A wide range of items and systems provide today’s warfighter with contamination avoidance, protection, decontamination and obscuration capabilities. Several representative examples are provided below.

Contamination Avoidance

The United States has fielded several types of nuclear detection and monitoring systems to assist in contamination avoidance.

Radiological detection indication and computation (radiac) provides soldiers and commanders with nuclear radiation detection capabilities, allowing them to fight effectively and survive on the nuclear battlefield. It also minimizes nuclear radiation exposure of troops during such peace-time missions as peacekeeping, nuclear-accident response, and recovery of vehicles and equipment containing radioactive material.

The AN/UDR-13 Radiac set is a compact, handheld, pocket-size tactical radiation meter, which measures and displays gamma dose rate and total gamma/neutron cumulative dose in a battlefield environment. A push-button pad enables mode selection, functional control and the setting of audio and visual alarm thresholds for both dose rate and mission dose. A “sleep” mode with automatic wake-up enhances battery life. A liquid crystal display provides data readout and warning-mode messages. As a replacement for the older IM-93/PP-1578, UDR-13 improvements include prompt dose measurement, including neutrons, alarms and rate measurement; backlit display; and stable readings and calibration. It does not need a separate charger.

The AN/VDR-2 Radiac set detects and measures nuclear radiation from fallout and radioisotopes. The system replaces the older IM-174 and AN/PDR-27. It performs ground radiological surveys from vehicles or, in the dismounted mode, as a handheld instrument. The set can also provide a quantitative measure of radiation to help personnel, equipment and supply decontamination operations.

The AN/PDR-75 Radiac Set measures the prompt and residual gamma doses and neutron doses stored on the DT-236 individual dosimeter from 1 to 1,000 centigray (cGy). The system provides a new operational capability to monitor and record the total dose exposure of individual personnel to gamma and neutron radiation. It responds to and measures prompt radiation from nuclear bursts. It will be used to calculate unit radiation status and to perform medical triage and assist in unit reconstitution.

The AN/PDR-77 Radiac Set detects and measures alpha, beta, gamma and X-ray radiation. The system replaces the older AN/PDR-56F and AN/PDR-60, which relied on aging technology and were not sensitive enough to accomplish the Army’s alpha detection mission.

The M27 Multipurpose Integrated Chemical Agent Detector (MICAD) is an integrated nuclear, biological and chemical detection warning and reporting system to be used in area warning, combat and armored vehicles, and tactical van and shelter mission profiles. MICAD automates the currently laborious NBC warning-and-reporting process throughout the battlefield. It automates the gathering of NBC contamination data from fielded NBC detectors and sensors and automatically formats and transmits alarms and reports up the chain of command throughout the battlefield.

The M21 Remote Sensing Chemical Agent Automatic Alarm (RSCAAL) is the first standoff chemical agent detector approved for fielding to the soldier. It gives early warning of blister and nerve agents up to 5 kilometers, thus allowing field commanders to identify and maneuver around contaminated areas.

An automatic scanning, passive infrared sensor, it detects agent vapor clouds by changes that the vapor causes in the background infrared spectra. Scanning a 60-degree arc, the M21 sounds a horn and illuminates either a blisters or nerve light. It is fielded in tripod-mounted configurations as well as mounted on a mast on the M93A1 Fox NBC reconnaissance system.

The M22 Automatic Chemical Agent Detection Alarm (ACADA) is an off-the-shelf alarm system capable of detecting and identifying standard blister and nerve agents. The M22 used the foreign comparative testing program for down-selection of the United Kingdom’s GID-3. The M22 system is manportable, operates independently after system start-up, and provides an audible and visual alarm.

The M22 Improved CAM (ICAM) is a handheld, soldier-operated, post-attack device for monitoring nerve and blister chemical agent contamination. It detects chemical agent vapors by sensing molecular ions of specific mobilities (time of flight) and uses timing and microprocessor techniques to reject interference.

The monitor detects and discriminates among nerve and mustard agent vapors. ICAM consists of a drift tube, signal processor, molecular sieve, membrane, confidence tester, dust filters, buzzer and battery pack. The monitor measures 4 inches by 7 inches by 15 inches and weighs approximately 5 pounds.

The Joint Service Lightweight Standoff Chemical Agent Detector (JSLS CAD) is designed to provide state-of-the-art capability in detecting nerve, blister and blood agent vapor clouds. The fully automatic detection system searches the surrounding atmosphere for chemical agent vapor clouds and is the first chemical vapor detection system to furnish 360-degree on-the-move coverage from ground-, air- and sea-based platforms at average distances of 2 kilometers. JSLS CAD provides warfighters with early warning to avoid contaminated battle spaces or, if avoidance is not possible, time to don protective masks and clothing.

Smoke/Obscurants

Smoke and other obscurants have been used in wars dating back to ancient Greece. On today’s battlefield, smoke can counter new generations of smart weapons. Smoke is used as camouflage, as blinding smoke laid directly on enemy positions, and as a decoy to confuse and mislead enemy forces. These basic smoke applications are used to increase survivability, buy maneuver time for the attacker, and protect forward-assembly areas and high-priority rear areas for the defense.

Smoke particles scatter or absorb radiant...
energy used by troops and smart weapons for target acquisition and for weapon guidance and control. Smart-weapon sensors operate in three main parts of the electromagnetic spectrum: visible; near-, mid- and far-infrared wavelengths; and millimeter wavelengths.

