIRONMENTS

☰ 51:3 Testing. (165:172) - D 51: R51

2 Codes:

- 30-INDEP-CONS-INT-PROBLEMS / ○ UNREALISTIC-TESTING-ENVIRONMENTS
-

◇ ○ EVALUATION COMPLEXITY

3 Quotations:

☰ 10:2 Integration, Understanding of processes (92:130) - D 10: R10

2 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ EVALUATION COMPLEXITY

☰ 21:3 The system-level architecture evaluation required some training and go..... (333:511) - D 21: R21

3 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ COMPLEX_PROCESS_FOR_STAKEHOLDERS / ○ EVALUATION COMPLEXITY

☰ 24:4 Coverage was spotty. This was a combination of the approach used, but..... (452:684) - D 24: R24

3 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ EVALUATION COMPLEXITY / ○ INSUFFICIENT_EVALUATION
-

◇ ○ **HARDWARE_TIMING**

3 Quotations:

- ☰ **3:3 Timing of hardware components Undocumented backdoors (274:325) - D 3: R3**

3 Codes:

- 28-EMERGENCE-ADD-PROBLEMS / ○ HARDWARE_TIMING / ○ SUBSYSTEMS-RELATED EMERGENCE CAUSES

- ☰ **4:2 The interface specified was formally compliant to established standard..... (111:260) - D 4: R4**

2 Codes:

- 30-INDEP-CONS-INT-PROBLEMS / ○ HARDWARE_TIMING

- ☰ **9:1 Interfaces, effects of radiation on processor resets (power off and re..... (16:175) - D 9: R9**

3 Codes:

- 21-REQ-PROBLEMS / ○ HARDWARE_TIMING / ○ LACK-OF-DOMAIN-KNOWLEDGE
-

◇ ☰ ○ **MIXED-EVAL-APPROACH**

3 Quotations:

- ☰ **7:2 System level architectural decisions were made simultaneously by separ..... (162:488) - D 7: R7**

4 Codes:

- 22-ARCH-DECISIONS / ● 24-ARCH-EVAL / ○ MIXED-EVAL-APPROACH / ○ MULTIDIS-ARCH-DECISIONS-APPROACH

- ☰ **8:4 Architecture was evaluated with various approaches as now described in..... (589:890) - D 8: R8**

3 Codes:

- 24-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH / ○ MIXED-EVAL-APPROACH

 **60:4 Some architectural decisions are inherited from domain culture with ov..... (1121:1555) - D 60: R60**

2 Codes:

- 24-ARCH-EVAL / ○ MIXED-EVAL-APPROACH
-

○ **SYSTEM-SOFTWARE-ALIGNMENT**

3 Quotations:

 **24:3 Two approaches: after the fact linkage of system to software requireme..... (273:428) - D 24: R24**

3 Codes:

- 25-SW-LEVEL-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH / ○ SYSTEM-SOFTWARE-ALIGNMENT

 **34:4 We use an in-house method to peer review the alignment between the bus..... (411:544) - D 34: R34**

3 Codes:

- 25-SW-LEVEL-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH / ○ SYSTEM-SOFTWARE-ALIGNMENT

 **37:2 Software architecture was evaluated in close collaboration with system..... (68:277) - D 37: R37**

2 Codes:

- 25-SW-LEVEL-ARCH-EVAL / ○ SYSTEM-SOFTWARE-ALIGNMENT
-

● **CHANGE_COSTS**

3 Quotations:

 **33:2 Time waste for propose changes in the interfaces but then wait for the..... (170:326) - D 33: R33**

2 Codes:

● 23-ARCH-DEC-PROBLEMS / ● CHANGE_COSTS

☰ 33:4 Mainly time waste in the review, validation and changes, into the neig..... (466:587) - D 33: R33

2 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● CHANGE_COSTS

☰ 38:5 Changes often result claims requiring additional efforts (at least fina..... (789:948) - D 38: R38

2 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● CHANGE_COSTS

◇ ○ A-POSTERIORI-EMERGENCE-ADDRESSED

3 Quotations:

☰ 18:4 Undesired emergent behavior was addressed not by the architecture a pr..... (350:566) - D 18: R18

3 Codes:

● 27-EMERGENCE-ADDRESS-OTHER / ○ A-POSTERIORI-EMERGENCE-ADDRESSED / ○ EMERGENCE-ADDRESS-APPROACH

☰ 30:4 Such problems were usually solved without changing the architecture (n..... (1007:1185) - D 30: R30

