Panel: Standardization and Optimization of Image Acquisition

Larry Clarke, PhD

Branch Chief Imaging Technology Branch (ITDB)

Cancer Imaging Program
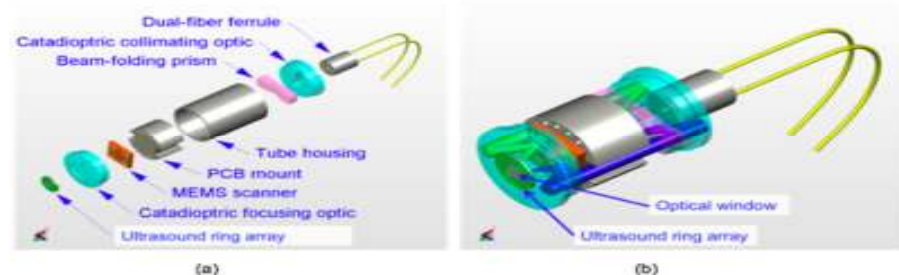
FDA Meeting, Tuesday 13th 2010

CIP-ITD Branch: Research Mission

- **Mission:** Development and validation of current and next-generation of imaging platforms, methods and resources, as required for cancer research and in future multi center clinical trials using RFA's, PA's and Contracts

- **RIDER and IRAT (CIP) (2005-2010):** Development of public resources and research communities to encourage a broad consensus on QI methods

- **PAR: Quantitative Imaging Network (QIN) U01: (**2008.) Development and validation of QI methods as applied to therapy response using <u>current generation</u> of anatomical, functional and molecular imaging methods.

- **RFA: Network for Translational Research (NTR) U54:(**2008), Development and validation of <u>next generation</u> multi-modality imaging platforms.

Current Generation: PET CT

Next Generation: Optical-US System 5 mm

Dual-fiber ferrule
Catadioptric collimating optic
Beam-folding prism
Tube housing
PCB mount
MEMS scanner
Catadioptric focusing optic
Ultrasound ring array
(a)

Optical window
Ultrasound ring array
(b)

LIDC RIDER (U01: 8 Contracts): Resource Development : 2005-2010

Mission and Goals

- **Quantitative Imaging:**
  - Data collection and QI-clinical decision tools to measure response to therapy.

- **Implementation Model:**
  - Phantom Data collection
  - Volunteer data collection
  - Patient retrospective data

- **Compare tool performance**

Commercial Platform Example: PET CT

Scope

- **Phantom Design**
  - Simulated CT, PET CT, DCE MRI and DI MRI

- **Longitudinal Repeat Studies**
  - CT, PET CT, DCE DI MRI
  - Measure Variance and Bias
  - DI MRI: Harmonization Study

- **Stakeholders**
  - IRAT, SNM, AAPM, RSNA (QIBA)

- **5 Consensus Pub: Trans Oncol. Dec 2009 : Variance and Bias**

PAR 08 225: Quantitative Imaging Network (QIN) Evaluation of Responses to Cancer Therapies: 2010-

Mission

- **Quantitative Imaging:**
  - **Data collection and quantitative clinical decision tools to measure response to therapy.**

- **Implementation Model:**
  - **Clinical trials in cancer centers and other oncology trial groups**

