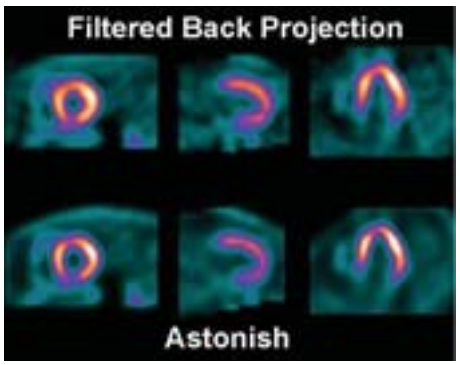
Astonish SPECT

Cardiac Astonish Acquisition Guide

Astonish SPECT is an advanced reconstruction algorithm within the AutoSPECT application of JETStream Workspace to dramatically reduce cardiac acquisition times or improve image quality in SPECT data sets. Astonish provides patient-specific and photon-specific corrections for resolution, scatter and attenuation and uses a Philips exclusive matched dual filtering technique.



How does Astonish SPECT work?

Astonish uses an iterative 3D-OSEM (Ordered Subset Expectation Maximum) algorithm with built-in corrections for resolution recovery, scatter, and attenuation correction. An accurate model of each Philips camera, each collimator, and the measured imaging distance for each acquisition angle is applied to the patient data to remove the blurring effect of the collimator. Scatter and attenuation correction can also be applied if an attenuation map* is present.

What image quality improvement is possible?

Reconstructed resolution has been shown in the NEMA SPECT phantom to improve from 10-11 mm to PET-like levels of 4-5 mm. Image contrast and signal-to-noise ratio also are improved with Astonish reconstruction.**

Can Astonish be used with Gated SPECT data?

Yes, Astonish supports both SPECT and Gated SPECT data sets.

What cardiac radionuclides are supported with Astonish?

Astonish supports both Tc-99m and Tl-201 agents.

How can Astonish be used to improve throughput?

Astonish cardiac images with half the counts as standard imaging have been shown*** to have equivalent image quality as filtered back projection data with full counts. Tc-99m MIBI Perfusion SPECT, Gated SPECT, and Tl-201 SPECT acquisition times may be reduced due to the improved signal-to-noise characteristics of Astonish. Astonish may be used on full count data (64 projections @ 20 sec/proj, per ASNC guidelines) to improve image quality or on half count data with equivalent image quality. Half count data may be acquired at either half frame (32 projections @ 20 sec/proj) or half time (64 projections @ 10 sec/proj).

What other studies may be used with Astonish?

Astonish can be applied to SPECT studies using Tc-99m, Tl-201, In-111, Ga-67, I-123, or I-131. Care should be used that the user evaluates, as with any reconstruction technique, the processing parameters for appropriate resolution and noise characteristics.

* Astonish supports CT-based attenuation maps. Vantage attenuation maps have not been validated for use with Astonish.

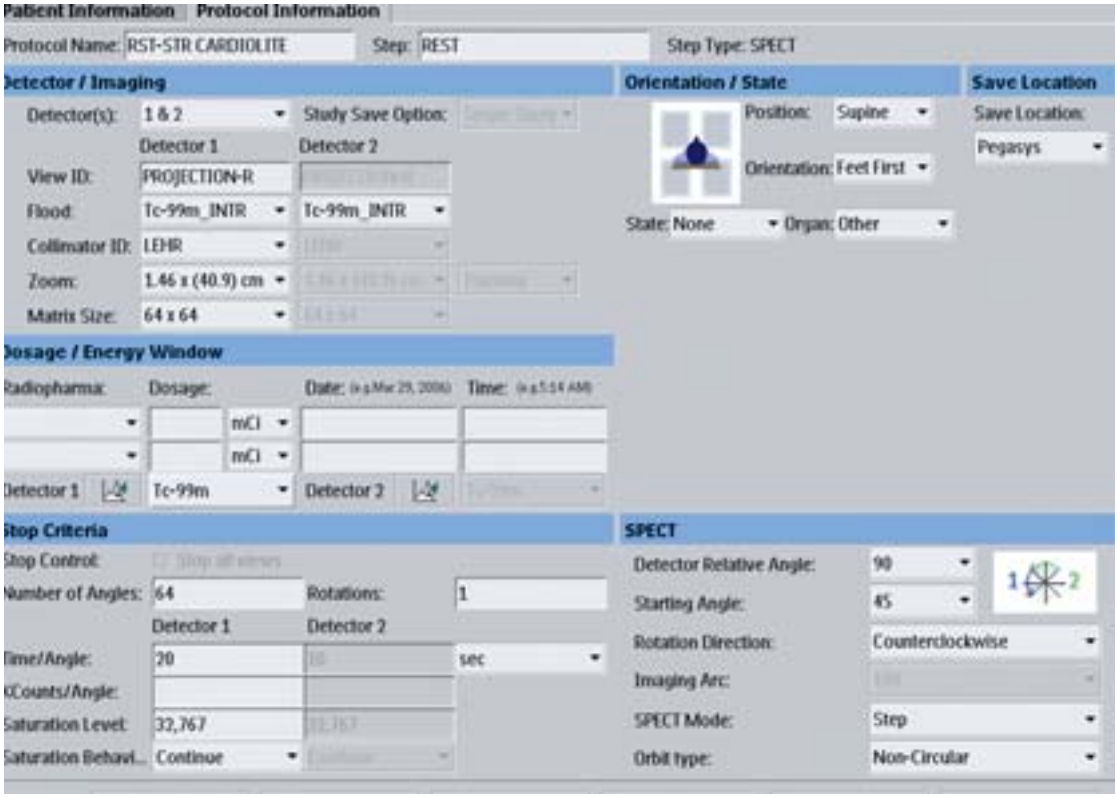
** White Paper: "SPECT Image Quality Improvement with Astonish Software"; January, 2006; available in Philips Literature Store