3 Codes:

● 28-EMERGENCE-ADD-PROBLEMS / ○ A-POSTERIORI-EMERGENCE-ADDRESSED / ○ EMERGENCE-ADDRESS-APPROACH

☰ 33:3 Emergent behaviour was addressed as par of the Assembly Integration and..... (349:436) - D 33: R33

2 Codes:

● 27-EMERGENCE-ADDRESS-OTHER / ○ A-POSTERIORI-EMERGENCE-ADDRESSED

◇ ○ ARCH-EVAL-OTHER-APPROACHES

3 Quotations:

 **9:2 Architectural decisions were made too often with a short term view of..... (190:295) - D 9: R9**

3 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVAL-OTHER-APPROACHES / ○ ARCHITECTURE_EVALUATION_APPROACH

 **21:2 The architectural decisions were evaluated within the architecting pro..... (201:309) - D 21: R21**

3 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVAL-OTHER-APPROACHES / ○ ARCHITECTURE_EVALUATION_APPROACH

 **58:3 evaluated by test driven development (260:295) - D 58: R58**

3 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVAL-OTHER-APPROACHES / ○ ARCHITECTURE_EVALUATION_APPROACH

○ LACK-OF-DOMAIN-KNOWLEDGE

3 Quotations:

 **9:1 Interfaces, effects of radiation on processor resets (power off and re..... (16:175) - D 9: R9**

3 Codes:

● 21-REQ-PROBLEMS / ○ HARDWARE_TIMING / ○ LACK-OF-DOMAIN-KNOWLEDGE

 **11:2 Common understanding among involved disciplines, even from the same do..... (46:119) - D 11: R11**

2 Codes:

● 21-REQ-PROBLEMS / ○ LACK-OF-DOMAIN-KNOWLEDGE

 **38:1 Lack of domain knowledge and business understanding in SW-Development..... (16:362) - D 38: R38**

2 Codes:

◇ ○ INDEPENDENT-CONST-INT-APPROACH

3 Quotations:

☰ 8:8 Definition of concepts of operation, concepts of usage and concepts of..... (1393:1534) - D 8: R8

3 Codes:

● 29-INDEPENDENT-CONS-INT / ○ CONOPS / ○ INDEPENDENT-CONST-INT-APPROACH

☰ 24:6 Handling of interfaces varied with the Constituent. In some cases, onl..... (908:1126) - D 24: R24

2 Codes:

● 29-INDEPENDENT-CONS-INT / ○ INDEPENDENT-CONST-INT-APPROACH

☰ 50:7 Definition of the subsystem interfaces was an ongoing process (agile)..... (1151:1308) - D 50: R50

2 Codes:

● 29-INDEPENDENT-CONS-INT / ○ INDEPENDENT-CONST-INT-APPROACH

◇ ○ UNSATISFIED_REQUIREMENTS

4 Quotations:

☰ 1:2 Stakeholders Needs did not addressed. (97:133) - D 1: R1

2 Codes:

● 23-ARCH-DEC-PROBLEMS / ○ UNSATISFIED_REQUIREMENTS

☰ 18:5 Available software, driven by the system level decisions, did not prov..... (594:706) - D 18: R18

2 Codes:

● 28-EMERGENCE-ADD-PROBLEMS / ○ UNSATISFIED_REQUIREMENTS

 **20:4 If undesired emergent behavior includes not meeting key system require..... (951:1114) - D 20: R20**

2 Codes:

- 28-EMERGENGE-ADD-PROBLEMS / ○ UNSATISFIED_REQUIREMENTS

 **49:2 System and software architectures did not fully satisfy functional saf..... (204:311) - D 49: R49**

1 Codes:

- UNSATISFIED_REQUIREMENTS
-

 ○ **LACK_OF_TRACEABILITY**

4 Quotations:

 **14:5 Lack of trazability, patches and problems not completely solved but c..... (316:405) - D 14: R14**

3 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ LACK_OF_TRACEABILITY

 **27:1 Disconnect was so great that the subsystem-level requirements were aba..... (16:173) - D 27: R27**

2 Codes:

- 21-REQ-PROBLEMS / ○ LACK_OF_TRACEABILITY

 **27:2 Disconnect and lack of traceability between system level and software..... (203:316) - D 27: R27**

2 Codes:

- 31-INDEP-CONS-EVOL-PROBLEMS / ○ LACK_OF_TRACEABILITY

 **58:2 Architecture stayed mostly at logical level, somewhat separated from t..... (91:245) - D 58: R58**

2 Codes:

- 21-REQ-PROBLEMS / ○ LACK_OF_TRACEABILITY

◇ ○ **INSUFFICIENT_EVALUATION**

4 Quotations:

☰ **19:1 Evaluation seemed to be informal. The chief architect would be notified..... (22:179) - D 19: R19**

