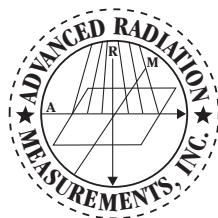
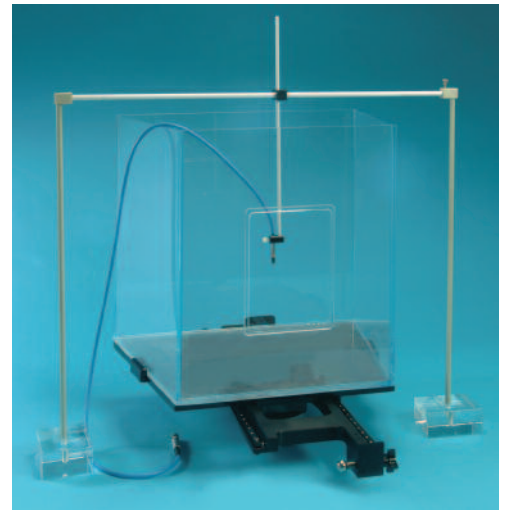
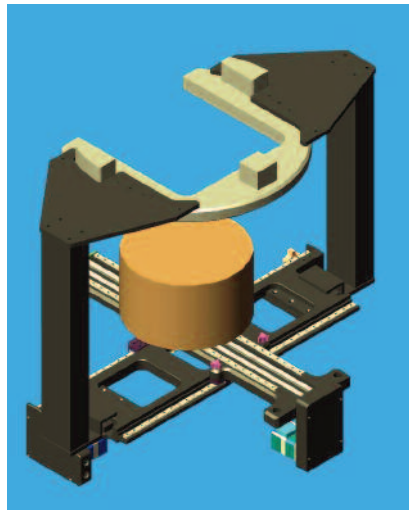
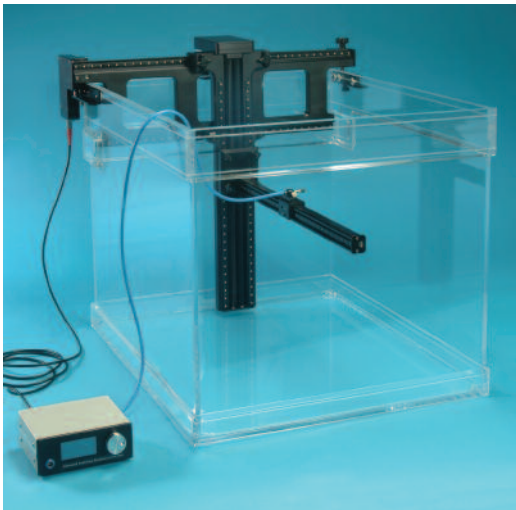


