

# Academy of Aerospace Quality – AAQ

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# AAQ Basic Information

<http://aaq.auburn.edu>

AAQ is an internet based forum to provide quality assurance training to students and faculty at all educational levels from K-12 through higher education involved in planning, designing, building, launching and operating payload projects for space.

These include Cube Sats, Small Sats, International Space Station, high altitude balloons, rockets, and more. The AAQ curriculum comprises interactive, multi-media educational modules for all aspects of quality assurance necessary to ensure mission success including the capacity to customize and store on line quality assurance plans. AAQ also provides a community for networking and sharing of lessons-learned and case studies, and sponsors annual workshops.

- Many educational entities are involved in space bound payloads
- These payloads are designed, constructed and tested under diverse conditions and by largely “amateur” teams
- AAQ’s goal is to provide assistance in assuring that payloads are “successful” from a quality standpoint



# AAQ Team

- Sponsored and led by NASA Headquarters Office of Safety and Mission Assurance (OSMA) with participation from Marshall and Glenn Space Flight Centers
- Auburn University leads development and deployment



# AAQ Expert User Group

- Alex “Sandy” Antunes
  - Capitol Technology University
- Jonathan Black
  - Virginia Tech
- Paul Darby
  - University of Louisiana – Lafayette
- Andy Hollerman
  - University of Louisiana – Lafayette
- Glenn Lightsey
  - Georgia Tech
- Iqbal Shareef
  - Bradley University
- Francis Wessling
  - University of Alabama – Huntsville
- Justin Yates
  - Francis Marion University



# Soldering Learning Module

## Soldering Tutorial

## Soldering Module Objectives

To provide the reader with an overview of soldering. The context of the module will be to introduce and educate the reader on the subject while discussing points of interest, techniques and Soldering issues. This module is not intended to be a comprehensive training module as soldering techniques vary based on the application. Applicable standards should always be referenced.

## Soldering Module Status

### Approved

Module is being considered ready for public use. Errors/bugs found by users are being remedied. Content is being reviewed.

#### Module creation date

Monday, January 14, 2013

#### Last update

Tuesday, November 19, 2013

Introduction >

☰ Outline >

### Soldering Tutorial

Introduction

Pb-Free Solder and Tin Whiskers

Related Soldering Materials

Quality Assurance and Cleanliness

Soldering Training Program

Summary

Examples (Templates)

Acronym - Abbreviation List

References

Standards

## Soldering Interactive Quiz 1

|                       |           |
|-----------------------|-----------|
| Questions:            | 10        |
| Attempts allowed:     | Unlimited |
| Available:            | Always    |
| Pass rate:            | 50 %      |
| Backwards navigation: | Forbidden |

Start quiz

## Soldering Interactive Quiz 2

|                       |           |
|-----------------------|-----------|
| Questions:            | 10        |
| Attempts allowed:     | Unlimited |
| Available:            | Always    |
| Pass rate:            | 50 %      |
| Backwards navigation: | Forbidden |