3 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ INFORMAL_EVALUATION / ○ INSUFFICIENT_EVALUATION

☰ **24:4 Coverage was spotty. This was a combination of the approach used, but..... (452:684) - D 24: R24**

3 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ EVALUATION_COMPLEXITY / ○ INSUFFICIENT_EVALUATION

☰ **50:6 Overall insufficient evaluation. No trending of quality attributes. (1059:1125) - D 50: R50**

3 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ INSUFFICIENT_EVALUATION / ○ NO-QA-TRENDING

☰ **53:4 More lessons could have been learned by better evaluation. (672:729) - D 53: R53**

2 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ INSUFFICIENT_EVALUATION

◇ ○ **EMERGENCY-ADDRESS-APPROACH**

4 Quotations:

☰ **8:6 Emergent behavior was stated at operational level and analyzed through..... (1018:1177) - D 8: R8**

3 Codes:

● 27-EMERGENCY-ADDRESS-OTHER / ○ EMERGENCY-ADDRESS-APPROACH / ○ MAPPED-TO-OPTION

 **18:4 Undesired emergent behavior was addressed not by the architecture a pr..... (350:566) - D 18: R18**

3 Codes:

● 27-EMERGENCE-ADDRESS-OTHER / ○ A-POSTERIORI-EMERGENCE-ADDRESSED / ○ EMERGENCE-ADDRESS-APPROACH

 **30:4 Such problems were usually solved without changing the architecture (n..... (1007:1185) - D 30: R30**

3 Codes:

● 28-EMERGENCE-ADD-PROBLEMS / ○ A-POSTERIORI-EMERGENCE-ADDRESSED / ○ EMERGENCE-ADDRESS-APPROACH

 **38:3 Emergent behaviour is considered as a problem of "architecture governa..... (548:666) - D 38: R38**

2 Codes:

● 27-EMERGENCE-ADDRESS-OTHER / ○ EMERGENCE-ADDRESS-APPROACH

○ **MAPPED-TO-OPTION**

4 Quotations:

 **8:6 Emergent behavior was stated at operational level and analyzed through..... (1018:1177) - D 8: R8**

3 Codes:

● 27-EMERGENCE-ADDRESS-OTHER / ○ EMERGENCE-ADDRESS-APPROACH / ○ MAPPED-TO-OPTION

 **14:6 mainly addressed by system level architecture and SW level architectur..... (428:512) - D 14: R14**

2 Codes:

● 27-EMERGENCE-ADDRESS-OTHER / ○ MAPPED-TO-OPTION

 **20:3 Emergent behavior was not considered because the contractor did not ap..... (701:923) - D 20: R20**

3 Codes:

● 27-EMERGENCE-ADDRESS-OTHER / ○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE / ○ MAPPED-TO-OPTION

☰ **24:7 Interface specs although incomplete (see previous note), were quite he..... (1155:1266) - D 24: R24**

3 Codes:

● 30-INDEP-CONS-INT-PROBLEMS / ● INCOMPLETE_INTERFACE_SPECIFICATIONS / ○ MAPPED-TO-OPTION

◇ ○ MULTIDIS-ARCH-DECISIONS-APPROACH

4 Quotations:

☰ **7:2 System level architectural decisions were made simultaneously by separ..... (162:488) - D 7: R7**

4 Codes:

● 22-ARCH-DECISIONS / ● 24-ARCH-EVAL / ○ MIXED-EVAL-APPROACH / ○ MULTIDIS-ARCH-DECISIONS-APPROACH

☰ **8:2 Decisions taken by a Board of Stakeholders with a collaborative appra..... (173:416) - D 8: R8**

2 Codes:

● 22-ARCH-DECISIONS / ○ MULTIDIS-ARCH-DECISIONS-APPROACH

☰ **31:2 System-level and software-level architectural decisions were taken tog..... (636:821) - D 31: R31**

2 Codes:

● 22-ARCH-DECISIONS / ○ MULTIDIS-ARCH-DECISIONS-APPROACH

☰ **60:3 Several layers of system and software each taking its own architectura..... (858:1106) - D 60: R60**