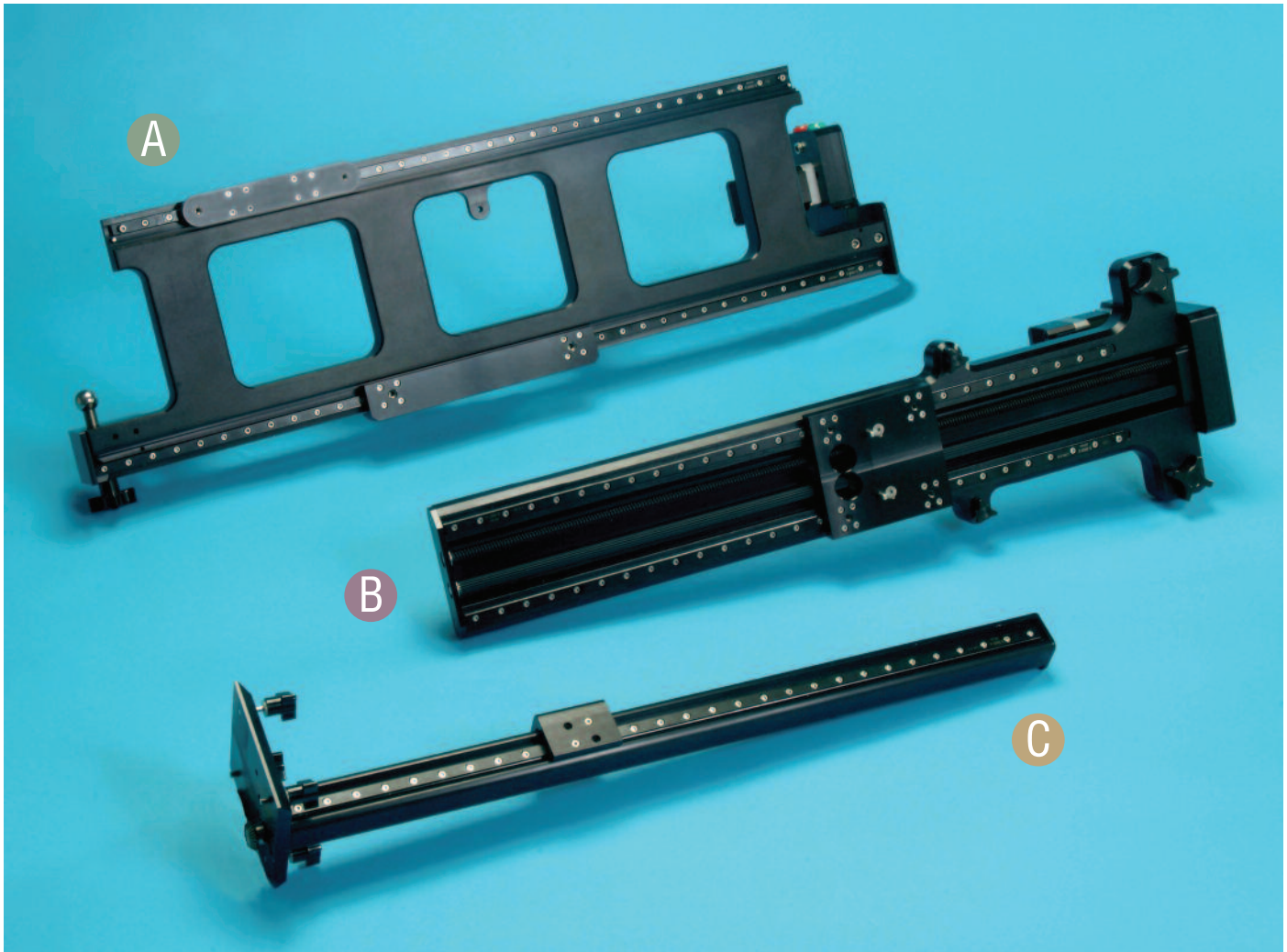
The MULTIFUNCTION MODULES of ARM Inc.



ADVANCED RADIATION
MEASUREMENTS, INC. (ARM)

THE MULTIFUNCTION, MULTITASK MODULES OF ARM Inc.

Three modules A, B and C made of crafted aluminum can be assembled for unique, fast and accurate measuring devices of therapeutic radiation.



These modules can be quickly assembled/disassembled.

Combining these modules, the following radiation measuring systems can be constructed:

- 1 3-D Radiation beam analyzer
- 2 2-D Radiation beam analyzer
- 3 Dynamic phantom
- 4 TMR/TPR direct measurement

*NOTE: All the components and functions of this device
are either patented or patent pending.*

THE MULTIFUNCTION, MULTITASK MODULES OF ARM Inc.

