NASA ACADEMY OF AEROSPACE QUALITY

Alice E. Smith
Jeffrey S. Smith

Auburn University

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.

Background

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 is for…

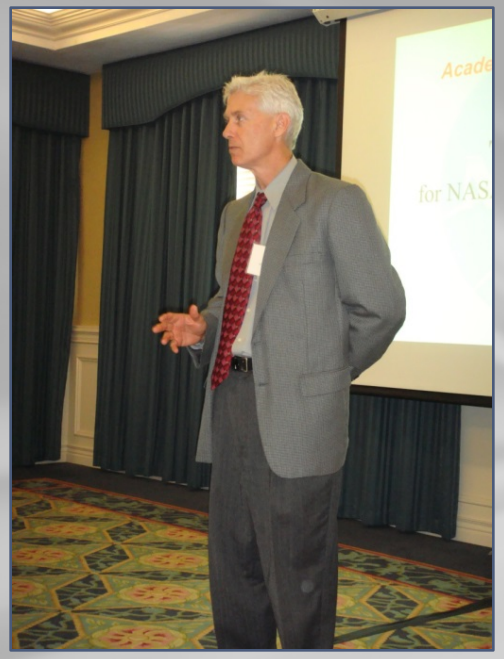
Students and faculty involved with payloads – on cube, small and micro satellites, ISS, balloons, rockets, and more

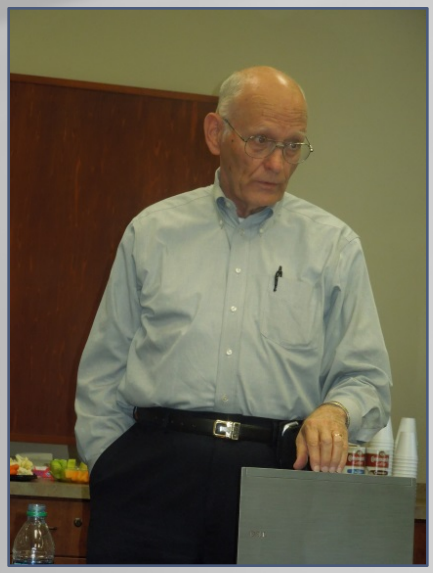
Those interested in becoming involved

Future scientists and engineers interested in space

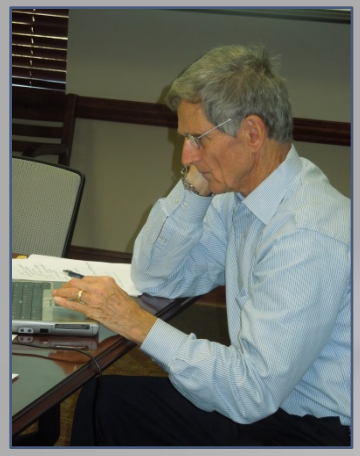
AAQ Team

- 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
- Expert User Group formed in 2014