*** Society of Nuclear Medicine Midwinter Meeting; February 11, 2006; Tempe, Arizona

PHILIPS

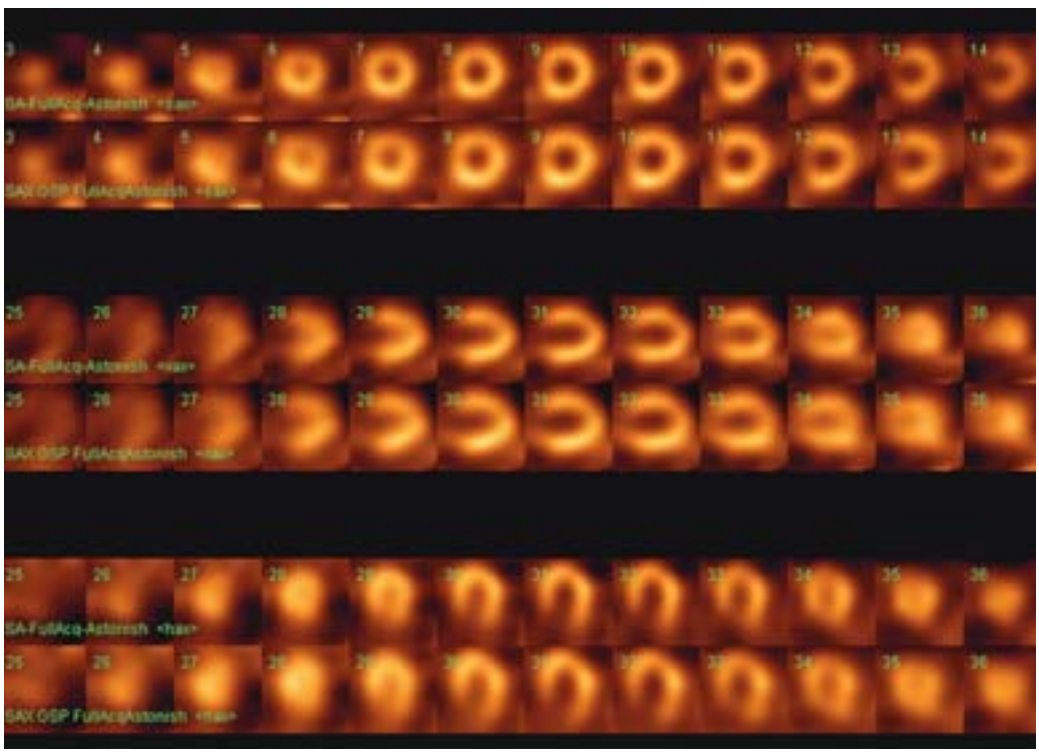
Example 1:
Full Count acquisition for improved image quality.