- **Retrospective-prospective data collections-web assessable.**

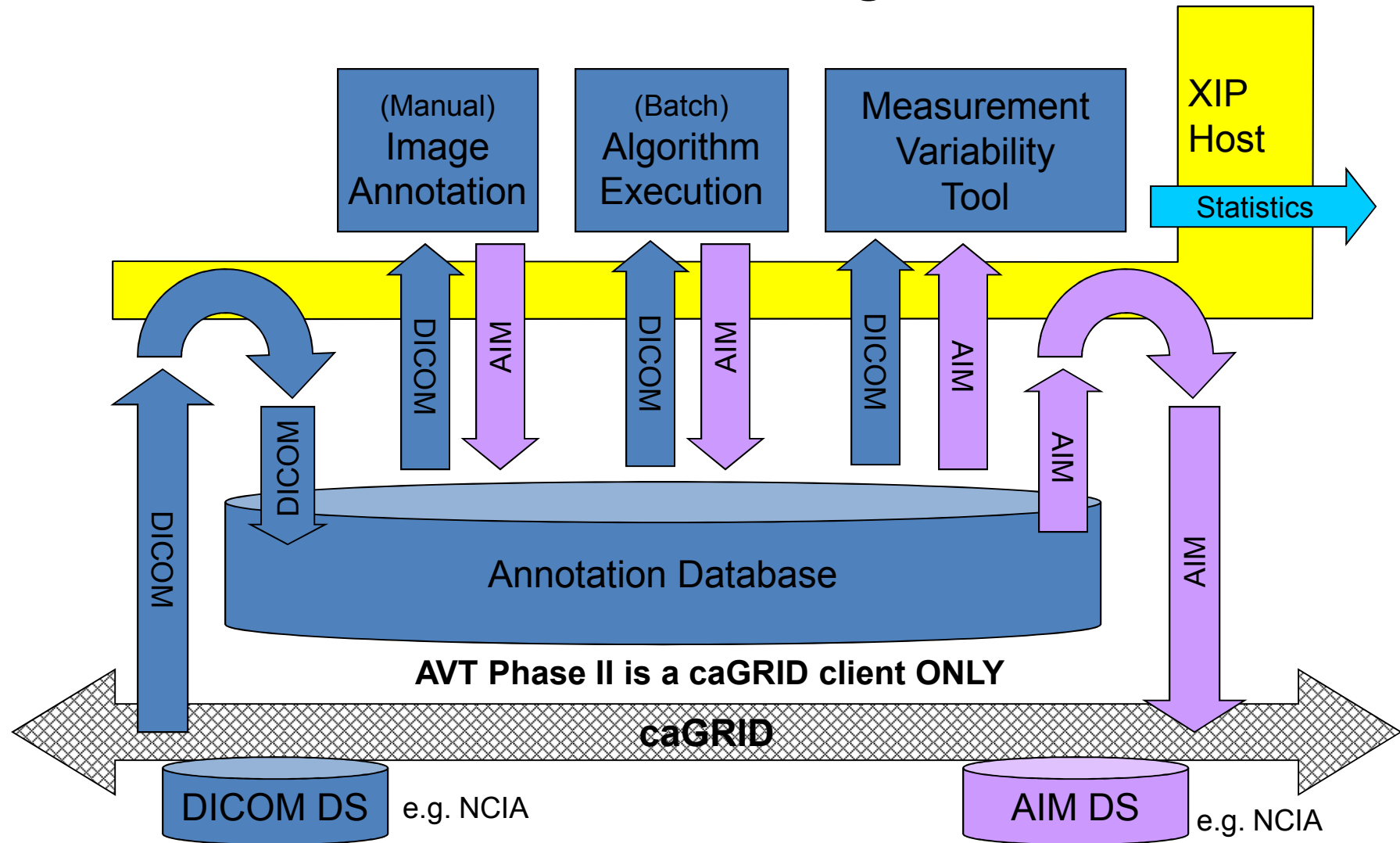**Commercial Platform
Example: PET CT**

Goals

- **Broad Consensus for QI**
  - **15 U01 Centers by Sept 2010**
  - **Associate Members: CC's**
  - **CR UK Imaging Centers**

- **Working Groups (WG's)**
  - **Q/C methods**
  - **Data Collection-Imaging Protocols**
  - **Archive-Informatics Solutions**
  - **Benchmarking Clinical Decision Tools**

caBIG: Imaging Workspace (XIP, AIM,AVT) RIDER-NIST (Biochange) 2006-2010

(Manual) Image Annotation

(Batch) Algorithm Execution

Measurement Variability Tool

XIP Host

Statistics

DICOM AIM DICOM AIM DICOM AIM AIM

DICOM DICOM

Annotation Database

AIM

AVT Phase II is a caGRID client ONLY

caGRID

DICOM DS — e.g. NCIA

AIM DS — e.g. NCIA

Platform: GRID: Benchmarking -Clinical Decision Tools