



# Academy of Aerospace Quality (AAQ)

**Luke A. Becker**

**Aerospace Quality  
What does the future hold?**

**NASA AAQ Workshop 2017  
Huntsville, AL**

# About me...

- BS – NGS



- MS – Alabama



- 3<sup>rd</sup> Year Doctoral Student @Northeastern



**1<sup>st</sup> year as an expert user with AAQ  
20 years as an aerospace quality professional**

# Instruments / Missions

## CRISM

Compact Reconnaissance Imaging Spectrometer for Mars

## Parker Solar Probe

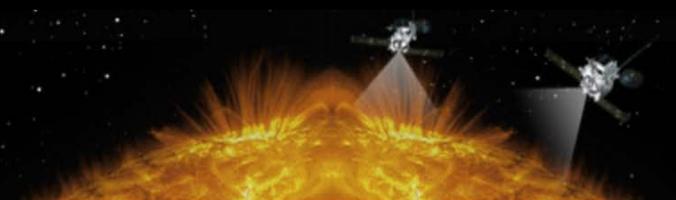
A NASA Mission to Touch the Sun



## STEREO

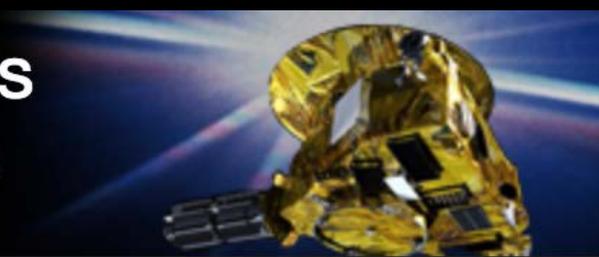
Solar TERrestrial RELations Observatory

Capturing the Sun in 3-D



## New Horizons

NASA's Mission to Pluto

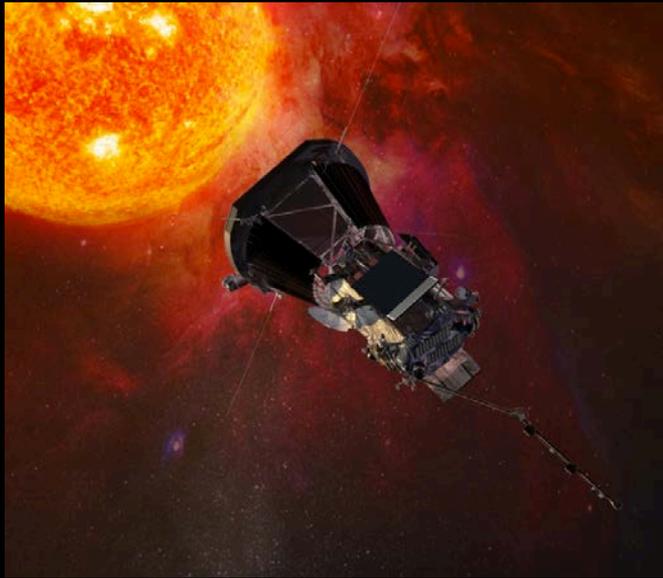


# MESSENGER

MErcury Surface, Space ENvironment, GEOchemistry, and Ranging

# Currently

## Mission Systems Assurance Manager NASA's Parker Solar Probe



Find out more:  
<http://solarprobe.jhuapl.edu>



# Framing Aerospace Quality

- **Aerospace Quality (as a profession)**
  - **Brief history**
    - **Supporting craft based industry**
      - not “mass production”
  - **Suggested approach to aerospace quality**
  - **Future of quality**
    - **What matters most in an aerospace quality professional?**
      - Education, leadership traits, personality?

**WHAT IS THE RIGHT SKILL SET?**

# Origin of Aerospace Quality

- **NASA is 59 years old**
  - Industrial quality was a natural place to start
  - The first aerospace quality professionals were existing engineers and technicians who were reassigned
- **As a result...**
  - Moved into quality out of necessity
  - Quality was often excluded from project team discussions
  - Quality became the “tax” that every program paid

# Evolution of Aerospace Quality

- **Past: The “I’m here to shut you down” approach is not effective.**
  - A product of an inspection (manufacturing) mindset?
  - Lack of professional development regarding quality?
  - Perceived authority was used “as a power trip”

**Quality was not sought after as a profession**

**People tended to move into quality towards the end of their careers**

- **Present: An educated and trained aerospace quality workforce has led to...**
  - An integrated (with the team) value added approach
  - A broader understanding of mission assurance requirements
  - A holistic (systems) view of the “quality” disciplines function within the aerospace community

# **Suggested approach to Aerospace Quality**

- **Pass or Fail mindset (ok for inspection)**
  - Same approach doesn't work for all aspects of mission assurance
- **Suggest a more qualitative holistic approach**
  - Support an environment in which engineering and project management are able to make risk based decisions
    - **Requires:**
      - System knowledge
      - Requirements knowledge (performance & assurance)
      - Communication, communication, communication...
  - **Integral and respected project team member**

# Failing Forward

- **Corrective Action:** Using failure as a catalyst for innovative change
  - Must learn from the industries mistakes
  - Organizational learning will propel our industry and profession forward
  
- **Preventive Action:** Aerospace quality professionals can lead the way for:
  - Incorporating Lessons Learned on future projects
    - Developing and using effective knowledge management systems across the broader spaceflight community

# Future of Aerospace

- **Increased access to space via:**
  - **Commercial Spaceflight**
  - **Space Tourism**
  - **Private Ventures**



- **This will result in an exponential increase in the amount of flight hardware and software that must be produced to support the aerospace industry**

# **What does that mean for Aerospace Quality**

- **More roles for aerospace quality professionals**
  - **Is it a viable and marketed profession?**
  - **How will the aerospace industry find the right people?**
  - **People assessed against a competency model?**

# Existing Education:



- **Quality Engineering programs are expanding**
  - More schools in the mix every year
- **However, much of the QE curriculum deals with mass production (industrial) approaches**
  - Quality cost analysis
  - Just In Time Manufacturing
  - Sustainability
  - Inspection and Sampling (SPC)

**How do we extrapolate these concepts when we are building ONE?**

# So, what will the future look like?

- **How will a revolution in higher education impact aerospace quality?**
  - Offer specific curriculum
  - Offer specific degrees
    - What delivery format?
    - Who develops the curriculum?
- **What about**
  - **Certifications versus Degrees?**
    - Is there a way to combine them?
  - **Emphasis on experiential learning**
  - **Experience over education**
  - **Mentoring within organizations / across industry**



# Future of Aerospace Quality

- **If I wanted to hire an aerospace quality professional:**
  - what do I look for and how do I write the job requisition?
- **Assessment of candidates**
  - Evaluate hiring practices
    - Identify the right skillset (competency model)
- **Can you measure how much someone cares about the “right things at the right time?”**
- **What are the right things?**
- **How do we quantify it?**



# Let's continue the conversation

- How can you make a positive impact on the future of the aerospace quality profession?
- Could or should aerospace quality become its own educational track within a formal higher education setting?
- Think specifically about what we should look for in the next generation of aerospace quality professionals?

How can **you** help?