2 Codes:

● 22-ARCH-DECISIONS / ○ MULTIDIS-ARCH-DECISIONS-APPROACH

◇ ○ TEAM COORDINATION CHALLENGES

4 Quotations:

 **1:1 The integration of the teams and whole goals communication. (16:74) - D 1: R1**

2 Codes:

- 21-REQ-PROBLEMS / ○ TEAM COORDINATION CHALLENGES

 **10:1 Communications between systems and software engineers (16:68) - D 10: R10**

2 Codes:

- 21-REQ-PROBLEMS / ○ TEAM COORDINATION CHALLENGES

 **24:1 Poor coordination, understanding, of dominant requirements—whether ori..... (16:132) - D 24: R24**

2 Codes:

- 21-REQ-PROBLEMS / ○ TEAM COORDINATION CHALLENGES

 **31:1 Assumptions of engineers varied in relation to the maturity of require..... (16:616) - D 31: R31**

3 Codes:

- 21-REQ-PROBLEMS / ○ ASSUMPTIONS_ABOUT_THE_OTHER_DISCIPLINE / ○ TEAM COORDINATION CHALLENGES

○ INTERDISCIPLINARY_CONCEPTS_INTERPRETATION

5 Quotations:

 **8:3 Cultural, methodological, semantic, economical, social, etc. problems..... (439:574) - D 8: R8**

5 Codes:

- 23-ARCH-DEC-PROBLEMS / ○ CULTURAL / ○ ECONOMICAL / ○ INTERDISCIPLINARY_CONCEPTS_INTERPRETATION / ○ METHODOLOGICAL

 **31:5 Documentation was a problem. Notably, our organization assumes that P..... (1798:2102) - D 31: R31**

3 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ INTERDISCIPLINARY_CONCEPTS_INTERPRETATION / ○ ORGANIZATION_CONSTRAINTS

☰ **34:2 Operations and manufacturing have completely different meanings in sys..... (244:340) - D 34: R34**

2 Codes:

● 21-REQ-PROBLEMS / ○ INTERDISCIPLINARY_CONCEPTS_INTERPRETATION

☰ **34:5 Language, concepts, conflicting terms and standards. For example, in s..... (568:879) - D 34: R34**

2 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ INTERDISCIPLINARY_CONCEPTS_INTERPRETATION

☰ **60:9 Difficulty to have homogeneous names and concepts. Lack of explicit ar..... (941:1049) - D 60: R60**

2 Codes:

● 23-ARCH-DEC-PROBLEMS / ○ INTERDISCIPLINARY_CONCEPTS_INTERPRETATION

◇ ○ **ASSUMPTIONS_ABOUT_THE_OTHER_DISCIPLINE**

5 Quotations:

☰ **20:1 The focus was on the subsystem level with the assumption that the syst..... (16:372) - D 20: R20**

3 Codes:

● 21-REQ-PROBLEMS / ○ ASSUMPTIONS_ABOUT_THE_OTHER_DISCIPLINE / ○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE

☰ **25:2 System, software, and programmatic (cost/schedule) goals of the archit..... (450:871) - D 25: R25**

3 Codes:

● 21-REQ-PROBLEMS / ● 23-INTERDISCIPLINARY_DIFFERENCES_RELATED / ○ ASSUMPTIONS_ABOUT_THE_OTHER_DISCIPLINE

☰ **30:1 System Level requirements posed significant limits on the software and..... (16:392) - D 30: R30**

4 Codes:

- 21-REQ-PROBLEMS / ● 23-INTERDISCIPLINARY_DIFFERENCES_RELATED / ○ ASSUMPTIONS_ABOUT_THE_OTHER_DISCIPLINE / ○ SYSTEM-LEVEL-SOFTWARE-LEVEL-REQS-TRADEOFF

☰ **31:1 Assumptions of engineers varied in relation to the maturity of require..... (16:616) - D 31: R31**

3 Codes:

- 21-REQ-PROBLEMS / ○ ASSUMPTIONS_ABOUT_THE_OTHER_DISCIPLINE / ○ TEAM COORDINATION CHALLENGES

☰ **49:3 Problems encountered with omitted behavior due to misunderstanding of..... (339:539) - D 49: R49**

2 Codes:

- 28-EMERGENCE-ADD-PROBLEMS / ○ ASSUMPTIONS_ABOUT_THE_OTHER_DISCIPLINE

◇ ○ INCOMPLETE SYSTEM REQUIREMENTS

5 Quotations:

☰ **2:1 Poorly documented or incomplete elicitation results and stakeholder an..... (16:92) - D 2: R2**

3 Codes:

- 21-REQ-PROBLEMS / ○ INCOMPLETE SYSTEM REQUIREMENTS / ○ POOR_DOCUMENTATION

☰ **2:2 Inconsistent design. Incomplete requirements leading to long re-work c..... (116:330) - D 2: R2**