AAQ Expert Users



Jonathan Black
- Virginia Tech

Paul Darby
- University of Louisiana – Lafayette

Andy Hollerman
- University of Louisiana – Lafayette

Glenn Lightsey
- Georgia Tech

Iqbal Shareef
- Bradley University

Clayton Smith
- Johns Hopkins University

Francis Wessling
- University of Alabama – Huntsville

Justin Yates
- Texas A&M University

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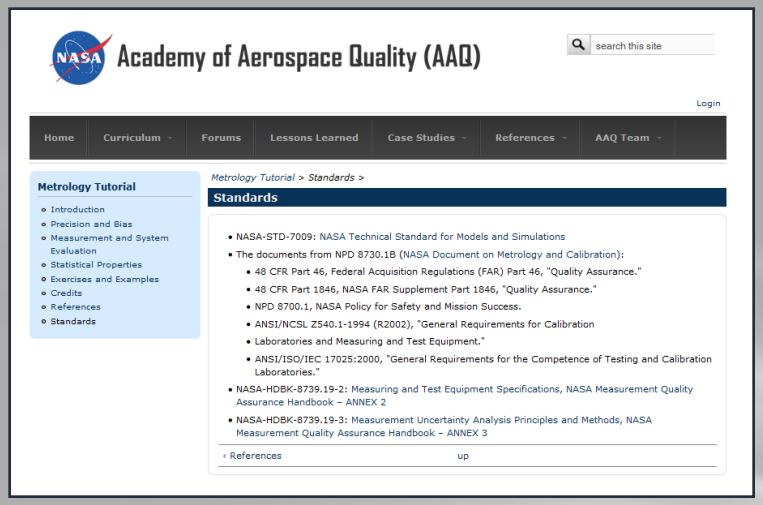
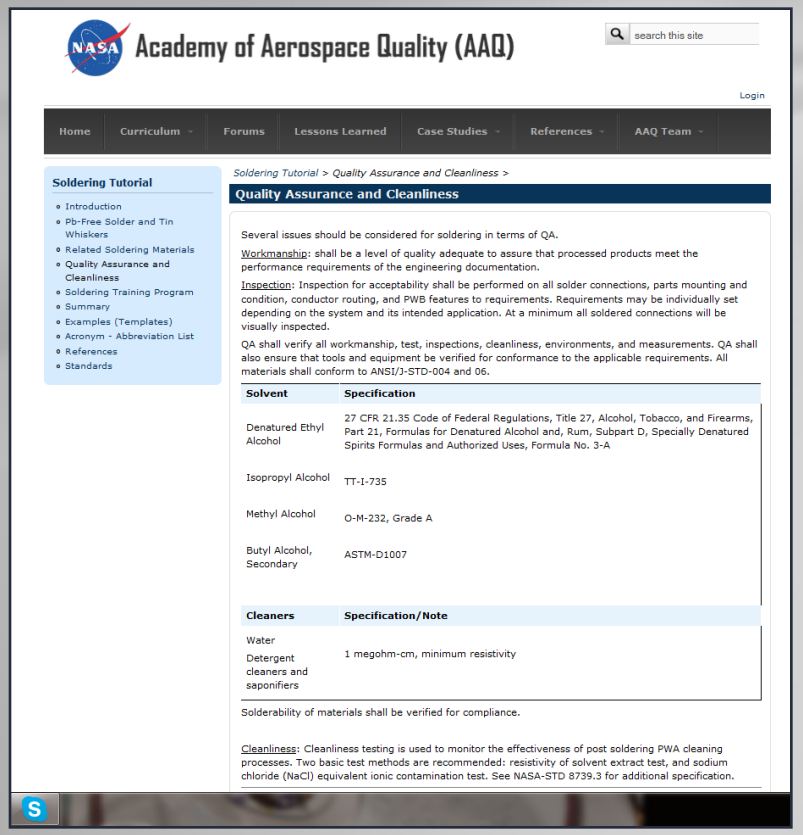
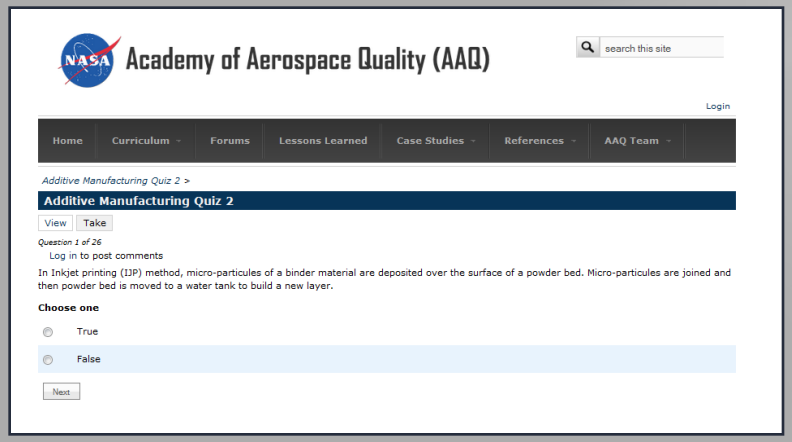
Educational Modules