1 3-D RADIATION BEAM ANALYZER

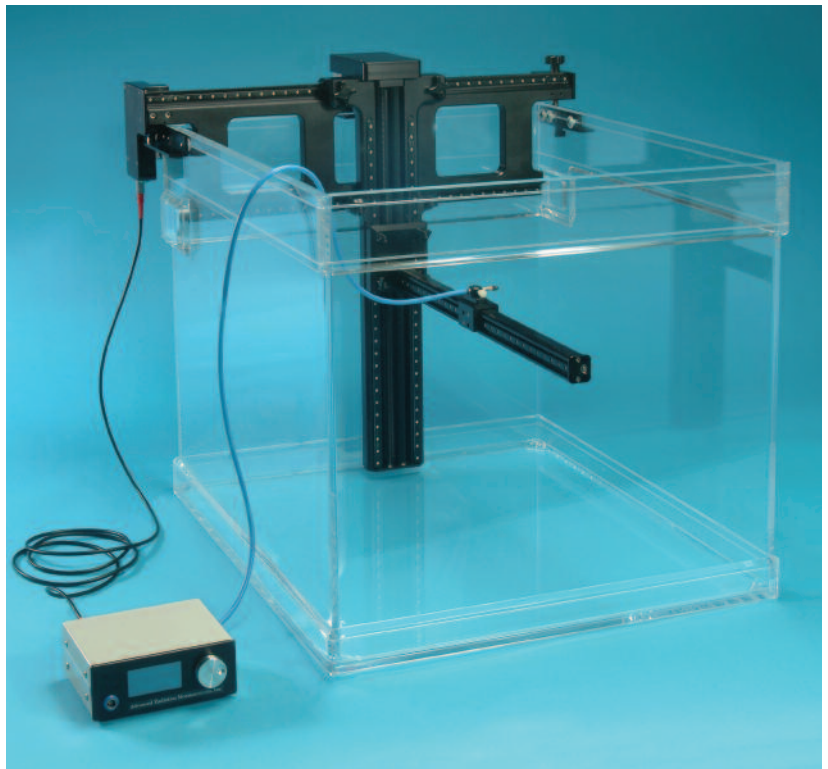
By assembling the three modules (A,B,C), a 3-Dimensional Radiation Beam Analyzer is constructed with the following unique and distinctive features, among others.

a) **LEVELING SYSTEM.** The technique of leveling the scanner against the water, instead of leveling the tank, is well known.

The ARM scanner can be leveled either:

1) **Mechanically.** The ARM special design allows accurate leveling with only two leveling points versus other scanners requiring three or four.

2) **Electronically.** Using ARM software and firmware algorithms the scanner is automatically leveled, compensating for mechanical maladjustments and/or misalignments.



b) **ACCURACY OF POSITIONING.** Driven by high precision lead screws the accuracy of positioning on all 3 axes is better than 1/10mm.

c) **MOTION AND SPEED.** The system is equipped with stepping motors, but a choice of continuous or stepping scanning is an option. High scanning speed with smooth cross and depth profiles. Independent and simultaneous motor motion.



d) **PORTABILITY.** The scanner can be assembled and disassembled in a few minutes. It fits in a hardcover, wheeled, durable Pelican case of 12"x12"x30".

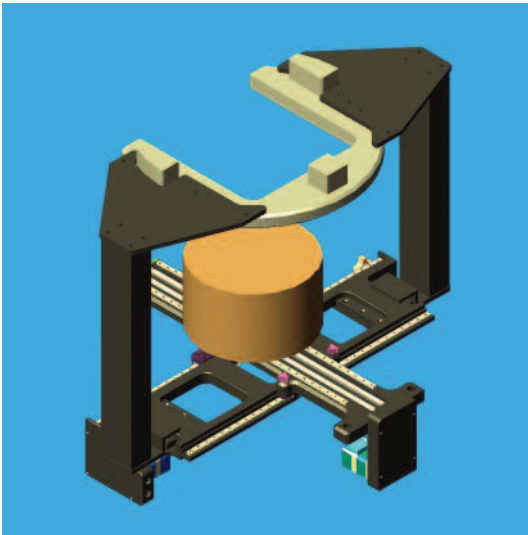
THE MULTIFUNCTION, MULTITASK MODULES OF ARM Inc.

2 2-D RADIATION BEAM ANALYZER

By disassembling the Module **C**, replacing it with an ad hoc ion chamber holder and substituting the larger tank for one of smaller dimensions (24"x13"x21") a 2-D radiation beam analyzer is obtained with similar features of 3-D scanner.

3 DYNAMIC PHANTOM

Based on the concept that most of the scatter collected by the ion chamber, comes from the relative small volume around of the detector, ARM was granted the patent for the Dynamic Phantom.



Phantom.

With the introduction of the new modules, the use of the dynamic phantom can be expanded to new ways for performing dynamic measurements.

The modules **A** and **B** can be arranged and placed either on top of the treatment table, or gantry mounted for scans at any gantry angle.

Because the motors can be moved independently and simultaneously, profiles of in-plane, cross-plane and multi angled diagonals are fast and accurately scanned.