4 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ DEFICIENT_BUSINESS_REQ / ○ INCOMPLETE SYSTEM REQUIREMENTS

☰ **41:1 Quality of Customer Requirements not sufficient, Several NFRs unclear/..... (16:144) - D 41: R41**

3 Codes:

- 21-REQ-PROBLEMS / ○ INCOMPLETE SYSTEM REQUIREMENTS / ○ REQUIREMENTS_ADDED_LATE

☰ **50:2 Scarce description of requirements on system level. Change Management..... (496:673) - D 50: R50**

3 Codes:

- 21-REQ-PROBLEMS / ○ 21-REQUIREMENTS_MANAGEMENT-RELATED-PROBLEM / ○ INCOMPLETE SYSTEM REQUIREMENTS

☰ **60:2 'Vagueness' in system level requirement (when train is at stop) leaves..... (485:838) - D 60: R60**

2 Codes:

- 21-REQ-PROBLEMS / ○ INCOMPLETE SYSTEM REQUIREMENTS
-

◇ ○ **SUBSYSTEMS-RELATED EMERGENCE CAUSES**

5 Quotations:

☰ **3:3 Timing of hardware components Undocumented backdoors (274:325) - D 3: R3**

3 Codes:

- 28-EMERGENCE-ADD-PROBLEMS / ○ HARDWARE_TIMING / ○ SUBSYSTEMS-RELATED EMERGENCE CAUSES

☰ **21:4 use of shared resources by competing systems (539:582) - D 21: R21**

2 Codes:

- 28-EMERGENCE-ADD-PROBLEMS / ○ SUBSYSTEMS-RELATED EMERGENCE CAUSES

☰ **23:1 COTS selected for subsystems too ridged and did not support emerging n..... (26:148) - D 23: R23**

3 Codes:

- 28-EMERGENCE-ADD-PROBLEMS / ○ COTS_SUBSYSTEMS_LIMITATIONS / ○ SUBSYSTEMS-RELATED EMERGENCE CAUSES

☰ **25:6 Emergent behaviors in this case were primarily caused by faulty compon..... (1449:1567) - D 25: R25**

2 Codes:

- 28-EMERGENCE-ADD-PROBLEMS / ○ SUBSYSTEMS-RELATED EMERGENCE CAUSES

☰ **60:7 Interfaces generally defined at system level as message exchanges betw..... (2105:2372) - D 60: R60**

3 Codes:

- 30-INDEP-CONS-INT-PROBLEMS / ○ SOFTWARE-LEVEL-INTERFACES-BELOW-SYSTEM-RADAR /
 - SUBSYSTEMS-RELATED EMERGENCE CAUSES
-

◇ ● **23-INTERDISCIPLINARY_DIFFERENCES_RELATED**

6 Quotations:

☰ **8:1 Collaborative Architecting activities involving several nations and se..... (16:153) - D 8: R8**

2 Codes:

- 21-REQ-PROBLEMS / ● 23-INTERDISCIPLINARY_DIFFERENCES_RELATED

☰ **13:1 Multiple Disciplines with different experts in each field: System engi..... (21:340) - D 13: R13**

2 Codes:

- 23-ARCH-DEC-PROBLEMS / ● 23-INTERDISCIPLINARY_DIFFERENCES_RELATED

☰ **16:3 Inter discipline conflict (445:469) - D 16: R16**

2 Codes:

- 23-INTERDISCIPLINARY_DIFFERENCES_RELATED / ● 26-ARCH-EVAL-PROBLEMS

☰ **25:2 System, software, and programmatic (cost/schedule) goals of the archit..... (450:871) - D 25: R25**

3 Codes:

- 21-REQ-PROBLEMS / ● 23-INTERDISCIPLINARY_DIFFERENCES_RELATED / ○ ASSUMPTIONS_ABOUT_THE_OTHER_DISCIPLINE

☰ **30:1 System Level requirements posed significant limits on the software and..... (16:392) - D 30: R30**

4 Codes:

● 21-REQ-PROBLEMS / ● 23-INTERDISCIPLINARY_DIFFERENCES_RELATED / ○ ASSUMPTIONS_ABOUT_THE_OTHER_DISCIPLINE / ○ SYSTEM-LEVEL-SOFTWARE-LEVEL-REQS-TRADEOFF