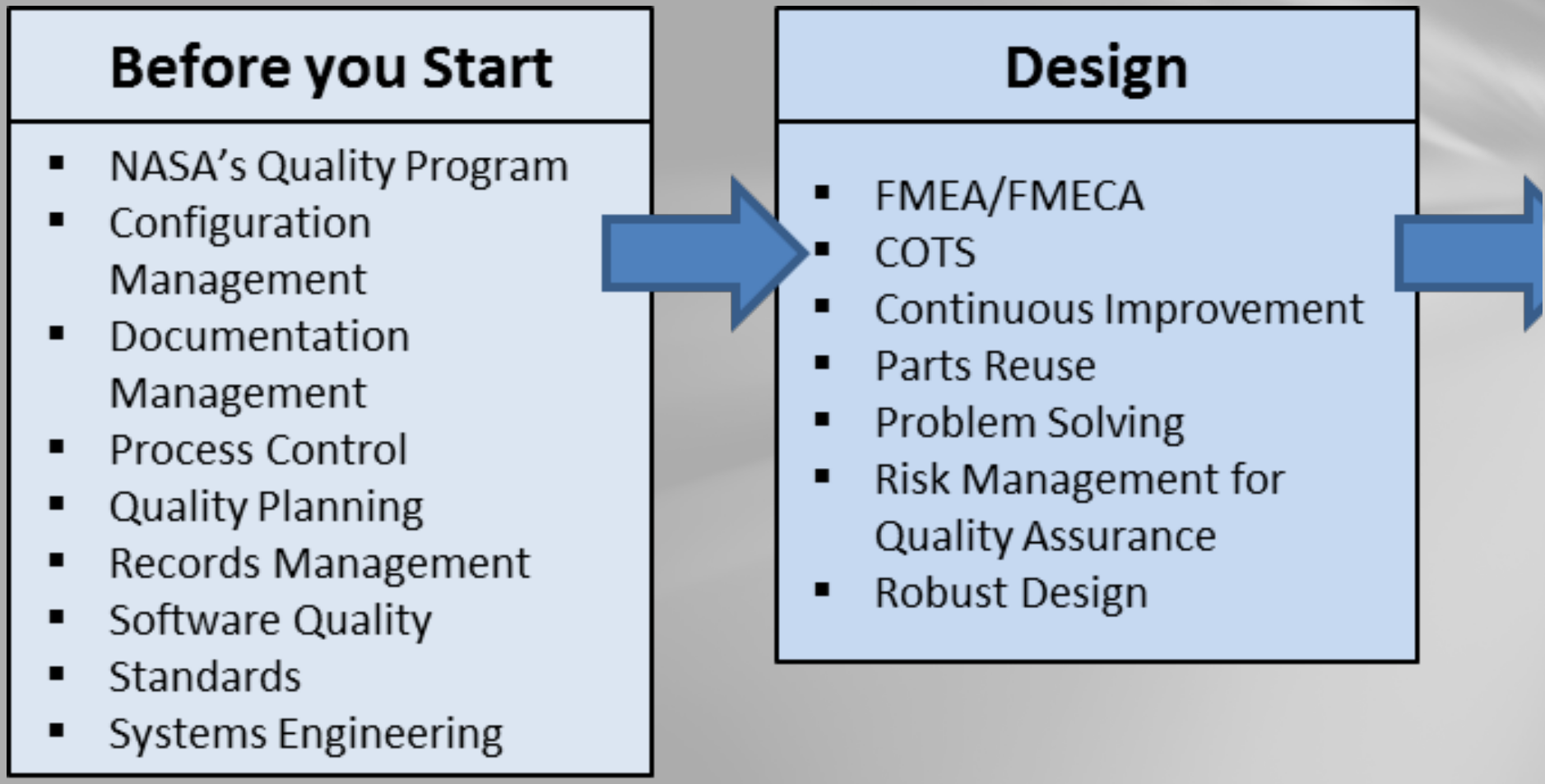
- Technical material
- Interactive self quizzes
- Figures and photographs
- Videos
- Links to Standards and supplemental materials







AAQ Topic Grouping



AAQ Topic Grouping

Implementation

- Part Selection, Purchasing and Procurement
  - Supplier Auditing
  - Acceptance Data Package
  - COTS
  - PEMs
  - MEMs
  - Counterfeit Parts
  - IEEE Parts
- Part Assembly
  - Additive Manufacturing
  - Soldering
  - Wire Crimping and Harness
  - Staking, Bonding and Conformal Coating
  - Connectors
  - Fasteners
  - Mechanical Parts
  - Fiber Optics
  - Workmanship
- Quality Assurance
  - FOD Control
  - Electrostatic Discharge
  - Fracture Critical
- Safety
  - Flammability
  - Offgassing
  - FMEA

Testing

- Inspection and Testing
- Non-destructive Evaluation (NDE)
- Corrective Action and Root Cause Analysis
- Statistical Quality Control
  - Metrology
  - Regression Analysis
  - Inferential Statistics
  - Statistics with Excel
  - Design and Analysis of Experiments (DoE)
  - Control Charts and Process Capability

