

NIST's commitment, in providing x-ray dose accountability to the US, advances in the new NIST x-ray calibration facility by combining the innovations of the past into a state-of-the-art measurement laboratory. The improved facility allows continuity of more than 80 years of developing standards which realize the SI unit of dose, the gray, and advances the measurements important in the radiological sciences through the dosimetry of x rays. The calibration of ionization chambers in the x-ray range between 10 kV and 300 kV are performed in the NIST x-ray facility in terms of the physical quantity air kerma. NIST calibrations have allowed x-ray air-kerma dose traceability in the US for medical, defense and energy applications, validated through international comparisons. Calibrations are performed by comparing the instrument to a NIST primary standard, which includes four primary standard free-air ionization chambers. Improvements in the facility allow for lower uncertainty in the measurement of time, distance, and voltage stability in the comparisons for the medical traceability to diagnostic and therapeutic radiology, radiation protection and personnel dosimetry. NIST provides x-ray dose proficiency tests for secondary calibration facilities for the FDA-MQSA, DOE, Armed Forces, US chamber manufacturers, NVLAP and the American Association of Physicists in Medicine (AAPM) Accredited Dosimetry Calibration Laboratory (ADCL) programs.