 **54:1 Decomposition of the system was different from system (more mechanical..... (16:100) - D 54: R54**

2 Codes:

● 21-REQ-PROBLEMS / ● 23-INTERDISCIPLINARY_DIFFERENCES_RELATED

○ **MODELLING_AND_SIMULATION LIMITATIONS**

6 Quotations:

 **2:3 Impossible to model all possible emergent behaviour, particularly when..... (358:779) - D 2: R2**

2 Codes:

● 28-EMERGENCE-ADD-PROBLEMS / ○ MODELLING_AND_SIMULATION LIMITATIONS

 **11:5 Imperfectness of Co-Simulation (336:365) - D 11: R11**

2 Codes:

● 28-EMERGENCE-ADD-PROBLEMS / ○ MODELLING_AND_SIMULATION LIMITATIONS

 **42:3 Underscrutinized complex interactions gave rise to many bugs and secur..... (184:263) - D 42: R42**

3 Codes:

● 23-ARCH-DEC-PROBLEMS / ○ BUGS/ISSUES CAUSED BY UNDERSCRUTINIZED COMPLEX INTERACTIONS / ○ MODELLING_AND_SIMULATION LIMITATIONS

 **51:1 Integration, Testing and Validation. Simulate field conditions. (16:78) - D 51: R51**

2 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ MODELLING_AND_SIMULATION LIMITATIONS

 **51:2 Simulate real field conditions. (106:136) - D 51: R51**

2 Codes:

● 28-EMERGENCE-ADD-PROBLEMS / ○ MODELLING_AND_SIMULATION LIMITATIONS

☰ **60:6 System uses wireless communication that has important error rate, link..... (1748:2076) - D 60: R60**

3 Codes:

● 28-EMERGENCE-ADD-PROBLEMS / ○ MODELLING_AND_SIMULATION LIMITATIONS / ○ SYSTEM-PHENOMENA-DIFFICULT-TO-CHARACTERIZE

◇ ● **CONFIGURATION_MANAGEMENT**

6 Quotations:

☰ **1:5 Configuration Management is a challenge to this subjects. (331:387) - D 1: R1**

2 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● CONFIGURATION_MANAGEMENT

☰ **8:9 Stability of the interface specifications with regards to evolution of..... (1563:1646) - D 8: R8**

3 Codes:

● 30-INDEP-CONS-INT-PROBLEMS / ● 31-INDEP-CONS-EVOL-PROBLEMS / ● CONFIGURATION_MANAGEMENT

☰ **24:8 For constituent systems in current development, the interface specifications..... (1296:1385) - D 24: R24**

2 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● CONFIGURATION_MANAGEMENT

☰ **31:8 documentation and version control of interface documentation was an is..... (2341:2414) - D 31: R31**

1 Codes:

● CONFIGURATION_MANAGEMENT

☰ **34:8 Specifications are not enough, you need lifecycle policies. How long w..... (1309:1509) - D 34: R34**

2 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● CONFIGURATION_MANAGEMENT

☰ 41:5 However, close synchronization was required between the affected teams..... (606:677) - D 41: R41

1 Codes:

● CONFIGURATION_MANAGEMENT

◇ ○ ARCH-EVALUATION-CRITERIA

6 Quotations:

☰ 1:3 Evaluate criteria, is the big challenge to define consider both aspect..... (157:248) - D 1: R1

2 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ ARCH-EVALUATION-CRITERIA

☰ 8:5 It is very difficult to get a set of weighted criteria agreed by the S..... (914:995) - D 8: R8

2 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ ARCH-EVALUATION-CRITERIA

☰ 11:3 Decisions were evaluated against architectural drivers (134:187) - D 11: R11

3 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVALUATION-CRITERIA / ○ ARCHITECTURAL_DRIVERS_ANALYSIS

☰ 24:2 Most analysis was done with scenario-based techniques. This tended to..... (147:258) - D 24: R24

3 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVALUATION-CRITERIA / ○ ARCHITECTURE_EVALUATION_APPROACH

☰ 31:3 We were driven more by user stories and use cases. A great deal of we..... (836:1287) - D 31: R31

3 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVALUATION-CRITERIA / ○ ARCHITECTURE_EVALUATION_APPROACH

☰ **44:1 By means of use cases and scenarios (13:48) - D 44: R44**

2 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVALUATION-CRITERIA

◇ ● INCOMPLETE_INTERFACE_SPECIFICATIONS

7 Quotations:

☰ **20:5 Evolution of the subsystems did not affect changes to the interface sp..... (1144:1331) - D 20: R20**

2 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● INCOMPLETE_INTERFACE_SPECIFICATIONS

☰ **24:7 Interface specs although incomplete (see previous note), were quite he..... (1155:1266) - D 24: R24**