Acquisition



Processing

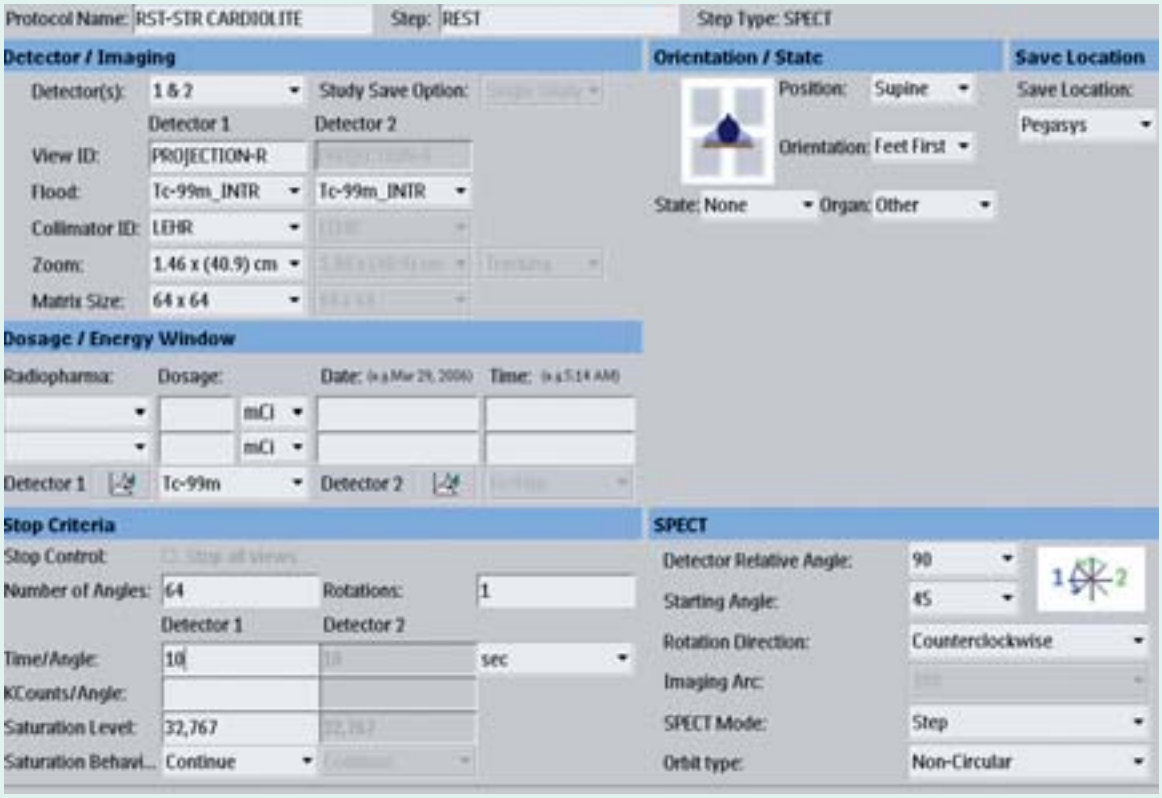
Astonish: 4 iterations, 16 subsets, Hanning 1.50 (Perfusion and Gated SPECT)



Top row:
Full Count Astonish Perfusion
Bottom row:
Full Count Astonish
Gated SPECT

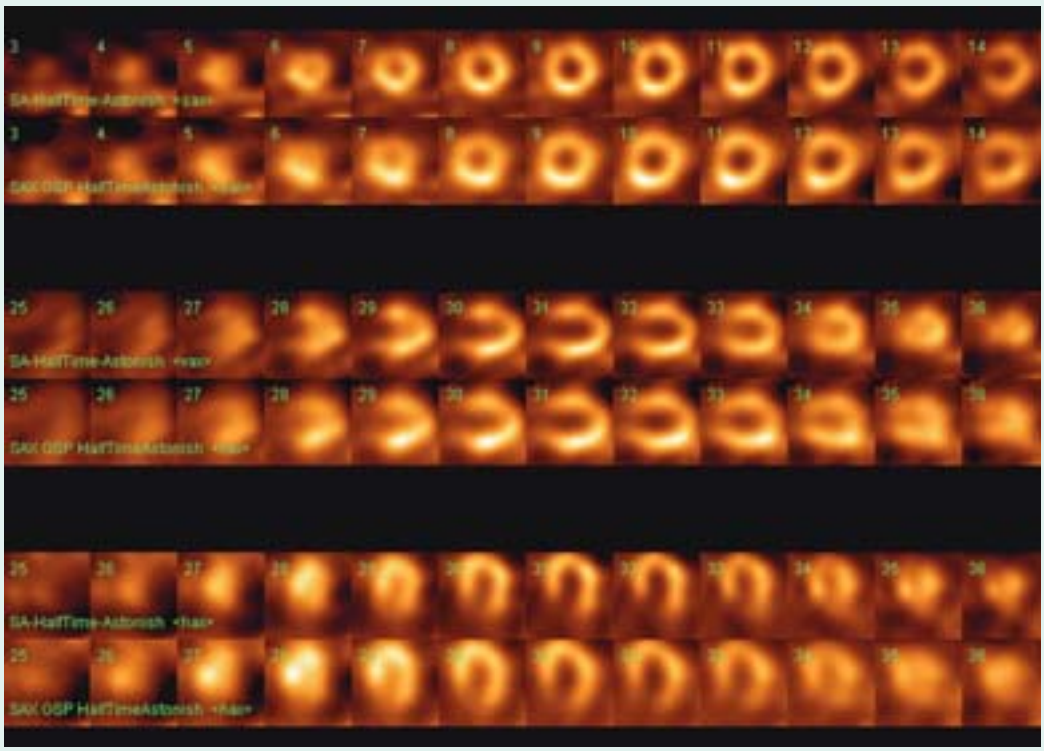
Example 3:
Half Time acquisition for equivalent image quality.