Deployment

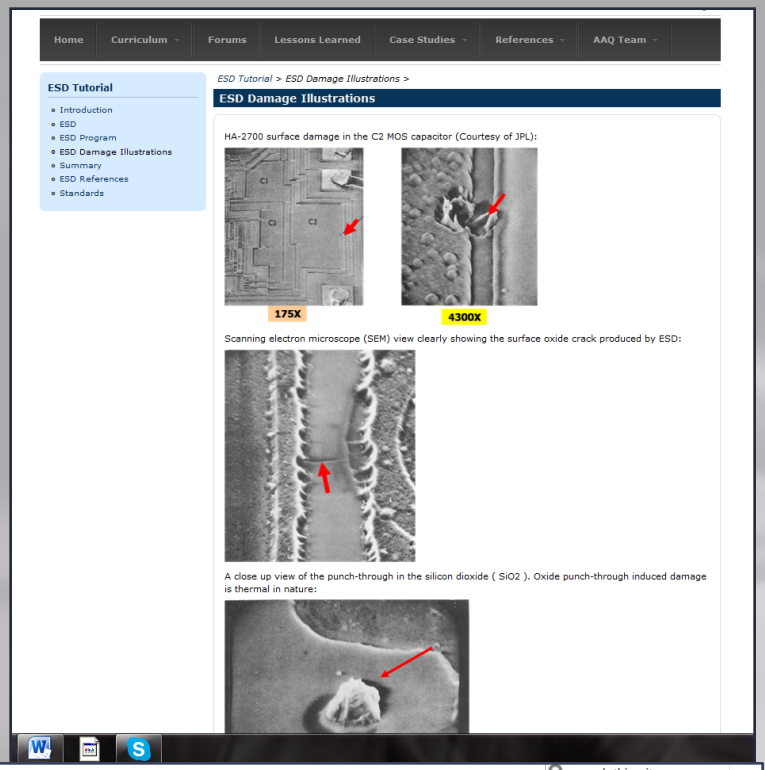
- Shelf Life Control
- Packaging and Delivery

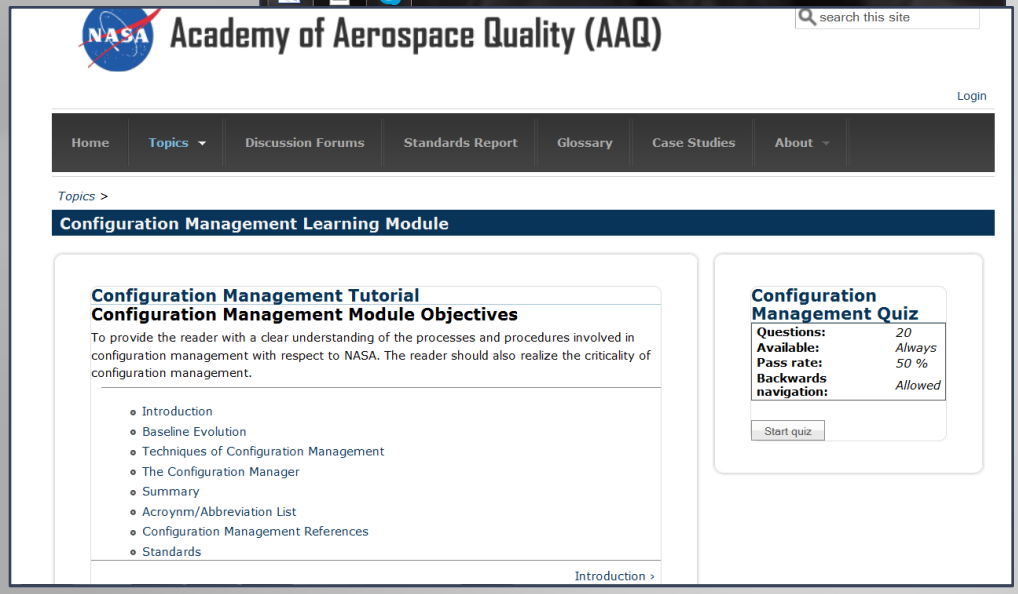
AAQ Module Status – Color Code

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.