3 Codes:

● 30-INDEP-CONS-INT-PROBLEMS / ● INCOMPLETE_INTERFACE_SPECIFICATIONS / ○ MAPPED-TO-OPTION

☰ **34:7 ' - The suppliers did not understand the specifications - The specifica..... (1001:1279) - D 34: R34**

4 Codes:

● 30-INDEP-CONS-INT-PROBLEMS / ● INCOMPLETE_INTERFACE_SPECIFICATIONS / ○ LACK_OF_SKILLS_FOR_UNDERSTANDING_INTERFACES / ○ THIRD_PARTY_COMPONENTS_INCONSISTENCIES

☰ **37:4 Missing clarity on intended usage of APIs - more docs and examples imp..... (428:502) - D 37: R37**

2 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ● INCOMPLETE_INTERFACE_SPECIFICATIONS

☰ **41:2 Two components both agreed on an interface, but without proper behavio..... (168:303) - D 41: R41**

1 Codes:

- INCOMPLETE_INTERFACE_SPECIFICATIONS

☰ 41:4 Some changes were actually required due to improper interface specific..... (494:677) - D 41: R41

2 Codes:

- 31-INDEP-CONS-EVOL-PROBLEMS / ● INCOMPLETE_INTERFACE_SPECIFICATIONS

☰ 51:4 Specification not complete to consider all cases. (202:250) - D 51: R51

2 Codes:

- 31-INDEP-CONS-EVOL-PROBLEMS / ● INCOMPLETE_INTERFACE_SPECIFICATIONS
-

◇ ○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE

7 Quotations:

☰ 12:2 Too late, much effort needed to make bandaid patches. Was not a cohesi..... (72:237) - D 12: R12

3 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE

☰ 16:2 Gaining a shared, and agreed, understanding of a desired level of abst..... (53:421) - D 16: R16

2 Codes:

- 21-REQ-PROBLEMS / ○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE

☰ 17:2 I assume you mean system architecting, and not software architecting?..... (149:464) - D 17: R17

2 Codes:

- 21-REQ-PROBLEMS / ○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE

☰ 20:1 The focus was on the subsystem level with the assumption that the syst..... (16:372) - D 20: R20

3 Codes:

● 21-REQ-PROBLEMS / ○ ASSUMPTIONS_ABOUT_THE_OTHER_DISCIPLINE / ○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE

 **20:2 Ultimately, the system was unable to meet its system requirements even..... (396:678) - D 20: R20**

1 Codes:

○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE

 **20:3 Emergent behavior was not considered because the contractor did not ap..... (701:923) - D 20: R20**

3 Codes:

● 27-EMERGENCE-ADDRESS-OTHER / ○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE / ○ MAPPED-TO-OPTION

 **60:8 Context was a product line development used by several projects, with..... (2402:2733) - D 60: R60**

3 Codes:

● 31-INDEP-CONS-EVOL-PROBLEMS / ○ CHANGES_COST_ASSESSMENT / ○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE

○ **ARCHITECTURE_PATCHES**

7 Quotations:

 **2:2 Inconsistent design. Incomplete requirements leading to long re-work c..... (116:330) - D 2: R2**

4 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ DEFICIENT_BUSINESS_REQ / ○ INCOMPLETE SYSTEM REQUIREMENTS

 **12:2 Too late, much effort needed to make bandaid patches. Was not a cohesi..... (72:237) - D 12: R12**

3 Codes:

● 26-ARCH-EVAL-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ LACK-OF-SYSTEM-LEVEL-PERSPECTIVE

 **14:2 SW constraints, continious patches... (76:112) - D 14: R14**

3 Codes:

- 21-REQ-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ SOFTWARE_CONSTRAINTS

 **14:5 Lack of trazability, patches and problems not completely solved but c..... (316:405) - D 14: R14**

3 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ LACK_OF_TRACEABILITY

 **16:4 Design defects were often only identified in later stages of developme..... (497:602) - D 16: R16**

3 Codes:

- 28-EMERGENCE-ADD-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ TIME_AND_RESOURCES_PROBLEM

 **17:3 Flaws in the architecture were discovered deep into implementation, an..... (488:642) - D 17: R17**

3 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ ARCH-PROBLEMS-DISCOVERED-AT-IMPLEMENTATION

 **30:3 There was no clear separation between software-level and system-level..... (643:979) - D 30: R30**

3 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ CHANGES_DERIVED_FROM_EVALUATION

