

INFORMATION PAPER

SUBJECT: Army Automated External Defibrillators (AED)

1. **BACKGROUND.** This information paper was generated in response to a request from the field looking for information on AEDs in the military system with and without air-worthiness certification.
2. **DISCUSSION.** AED stands for *automated external defibrillator*. A defibrillator is a medical device that delivers an electric shock to a patient's chest, which in turn passes through the heart. This is done to terminate lethal cardiac rhythms and cause the heart to resume normal pumping activity.

AEDs are called automated because they take the decision to deliver a shock out of the hands of rescuers and place it in an internal computer chip. Audible prompts tell the rescuer what to do, from attaching electrodes to the patient's chest, to pushing a button to deliver a shock. AEDs have been commercially available for the past ten years. Currently, some AEDs can weigh as little as 4 pounds and are highly portable as well as automated.

The most common lethal rhythm leading to a sudden cardiac arrest, ventricular fibrillation, causes the lower portion of the heart (the ventricles) to quiver uncontrollably. The heart cannot pump blood, and death quickly follows unless CPR and rapid defibrillation occurs. Sudden cardiac arrest is by nature unpredictable and can strike anyone at anytime. It is for this reason that the issue of public access defibrillation is so urgent.

Due to their easy-to-use design, superior technology, and affordability, AEDs are now being placed in a wide range of settings such as hospitals and clinics, offices and industrial locations, airports and airplanes, schools, government buildings, health clubs and golf courses. This innovative AED technology has also enabled a broader range of people beyond community EMS professionals to provide lifesaving therapy.

The following are a selection of AEDs with assigned NSNs:

- **Defibrillator Monitor-Recorder System, Reusable, NSN 6515-01-479-4267,** Philips Medical, Part Number M3861, Heartstream FR2 AED, \$2,187.50

The Heartstream FR2 automated external defibrillator (AED) is portable and lightweight. The FR2 is the only AED cleared for use on people of all ages.

The FR2 AED operates with long-life maintenance-free, lithium manganese batteries that are designed specifically for high-volume consumer applications where safety and reliability are of the utmost importance. The FR2 performs daily, automated self-tests that check readiness for use. Other features include easy-to-follow voice prompts, and a bright LCD display to reinforce the voice prompts, making it easy to use in noisy or dark settings; the FR2 also has enhanced features that can be enabled for improved hand-off to advanced life support (ALS) responders. Additionally, the FR2 has on-board training capabilities when used with the fully rechargeable Training and Administration Pack. This allows users to safely train on the FR2 using realistic training scenarios.

The FR2 AED incorporates the Philips' low-energy SMART Biphasic technology. Additionally, the SMART Analysis System automatically determines if a shock is required and protects against inappropriate delivery of a shock. This feature eliminates the need for the operator to be trained in reading and interpreting the patient's electrocardiogram (ECG).



Figure 1. Philips Medical FR2 AED

- **Defibrillator, External, NSN 6515-01-459-1784, SurvivaLink Corporation,** Part Number 9100-101 SurvivaLink FirstSave® AED, Part Number 9100-101, \$2,199.00.

The FirstSave AED is the only AED with one-button operation and pre-connected, interchangeable electrodes. Its exclusive RescueReady® feature also ensures that the battery, circuitry and electrodes are in working condition. FirstSave's patented technology checks if the electrodes are in the device and ready for use. It also utilizes escalating, variable energy biphasic waveform, demonstrating 100 percent effectiveness in clinical trials.

The FirstSave AED performs daily, weekly and monthly testing automatically. Each day, the battery, electronics and electrodes are checked. Every seven days, FirstSave performs a partial charge internally to test its high-voltage circuitry. Then, once a month, the device performs a full charge internally to test its high voltage circuitry. If FirstSave fails any one of its self-tests, the status indicator on the outside of the device changes from green to red and an audible alert is emitted. In addition to providing the most extensive self-testing available for the battery and circuitry, FirstSave is the only AED with patented technology that confirms electrodes are in the device and ready for use. This exclusive feature minimizes the possibility of arriving at the rescue scene without electrodes or with electrodes that are unusable.

Survivalink's proprietary STAR Biphasic technology utilizes escalating biphasic energy and customized, variable energy. Unlike conventional biphasic waveforms which deliver a fixed energy level regardless of patient needs, STAR Biphasic varies the energy delivered to each patient based on the charge balancing principle. This principle states that once a defibrillation charge is given, excess or residual charge on the heart's cells must be neutralized to prevent refrillation. STAR Biphasic technology measures a patient's impedance, adjusts defibrillation parameters, and delivers a waveform and energy level customized to the needs of the patient.



Figure 2. SurvivaLink FirstSave® AED

- **Defibrillator, External with Audio Feature, NSN 6515-01-459-1041, Part Number 3005400-300 (LP 500), Medtronic Physio-Control Group, \$2,310,19.**

The LIFEPAK 500 automated external defibrillator is designed to be used by first responders to cardiac emergencies. The device is extremely portable at only seven pounds. Low maintenance requirements and intuitive operation are also trademarks of this AED.

Features include pre-connected *QUIK-COMBO™ ELECTRODES*; simple 3-button operation; clear, concise voice prompting for defibrillation and CPR; LCD for text messages, shock count, and real-time clock. Automatic self-testing saves time and improves testing consistency. Battery options include a rechargeable lead acid battery and a high capacity extended shelf-life lithium battery that requires no charging and no maintenance.



The 500 utilizes the same field-proven Shock Advisory System™ used in thousands of Physio-Control AEDs over the past ten years. It employs the industry standard *Edmark* defibrillation waveform at energy levels recommended by the American Heart Association and European Resuscitation Council.



Figure 3. Lifepak 500 Automated External Defibrillator

- **Defibrillator/Monitor with AED function, NSN 6515-01-458-3827**, Medtronic Physio-Control, Part Number Lifepak 12, \$6,796.00.

The Lifepak 12 can be utilized for AED, manual defibrillation or both, depending on users' skills and comfort level. The device includes noninvasive pacing, pulse oximetry (SpO₂), 12-lead ECG, EL or LCD display, capnography and noninvasive blood pressure (NIBP). Also available are a choice of ADAPTIV Biphasic or industry standard monophasic (Edmark) defibrillation waveforms with the capability to deliver shocks at energy levels recommended by the American Heart Association in collaboration with the International Committee on

Resuscitation. Both monophasic and biphasic devices utilize the same field-proven Shock Advisory System used in Lifepak AEDs since 1986. Configurable options, including AED and manual defibrillation modes, allow standardization across user groups and ease of patient transfer. In AED mode, the Lifepak 12 defibrillator/monitor utilizes the Shock Advisory System with clear, voice prompts to advise the operator when it detects a shockable rhythm with visual and voice prompts. Manual mode features a simple 1-2-3 operation.



Figure 4. Lifepak 12 Defibrillator/Monitor with AED

3. CONCLUSION. This list is not all-inclusive but identifies AED models that are currently being manufactured and have NSNs. Currently, two Defibrillator/Monitors with AED abilities are in the pipeline for Aeromedical Evacuation certification, the Lifepak 12 by Medtronic Physio Control, which has an assigned NSN, and the Zoll Medical M Series CCT. This testing should be completed by early in calendar year 2003. Additionally, the SurvivaLink FirstSave AED has been awarded an Airworthiness Release but still requires Medical Certification.