Other Distinctive Features:

- Autocenter. The scanner automatically finds the center of the radiation field
- Limit/Home Switches for Reliable Operation. This function prevents any collision with the walls of the tank.
- All the scanner motions are driven by lead screws for high positioning accuracy and repeatability.
- The scanner assembles and disassembles in a few minutes.
- In the normal operation the scanner takes samples every mm. It also has the option of collecting data at a resolution of 0.1mm, 0.2mm and 0.5mm.
- The scanner can be used with distilled or common water. All the scanner parts are made of stainless steel; or high quality anodized aluminum.

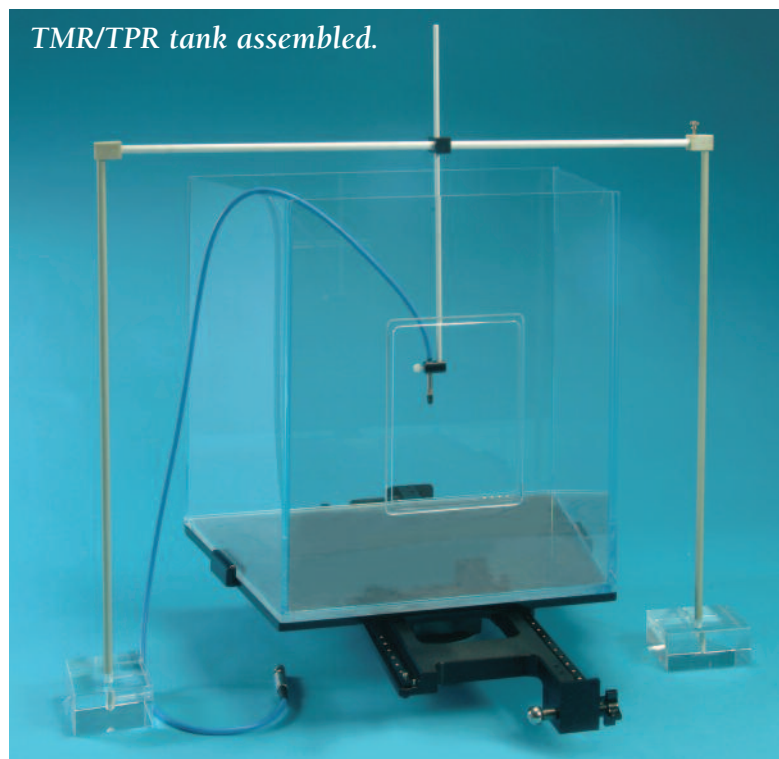
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4 DIRECT MEASUREMENT OF TMR/TPR

Tissue Maximum Ratio/Tissue Phantom Ratio, can either be obtained by calculation from the measured PDD values or by direct measurements.

The technique used by the other manufacturers is to place the ion chamber at 100SSD, close to the bottom of the tank, and taking measurements by pumping water in the tank. The inconvenience and length of this process is obvious.

The ARM has a different approach in resolving this issue.



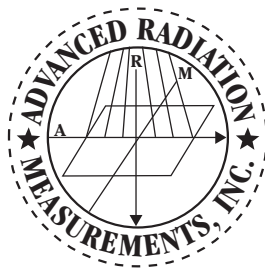
A special tank has been designed with a trapezoidal shape, so it follows the divergence of the radiation beam. This saves a substantial amount of weight and water to be poured into the tank. The tank is then placed on top of a platform **using the module A**, with the two high quality linear guides for easy and accurate movement of the tank. After turning the gantry 90 degrees, the ARM program moves the tank towards the gantry and takes measurements as the ion chamber independently stays at 100SSD.

Duration of the process to measure a TMR/TPR field of 30cm range: **less than 1 minute.**

The top photo shows how the system is arranged. The bottom photo shows the system working with the gantry at 90 degrees.



System working with gantry at 90 degrees.



ADVANCED RADIATION MEASUREMENTS, INC. (ARM)

601 NE Emerson Street, Port St. Lucie, Florida 34983

Phone: 772-340-3279 • Fax: 772-871-5995

E-mail: armx2000@aol.com Website: www.armx2000.com