Acquisition

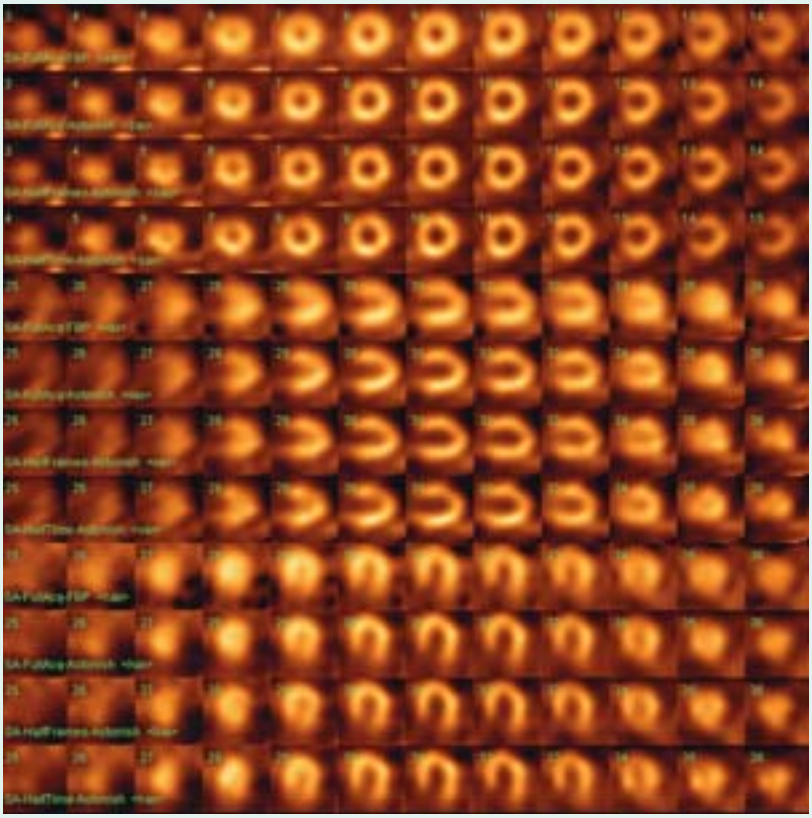


Processing

Astonish: 4 iterations, 8 subsets, Hanning 1.14 (Perfusion and Gated SPECT)