Start quiz

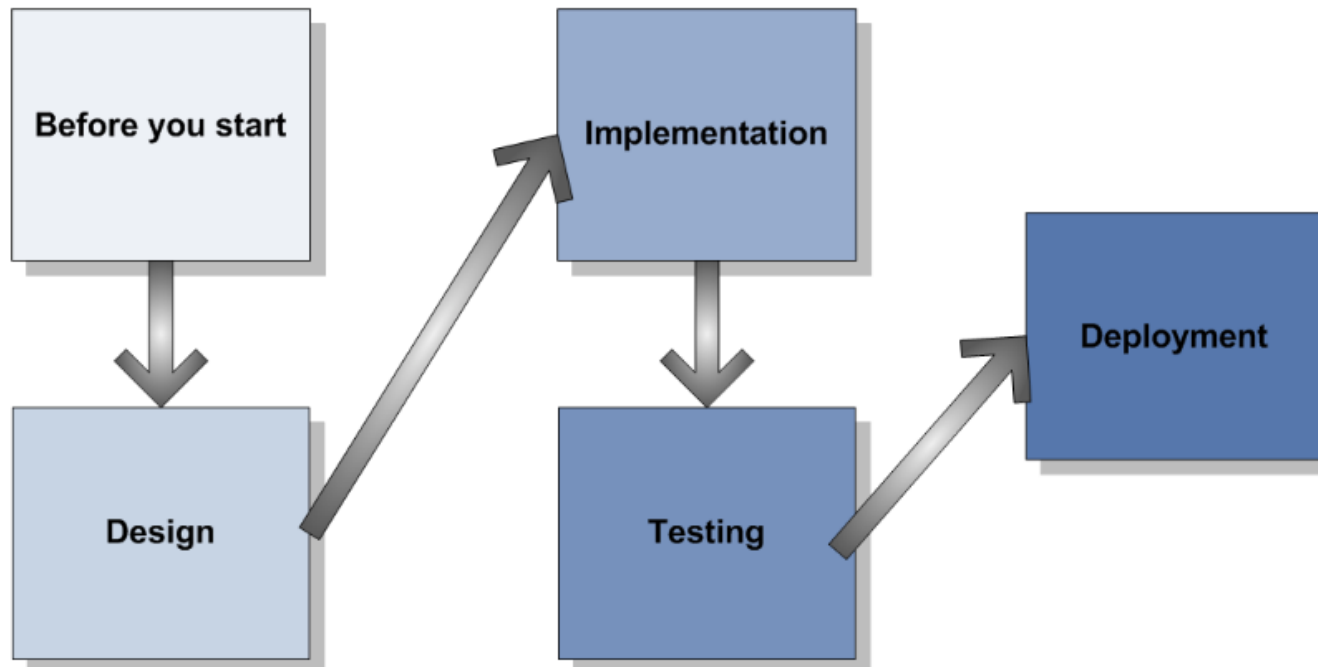
## Lessons Learned

- Observed Heat
- Low Strength Solder Joints



## AAQ Curriculum

The Academy of Aerospace Quality is built around a curriculum. You can see a diagram of this curriculum below. The available curriculum items can be accessed from the "Curriculum" section of the main menu. When you click on one of these items, you will be taken to the module page for that topic. The module page lists all the materials that are related to that specific topic. For each topic, there is a training tutorial, quizzes and other related materials. Training tutorials seek to introduce the visitor to the selected topic. They are structured in the form of a lesson that the visitor can read through in order to become familiar with the topic. They contain information, examples, figures and exercises that will guide the visitor through the learning process. Quizzes are intended to test the visitor's knowledge of the topic. They can be accessed through the topic module page or throughout the tutorial. They are composed of multiple choice and true or false questions. Some training modules contain additional exercises that the user is asked to solve and, once finished, will display the correct results.



Introduction to the NASA Quality Program

Acceptance Data Package (ADP)

Additive Manufacturing

Commercial Off-the-Shelf (COTS)

Configuration Management

Connectors

Continuous Improvement

Corrective Action and Root Cause Analysis

Control Charts and Process Capability

Counterfeit Parts

Design of Experiments (DoE)

Documentation Management

Electrostatic Discharge (ESD)

Failure Mode and Effects Analysis (FMEA)

Fasteners

Fiber Optics

Flammability

Foreign Object Debris (FOD)

Fracture Critical

IEEE Parts

Inferential Statistics

Inspection Control

International Traffic in Arms Regulations (ITAR)

Mechanical Joint Assembly

Mechanical Parts

Metrology

Micro-Electrical-Mechanical Parts (MEMs)

Non-destructive Evaluation (NDE)

Offgassing

Packaging and Delivery

Parts Reuse

Plastic Encapsulated Microcircuits (PEMs)

Preloading

Problem Solving

Process Control

Quality Planning

Records Management

Regression Analysis

Risk Management for Quality Assurance

Robust Design

Shelf Life Control

Software Assurance (Quality)

Soldering

Staking, Bonding and Conformal Coating

Standards

Statistics with Excel

Supplier Audit

Systems Engineering

Welding

Wire Crimping and Harness

Workmanship

The AAQ (Academy of Aerospace Quality) is a leading aerospace research, test and development organization necessary to ensure project success. AAQ is led by Dr. Jeffrey S. Smith and Dr. Jeffrey S. Smith.

The Academy of Aerospace Quality curriculum consists of 20 topics covering the entire aerospace quality process.

### Quality Assurance Plans

Each topic contains a detailed introduction to the topic, quizzes and other interactive elements to help the visitor understand the topic.

## Quality Assurance Plans

A quality assurance plan allows your team to document the best practices that will be put in place to assure the quality (and success) of your project. You can create one on our website using a template developed by a team of academics with many years of experience in payload research.



## Contact Us!

We are constantly looking for feedback on the usability of our site. If you have any questions or suggestions, feel free to contact us! If you are interested in collaborating with our project, contact us at: <http://aaq.auburn.edu/contact>



# AAQ Module Status Codes

| Stage                        | Description  |
|------------------------------|--|
| Defined                      | Idea for the module exists. No research/content currently.   |
| Content Collection           | Topic is being researched. Content is being collected.   |
| Content Publication          | Satisfactory level of content has been collected and is being published to the site, including media.  |
| Module Enhancement           | Module quiz, Lessons Learned, glossary, and acronyms links are being added. "Site" aspects of the module are functional at the completion of this stage. |
| Expert User Testing          | Module is being checked by AAQ expert users.   |
| NASA Vetting                 | Module is being checked by NASA subject matter experts.  |
| Approved                     | Module is considered ready for public use. Errors/bugs found by users are being remedied. Content updated as necessary.                                  |
| Needs Revision and Revetting | Approved but needs major revision and revetting.   |

# Other Site Resources

- Interactive Quality Assurance Plans
- 31 Lessons Learned
- 3 Case studies
- Acronyms and definitions
- Links to Standards
- Interactive user forum for posts (Q&A, news)

# The Future

- Continue developing materials for the existing modules.
- Complete the trials and modifications of the Quality Assurance Plan Templates
- Continue holding periodic workshops
- User tracking and certification