○ **TIME_AND_RESOURCES_PROBLEM**

8 Quotations:

 **3:2 Problems caused by suppliers (inconsistencies in descriptions) Architec..... (97:246) - D 3: R3**

4 Codes:

- 23-ARCH-DEC-PROBLEMS / ○ ARCHITECTURE_DRIFT / ○ THIRD_PARTY_COMPONENTS_INCONSISTENCIES / ○ TIME_AND_RESOURCES_PROBLEM

 **16:4 Design defects were often only identified in later stages of developme..... (497:602) - D 16: R16**

3 Codes:

- 28-EMERGENGE-ADD-PROBLEMS / ○ ARCHITECTURE_PATCHES / ○ TIME_AND_RESOURCES_PROBLEM

 **24:5 There was a recognition (on both system and software teams) of the nee..... (712:882) - D 24: R24**

2 Codes:

- 28-EMERGENGE-ADD-PROBLEMS / ○ TIME_AND_RESOURCES_PROBLEM

 **37:3 Took quite some time to get to a solid baseline architecture - but was..... (301:398) - D 37: R37**

2 Codes:

- 26-ARCH-EVAL-PROBLEMS / ○ TIME_AND_RESOURCES_PROBLEM

 **38:4 Not enough time and resources sent for "architecture governance". (694:759) - D 38: R38**

2 Codes:

- 28-EMERGENGE-ADD-PROBLEMS / ○ TIME_AND_RESOURCES_PROBLEM

 **40:1 Timing constraints (scheduling of actions to be performed by the SW) (16:83) - D 40: R40**

2 Codes:

- 21-REQ-PROBLEMS / ○ TIME_AND_RESOURCES_PROBLEM

 **45:2 Additional development costs, and time (91:128) - D 45: R45**

2 Codes:

- 28-EMERGENGE-ADD-PROBLEMS / ○ TIME_AND_RESOURCES_PROBLEM

 **53:5 The integration of the systems too more time than estimated (758:816) - D 53: R53**

2 Codes:

- 30-INDEP-CONS-INT-PROBLEMS / ○ TIME_AND_RESOURCES_PROBLEM

◇ ○ **ARCHITECTURE_EVALUATION_APPROACH**

12 Quotations:

☰ **8:4 Architecture was evaluated with various approaches as now described in..... (589:890) - D 8: R8**

3 Codes:

● 24-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH / ○ MIXED-EVAL-APPROACH

☰ **9:2 Architectural decisions were made too often with a short term view of..... (190:295) - D 9: R9**

3 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVAL-OTHER-APPROACHES / ○ ARCHITECTURE_EVALUATION_APPROACH

☰ **18:2 Architectural decisions were evaluated using informal experiential-bas..... (60:212) - D 18: R18**

3 Codes:

● 24-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH / ○ EXPERIENCE-BASED-EVALUATION

☰ **21:2 The architectural decisions were evaluated within the architecting pro..... (201:309) - D 21: R21**

3 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVAL-OTHER-APPROACHES / ○ ARCHITECTURE_EVALUATION_APPROACH

☰ **24:2 Most analysis was done with scenario-based techniques. This tended to..... (147:258) - D 24: R24**

3 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVALUATION-CRITERIA / ○ ARCHITECTURE_EVALUATION_APPROACH

☰ **24:3 Two approaches: after the fact linkage of system to software requireme..... (273:428) - D 24: R24**

3 Codes:

● 25-SW-LEVEL-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH / ○ SYSTEM-SOFTWARE-ALIGNMENT

☰ **31:3 We were driven more by user stories and use cases. A great deal of we..... (836:1287) - D 31: R31**

3 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVALUATION-CRITERIA / ○ ARCHITECTURE_EVALUATION_APPROACH

☰ **34:4 We use an in-house method to peer review the alignment between the bus..... (411:544) - D 34: R34**

3 Codes:

● 25-SW-LEVEL-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH / ○ SYSTEM-SOFTWARE-ALIGNMENT

☰ **38:2 Instead of simulations we also use estimations by experts, especially..... (377:525) - D 38: R38**

3 Codes:

● 24-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH / ○ EXPERIENCE-BASED-EVALUATION

☰ **50:4 First evaluation at system integration (770:807) - D 50: R50**

2 Codes:

● 24-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH

☰ **50:5 Dependent on the different involved SW systems: - Walking skeleton - F..... (822:1035) - D 50: R50**

2 Codes:

● 25-SW-LEVEL-ARCH-EVAL / ○ ARCHITECTURE_EVALUATION_APPROACH

☰ **58:3 evaluated by test driven development (260:295) - D 58: R58**

3 Codes:

● 24-ARCH-EVAL / ○ ARCH-EVAL-OTHER-APPROACHES / ○ ARCHITECTURE_EVALUATION_APPROACH