Current Module Status

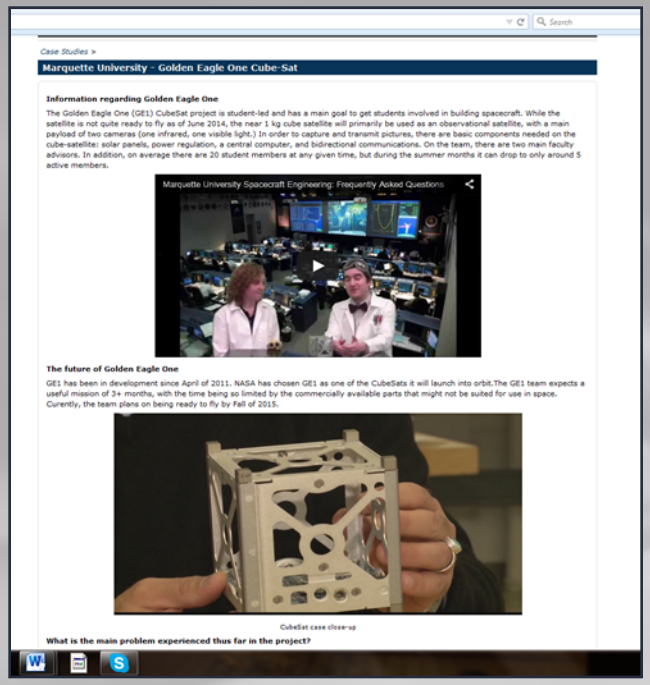
- 2 approved
- 15 in or ready for expert user testing
- 11 in module enhancement
- 7 in content publication
- 3 in content collection
- 7 defined
- 1 in need of revision and vetting





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)



Quality Assurance Plan

- Customizable, interactive template for project teams
- Can upload files – text, spreadsheet, pictures, etc.
- Permissions granted by project leader (faculty member)
- **Need volunteers to trial this during their payload projects**

Mission Definition

Project Team

Schedule

Training Needs

Budget and Supplies

Design Requirements Management

Configuration Management

Testing and Calibration

Post Mortem

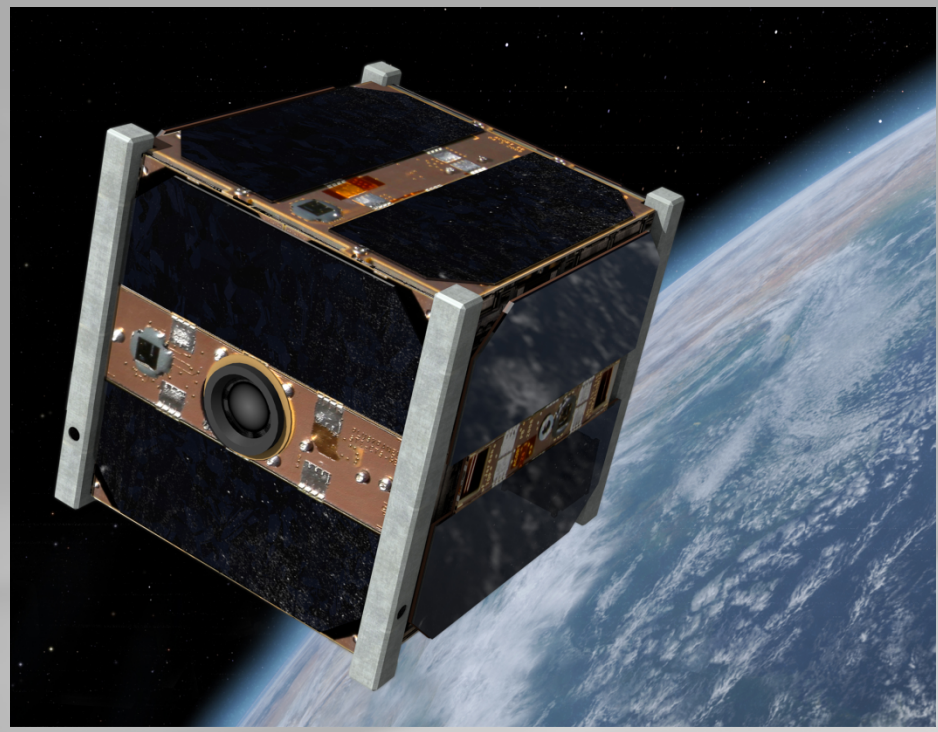
Networked Community of Users

Expert User Advisory Group

Annual AAQ Workshop

- September 1, 2015
- Huntsville
- Travel stipends available
- Look for an email announcement soon!

The Future



Continue module inception, development, trialing, review

Complete and trial interactive Quality Assurance Plan and develop samples/templates

Add case studies and lessons learned

Customize to different categories of users

Add features and modify content according to feedback from the user community – **YOU**!