



Goddard Procedures and Guidelines

DIRECTIVE NO. GPG 8070.2A
EFFECTIVE DATE: October 6, 1998
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Title: IDENTIFICATION AND APPLICATION OF STATISTICAL TECHNIQUES

Preface

P1. PURPOSE

This procedure establishes the process for identifying the need for and applying statistical techniques for monitoring, controlling and verifying process capability and product characteristics.

P2. APPLICABILITY

This procedure applies to all Goddard Space Flight Center (GSFC) product covered by the scope of the Quality Management System and the production and installation processes applied to them.

P3. AUTHORITY

NPD 8730.3, NASA Quality Management System Policy (ISO 9000)

P4. REFERENCES

- a. GPG 5330.3, Inspection and Test Status
- b. GPG 8072.1, Process Control

P5. CANCELLATION

GPG 8070.2, Identification and Application of Statistical Techniques

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Procedure

1. DEFINITIONS

- a. Product Design Lead (PDL) - The manager or leader with overall responsibility for managing the design activity, managing the technical and organizational interfaces identified during design planning, and where required, forming and leading the Product Design Team (PDT). The term refers to flight project managers, mission managers, instrument managers, subsystem technical managers, integrated product development team leaders, lead engineers, etc.
- b. Process Owner – The single, lowest level organization or individual with responsibility for managing a process to ensure it is implemented effectively.
- c. Statistical Techniques – Methods used to collect, process, analyze, and present data in such a form to allow a determination of process or product acceptability to be made. Examples of statistical techniques are:
- (1) Graphical methods, such as histograms, sequence charts, scatter plots, Pareto diagrams, and cause-and-effect diagrams
 - (2) Statistical control charts for monitoring and controlling production and measurement processes for product
 - (3) Regression analysis, which provides a quantitative model for the behavior of a process or a product when the conditions of process operation or product design are changed
 - (4) Analysis of variance (separating the total observed variability), leading to variance component estimates useful for designing sample structures for control charts and for product characterization and release; the magnitudes for the variance and components are also a basis for prioritizing quality improvement efforts
 - (5) Methods of sampling and acceptance
 - (6) Statistical methods for inspection and testing

2. IMPLEMENTATION

2.1 Identification of Need

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2.1.1 Product Characteristics

PDL's shall determine when statistical techniques, in lieu of 100% inspection or test, are to be employed to verify product characteristics. The technique to be employed shall be identified in appropriate inspection/test instructions. The PDL shall also identify product-unique process control statistical technique(s), which differ from those established as a result of 2.1.2, and document/reference them in the applicable Work Order Authorization (see GPG 5330.3).

2.1.2 Process Controls

Process owners shall determine statistical techniques to be applied to the measurement and maintenance of identified process controls. These techniques shall be documented in applicable process control documents (see GPG 8072.1).

2.2 Application of Statistical Techniques

The PDL/Process Owner shall document how the statistical techniques identified for use in 2.1.1 and 2.1.2, respectively, shall be applied (e.g., data gathering frequency), including what outputs (quality records) are expected and how the outputs will be used to effect decisions on the acceptability of the associated processes and products.

3. RECORDS

None

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CHANGE HISTORY LOG

Revision	Date	Description of Changes
Baseline	8/12/98	
A	10/6/98	Header and footer format changes. OPR changed from Code 300 to Code 500.