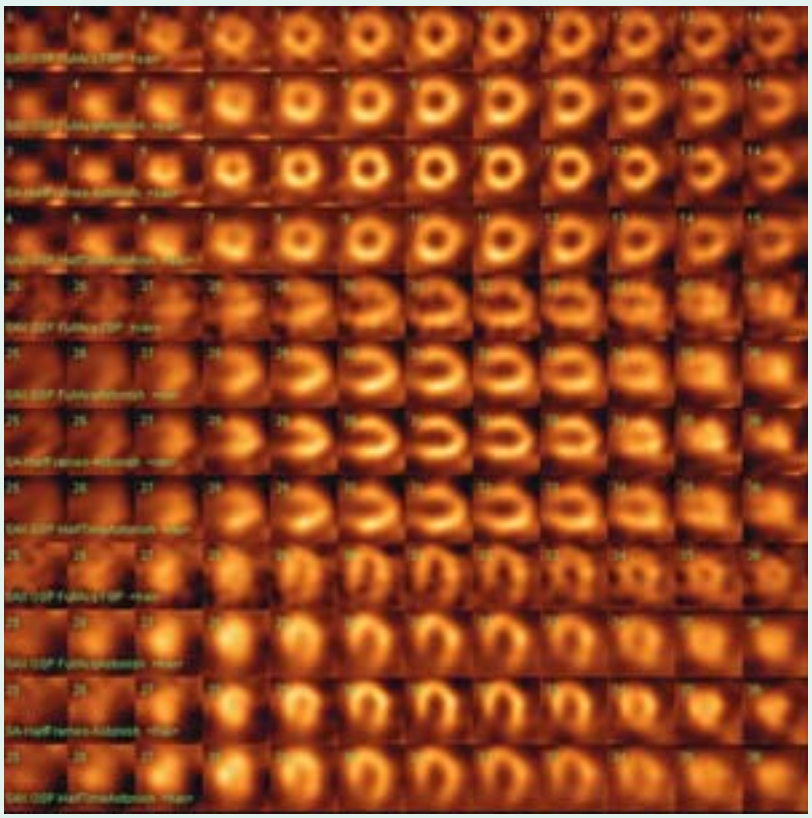


Top row:
Half Time Astonish Perfusion
Bottom row:
Half Time Astonish Gated SPECT



Comparison of FBP with Astonish (Perfusion)

Row 1: **FBP**
Standard FBP; Butterworth; Analytic; Cut-off 0.66, Filter Order 5.00
Row 2: **Full Count Astonish**
4 iterations, 16 subsets, Hanning 1.50
Row 3: **Half Frame Astonish**
4 iterations, 8 subsets, Hanning 1.14
Row 4: **Half Time Astonish**
4 iterations, 8 subsets, Hanning 1.14

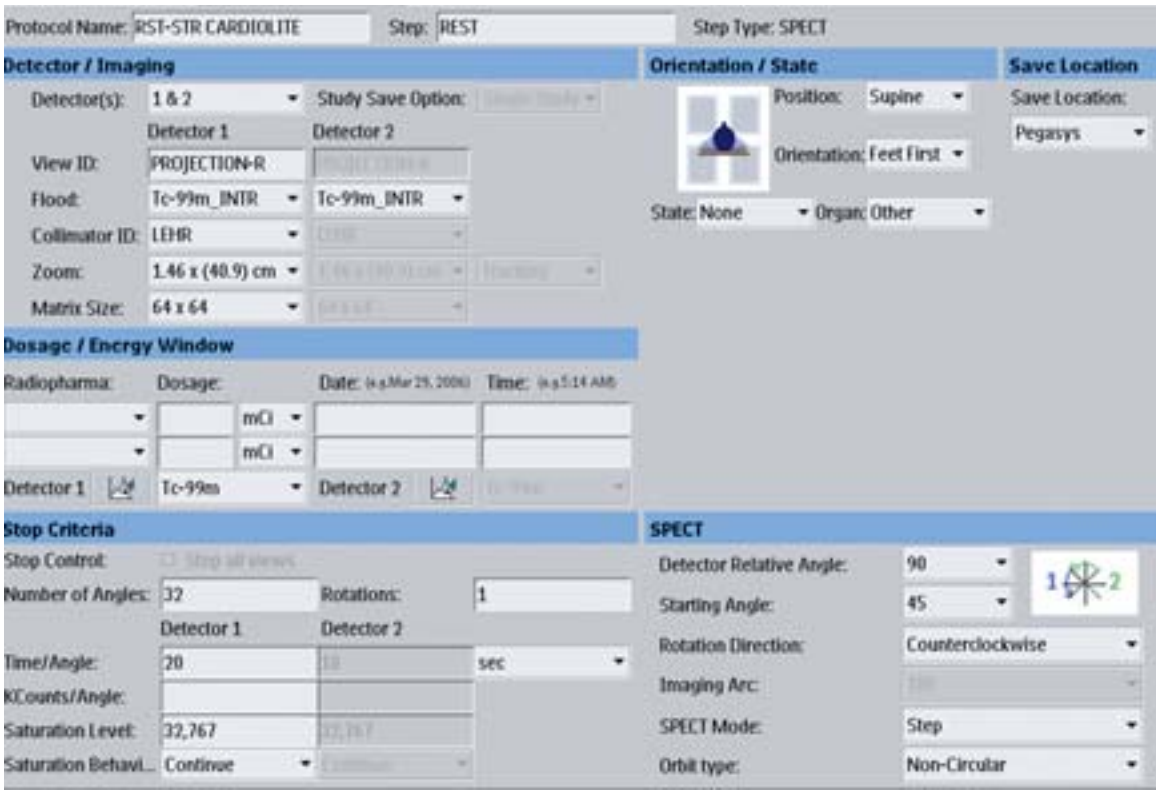


Comparison of FBP with Astonish (Gated SPECT)

