

## Radiation Risks and Protection Guidelines

BER studies have become the foundation for laws and standards that protect the population, including workers exposed to radiological sources:

- Guidelines for the safe use of diagnostic X rays and radiopharmaceuticals.
- Safety standards for the presence of radionuclides in food and drinking water.
- Radiation-detection systems and dosimetry techniques.

## Finding a Link Between DNA Damage and Cancers

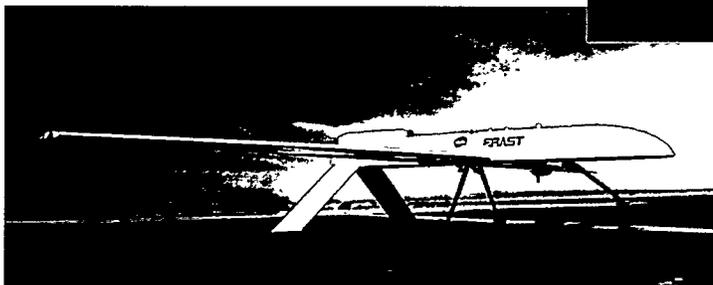
Studies of DNA damage have uncovered similar mechanisms at work in damage caused by radiation exposure, X rays, ultraviolet light, and cancer-causing chemicals. A screening test for such chemicals is now one of the first hurdles a new compound must clear on its way to regulatory and public acceptance.

## Tracking the Regional and Global Movement of Pollutants

BER research helped to establish the earliest and most authoritative monitoring network in the world to detect airborne radioisotopes. The use of atmospheric tracers has led to the improved ability to predict the dispersion of pollutants.

## Understanding Global Change

Important achievements in environmental research have led to enhanced capabilities in studying global change, including more accurate predictions of global and regional climate changes induced by increasing atmospheric concentrations of greenhouse gases.

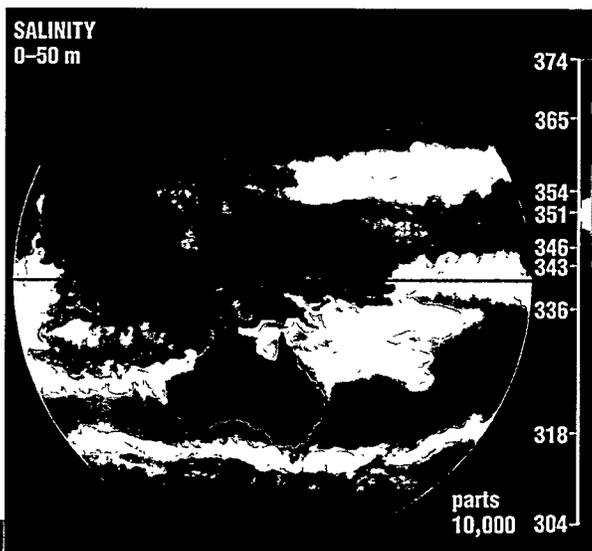


The Unmanned Aerospace Vehicle (above) conducts measurements to quantify the fate of solar radiation falling on the earth.



Human chromosomes “painted” by fluorescent dyes to detect abnormal exchange of genetic material frequently present in cancer. Chromosome paints also serve as valuable resources for other clinical and research applications.

“... (it's) not so much where we stand  
as in what direction we are moving.  
[Oliver Wendell Homes, Sr.]”



High-performance computing is promoting faster and more realistic solutions to long-term climate change.

## Creating a New Science of Ecology

BER achievements in using radioactive tracers to follow the movements of animals, routes of chemicals through food chains, decomposition of forest detritus, together with the program's introduction of computer simulations, created the new field of radioecology.