The Army uses several models of smoke-generation systems, including the M56 Coyote, the M58 Wolf, the M157A2 Lynx and the M1059/M1059A3 Lynx. In addition, the M6 countermeasure discharger provides self-screening protection to individual combat vehicles.

The M56 Coyote Smoke-Generation System (SGS) provides large-area obscuration in the visual and infrared spectra. It is a Humvee-mounted, large-area, smoke-generator system. In addition to providing enhanced spectrum coverage, the M56 system provides smoke generators with a new wheeled-vehicle platform.

The M58 Wolf Smoke-Generation System places the capabilities of the M56 on a derivative of the tracked M113 armored personnel family.

The M157A2 Lynx Smoke-Generation System consists of two M54A2 smoke generators, an air compressor assembly, a 120-gallon fog-oil tank, a fog-oil pump assembly and a remote-control panel. The entire package is mounted on the rear of an M1037/M1097 Humvee.

The M1059/M1059A3 Lynx Smoke-Generation Carrier is an M113A2 armored personnel carrier modified to transport a single M157 smoke-generating set. The two generators, mounted on the roof of the vehicle under armor, are remotely controlled from inside the vehicle.

The M6 Countermeasure Discharger is a four-tube smoke grenade launcher that enables combat vehicles to conceal themselves from hostile surveillance, target acquisition and weapon guidance systems. The M6 can fire all Q-STAG 401 conforming grenades (66 mm) and interfaces with vehicle integrated defense systems.

### Biological Detection

The M31/M31A1/M31A2 Biological Integrated Detection System (BIDS) mitigates the effects of biological warfare attacks during all phases of a campaign. As a corps-level asset, it is employed by a dedicated biological defense company to detect large-area biological attacks.

The M93A1/M93A1P1 Fox Nuclear-Biological-Chemical Reconnaissance System (NBCRS) is a dedicated system of nuclear and chemical sampling, detection and warning equipment, and biological sampling equipment integrated into a high-speed, high-mobility, six-wheel armored vehicle. It is capable of performing NBC reconnaissance on primary, secondary or cross-country routes throughout the battlefield. The M93A1P1 up armored configuration added an improved weapon and slat armor to improve crew survivability.

The Joint Biological Point Detection System (JPBDS) is a successor to the Army BIDS that will increase the number of agents that are identified, decrease detection and identification time, increase detection sensitivity, and automate the detection and identification process. It is the first fully automated biological threat agent detection, collection and identification suite designed for employment by all four services.

### Individual NBC Protection

The M40/42-Series Protective Masks, a family of chemical-biological (CB) protective masks, provide respiratory, eye and face protection against chemical and biological agents, toxins, radioactive particles and battlefield contaminants.

The M45 Chemical-Biological Protective Mask supports the Land Warrior program as well as Joint Special Operations Command requirements and serves as the mask for Army, Navy, Air Force and Marine Corps personnel who cannot be fitted with the standard M40/M40A1, M42/M42A2 or MCU/2A/P protective masks. The M45 mask provides protection to the face, eyes, head, neck and respiratory tract from CB agents and radioactive particles without the aid of forced ventilation air, while maintaining compatibility with rotary-wing aircraft—sighting systems and night-vision devices.

The M50/M51 Joint Service General Purpose Chemical-Biological Protective Mask (JSGPM) is a lightweight protective ground mask system—consisting of mask, carrier and accessories—designed to minimize impact on the wearer’s performance while maximizing ability to interface with the NBC Protective Future Ensemble. The mask replaces the M40/M42 and MCU/2/P series masks as well as the M45 in the Land Warrior program.

The M48 Chemical-Biological Aircraft Protective Mask provides CB protection for Apache aviators and was designed for compatibility with the AH-64 Apache helicopter’s integrated helmet and display sighting system (IHADSS) and optical relay tube.

The Joint Service Aircrew Mask, Apache (JSAM, Apache) will replace the M48 to provide head, eye, respiratory and CB protection for U.S. Army and AH-64A/D Apache aircrew.

### Collective Protection

The M8 Chemical-Biological Protective Shelter (CBPS) replaces the M51 collective protection shelter. It consists of a lightweight multipurpose shelter mounted on an M1113 Humvee, an airbeam supported CB-protected soft shelter and high mobility trailer with towed 10-kilowatt Tactical Quiet Generator set. The CBPS M8E1 is an engineering change to an electrically powered system on an M1085A1P2 Medium Tactical Vehicle.

The CBPS provides 72 hours of contamination-free, environmentally controlled working area for medical, combat service and combat service support personnel to obtain relief from the need to continuously wear chemical-biological individual protective clothing.

Chemically Protected Deployable Medical Support (CP DEPMEDS) is a containerized set that provides Army DEP-MEDS combat support hospitals with a capability to sustain operations in an NBC environment.

This modular system integrates environmentally controlled collective protection elements into 16-foot, 32-foot, 48-foot and 64-foot Tent Extendable Modular Personnel (TEMPER). CP DEPMEDS uses M28 collective protection equipment, power, waste and latrine management assets to provide an extended hospital capability.

The M20A1 Simplified Collective Protection Equipment (SCPE) provides a clean-air shelter for use against chemical and biological warfare agents and radioactive particles. The SCPE is an inflatable shelter that allows personnel to perform duties without wearing individual protective equipment. It can be used as a command, control, communication and intelligence shelter or as a soldier rest-and-relief facility.