

**THE BENEFITS AND OBJECTIVES OF A
CORPORATE-STANDARD PROJECT-LEVEL
SOFTWARE QUALITY PROGRAM (SQP)**

**DONALD G. FIRESMITH
MAGNAVOX ELECTRONIC SYSTEMS COMPANY
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**The four horsemen of the
Software Apocalypse:**

- Failed Requirements
- Poor Maintainability
- Cost Overruns
- Schedule Slippages



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**This is why we have requirements for
the implementation of project-level
SOFTWARE QUALITY PROGRAMS.**

a.k.a.

**Software Quality Assurance Programs
Software Quality Control Programs
Software Quality Evaluation Programs
Software Verification Programs**



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The definition of software quality depends strongly upon the person who defines it. To the developer, software quality is primarily the MEETING OF REQUIREMENTS.



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Diferent contracts require software developers to comply with differant, or military, govermental, industrial, or customer-related requirements concerning the establishment and implementation of project-level Software Quality Programs.

A single, easily-tailored, corporate-standard project-level Software Quality Program and Software Quality Program Plan can be developed.



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BENEFITS INCLUDE:

- INCREASED QUALITY**
- INCREASED PRODUCTIVITY**
- DECREASED DEVELOPMENT RISKS**
- INCREASED MANAGEMENT CONTROL**
- INCREASED CUSTOMER/USER SATISFACTION**



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OBJECTIVES OF THE SQP

The vital first step in the development of an effective corporate-standard project-level SQP is the establishment of its objectives.



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ENSURE SOFTWARE QUALITY

Ensure Requirements Quality

Ensure Process Quality

Ensure Proper Evaluation
Ensure Corrective Action
Ensure SQ Documentation

Ensure Support Quality

Ensure Customer Satisfaction

Ensure Cost Savings

Decrease Development Risks

Meet Cost/Schedule Projections

Meet SQP Requirements

HIERARCHY OF SQP OBJECTIVES



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The primary objective of any corporate-standard or project-specific Software Quality Program (SQP) is to ENSURE SOFTWARE QUALITY. One must:

Assess, measure, evaluate, document, and ensure, throughout the project and during each phase of contract performance, that all:

- Deliverable software,
- Nondeliverable software, and
- Related documentation

which is acquired, developed, modified, tested, implemented, or maintained under contract MEET ALL SOFTWARE REQUIREMENTS including:

- Contractual requirements including:
 - Functional/performance/sizing rqmts.
 - SW quality-factor requirements.
 - SQP and SQPP requirements.
- Derived requirements.
- SW Engineering rqmts/stds.
- SW Quality Engineering rqmts/stds.



In order to meet this primary objective, the scope of the SQP (and SAPP) must include not only Software Quality, but also Requirements Quality, Process Quality, and Support Quality.

The first three secondary objectives of any project-level SQP are to ensure:

- 1) Requirements Quality.**
- 2) Process Quality.**
- 3) Support Quality.**



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ENSURE REQUIREMENTS QUALITY.

During all phases of contract performance, one must document, establish, evaluate, control, and maintain clear, complete, consistent, cost-effective (from a lifecycle perspective), current, practical (feasible and implementable), necessary, measurable and quantifiable (where practical), objective, testable or demonstratable, and verifiable (traceable) software requirements.



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ENSURE PROCESS QUALITY.

During all phases of contract performance, one must:

- Ensure the implementation and enforcement of an effective SW Engineering Methodology and SQ Engineering Methodology.**
- Ensure that the SQ Engineering Methodology is consistent with the SW Quality Program Plan (SQPP).**
- Ensure that all project activities conform with these methodologies.**
- Ensure that the responsibility for all oversight, verification, and validation activities is assigned to specific project entities with the necessary independence.**



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ENSURE SUPPORT QUALITY.

During all phases of contract performance, one must ensure that:

- **Project management, personnel, resources facilities, and support tools are:**

Sufficient to meet all project goals and contractual obligations.

Properly organized and structured.

Cost-effective from a life-cycle perspective, effective, efficient, and productive.

- **The accountability for, and the development of, adequate and required SQA and SQC functions are encompassed within the SQP.**
- **Adequate training and participation of all project personnel in the SQP is provided for.**



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Other secondary objectives of the SQP are:

- ENSURE CUSTOMER/USER SATISFACTION.**
- DECREASE DEVELOPMENT RISKS.**
- MEET COST AND SCHEDULE PROJECTIONS.**
- MEET SQP REQUIREMENTS.**



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OBJECTIVES OF THE SQPP

DOCUMENT THE PROJECT SQP.

BE THE MASTER SQP DOCUMENT.

DESCRIBE THE SQ ENGINEERING METHODOLOGY.

ENSURE AN ORGANIZED APPROACH.

ALLOCATE SQP FUNCTIONS.

SUPPORT SENIOR MANAGEMENT.

SUPPORT PROJECT PERSONNEL.

SUPPORT THE CUSTOMER/USER.

SUPPORT SUBCONTRACTORS.

DEMONSTRATE CONTRACTOR COMPETENCE.

MEET CONTRACT REQUIREMENTS.



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REFERENCES

AFR 74-1	U.S. Air Force
AQAP-13	NATO
DI-ECRS-8XX5	DOD (proposed)
DI-R-1710	U.S. Army
DI-R-2174A	U.S. Navy
DI-R-X105	DOD (proposed)
DODD 4155.1	DOD
DOD-STD-1679A	U.S. Navy
DOD-STD-SDS	DOD (proposed)
DOD-STD-SQR	DOD (proposed)
FAA-STD-016	FAA
FAA-STD-018	FAA
IEEE STD 730-1984	IEEE
MIL-M-85337 (AS)	U.S. Navy
MIL-Q-9858A	DOD
MIL-S-52779A	DOD
MIL-STD-SQAM	DOD (proposed)
NAVELEX INST 5200.23	NESC (U.S. Navy)
NHB 5300.4(1B)	NASA
NHB 5300.4(1D-2)	NASA
NOSC TN 410	NOSC (U.S. Navy)
NSAM 81-2	NSA/CSS
NSAM 81-3	NSA/CSS
TB 18-102	U.S. Army (proposed)
USACSC REG 5-5	USACSC (U.S. Army)



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