Row 1: **FBP**
Standard FBP; Butterworth; Analytic; Cut-off 0.66, Filter Order 5.00
Row 2: **Full Count Astonish**
4 iterations, 16 subsets, Hanning 1.50
Row 3: **Half Frame Astonish**
4 iterations, 8 subsets, Hanning 1.14
Row 4: **Half Time Astonish**
4 iterations, 8 subsets, Hanning 1.14

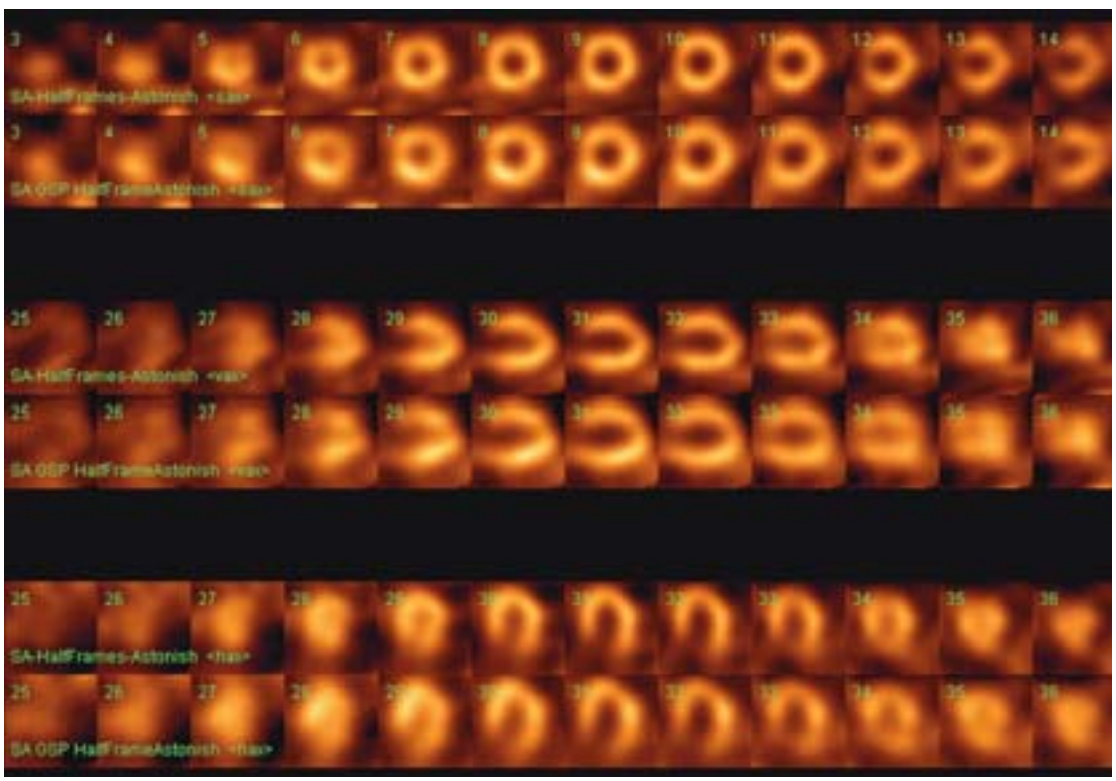
Example 2:
Half Frame acquisition for equivalent image quality.

Acquisition



Processing

Astonish: 4 iterations, 8 subsets, Hanning 1.14 (Perfusion and Gated SPECT)



Top row:
Half Frame Astonish Perfusion
Bottom row:
Half Frame Astonish
Gated SPECT

© 2008 Koninklijke Philips Electronics N.V.
All rights are reserved.

Philips Healthcare reserves the right to make changes in specifications and/or to discontinue any product at any time without notice or obligation and will not be liable for any consequences resulting from the use of this publication.

Philips Healthcare is part of Royal Philips Electronics

www.philips.com/healthcare
healthcare@philips.com
Tel: +1 888 647 4285

Philips Healthcare
540 Alder Drive
Milpitas, CA 95035

Printed in The Netherlands.
4522 962 15731/882 * APR 2008