

# PIAAA

## Phantom Image Automatic Acquisition and Analysis

FAQ  
Frequently Asked Questions

# What does CyberQual do?

CyberQual is a company devoted to design and development of instrumentation and advanced computer systems for automation and quality control of processes, mainly in the field of medical imaging. CyberQual is a 15-year-old company with competences in quality control and software development.

# Why is automatic analysis better than human scoring?

Automatic scoring eliminates subjectivity and environmental influence. This is crucial, because quality control is based on comparison between measurements that shall be evaluated with the same criteria.

Furthermore, automatic scoring is reproducible, even by different people, and less error-prone.

Last but not least, automatic analysis is more cost-effective, because the commitment of costly human resources is low and computers perform cheaper and faster.

# Human or automatic metrics: which one is better?

They are different because they are tailored to very different subjects: humans and computers.

The real question is not which one is better, but which one is more adequate to control quality through comparison.

Automatic scoring warrants reproducibility and objectiveness, which are fundamental features to deliver reliable results.

# What does PIAAA measure?

- Manual analysis metrics
  - Mean Grey Level
    - Background
    - High and low density points
  - Resolution limits (line pairs per millimetre)
    - Parallel and perpendicular high contrast resolution gratings
  - Number of “visible” details
    - Large details with low contrast
    - Small details with high contrast
  - Number of step wedges “perceived” as non-uniform
    - Particle step wedges
- Automatic analysis metrics
  - Contrast-to-noise ratio
    - Large details with low contrast
    - Small details with high contrast
  - Detail Compact Contrast
    - Small details with high contrast
  - Relative contrast
    - Uniform step wedges
  - Modulation of the low frequency bars
    - High contrast resolution gratings
  - Ratio between variances of micro particle step wedges and uniform step wedge
    - Micro particle step wedges

# What do I need to run the software?

A simple PC running Windows 2000 or above.

If final images are printed on a film, you also need a TWAIN 1.7 compatible flatbed scanner with at least 3.0 of maximum optical density and 1200 dpi resolution.

CyberQual can provide compatible and tested scanners.

# How can I integrate PIAAA in my existing infrastructure?

Integration is very easy.

If the imaging system develops a film, a scanner is needed.

If the imaging system is digital, it is sufficient to have access to the file containing the image from the PC where PIAAA is installed.

Probably, IT infrastructure already allows this. Otherwise, a simple and standard procedure is sufficient: the imaging system just has to send the file to a DICOM station which is the PC with PIAAAA.

# Can PIAAA calculate human scoring metrics?

Human scoring metrics were thought for human beings rather than computers.

However, PIAAA is capable of simulating those metrics starting from its own measures.

This grants a gradual integration in environments where analysis is currently performed by humans.

# Will PIAAA calculate the same values of a human being?

It is evident that PIAAA cannot always give the same values as those estimated by humans.

This is caused by the inherent difference between human perception and software input: A difference that cannot be removed.

In the same way, two people, or the same person in different moments, might report different values; this is due to subjectivity of human observation. Something that the software will never happen to do.