



White Paper

Holocom[®] PDS
and Electrical Metallic Tubing (EMT)

*Cost Comparison of Initial and Retrofit
SIPRNet Installations*

Holocom® PDS and EMT

Cost Comparison of Initial and Retrofit Installations

OVERVIEW

National Security Telecommunications and Information Systems Security Instruction (NSTISSI) No. 7003, Protective Distribution Systems (PDS), provides guidance for the protection of cable and optical fiber and associated connectors transmitting unencrypted classified National Security Information (NSI) through an area of lesser classification or control. This directive, dated 13 December 1996, was intended to be a minimum standard. Federal agencies and departments using classified networks have incorporated additional directives to this baseline set of guidelines.

There are three categories of PDS. This paper pertains to hardened carrier deployment only.

The first installations for meeting NSTISSI 7003 comprised conduit constructed of electrical metallic tubing (EMT) or ferrous conduit (pipe), pull boxes with associated locks at regular intervals, steel enclosures to house the network connections, and all joints and seams sealed with epoxy. While this PDS solution meets NSTISSI 7003 guidelines, it has limitations in many applications.

One critical limitation is a lack of modularity. Once an EMT or pipe-based PDS is established, all or major portions of the system are often completely dismantled or discarded in order to implement moves, adds or changes (MACs). In some circumstances, an additional homerun-type cable is added from the CAA closet or nearest pull box resulting in what amounts to an entirely new installation. The practical result of making changes to a system that lacks modularity is, in most circumstances, a critical disruption to the work environment and significant additional cost for PDS MACs.

Holocom® PDS is a patented PDS that meets the spirit and intent of NSTISSI 7003 and provides the modularity absent in the EMT/pipe solution. Holocom PDS was specifically designed and engineered to improve upon the limitations of EMT and enable easy installation, expandability, and cost advantages to organizations implementing a new PDS or modifying an existing installation.

The purpose of this paper is to compare the cost of EMT and Holocom PDS in a three-step PDS implementation: (1) *initial installation* in a transitional facility such as a trailer, (2) *moving* the PDS to a permanent building, and (3) *adding* more SIPRNet drops. We used equivalent labor rates and retail prices for EMT and Holocom PDS solutions.

Holocom Networks recognizes that dollar-for-dollar costs of EMT and Holocom PDS are not always consistent with the example presented in this white paper. There are many factors that influence the final cost of a particular deployment. It is our intention to offer a comparison that enables the reader to derive meaningful trends and expectations for the total cost of PDS ownership in most PDS deployments.

PROTOCOL

Holocom Services Division presented site drawings to one of its certified industry partners¹ and collaborated on estimating labor and material costs for both EMT and Holocom PDS solutions. Adhering to the installation requirements specified in the Army's SIPRNet technical guidelines², technical staff determined the bill of materials and labor requirements using Cat 6 shielded copper cable for the following scenarios:

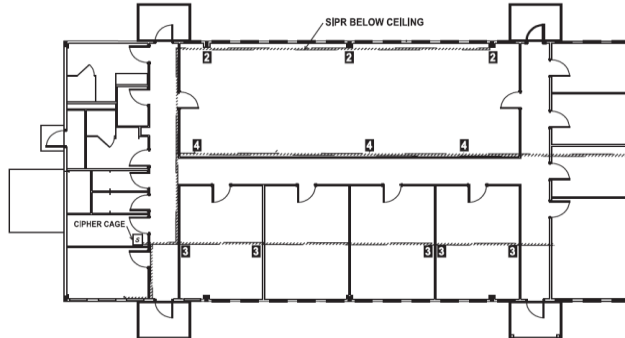
- Phase I: *Initial* PDS Installation in a Transitional Facility
- Phase II: *Moving* the PDS to a Permanent Building
- Phase III: *Adding* SIPRNet Drops to the Permanent Building PDS

PHASE I SITE DRAWING



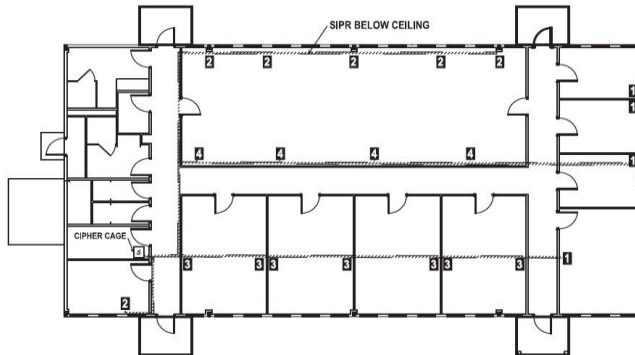
▶ Lock Box with 2 SIPRNet Drops

PHASE II SITE DRAWING



1 Lock Box with 1 SIPRNet Drop
2 Lock Box with 2 SIPRNet Drops
3 Lock Box with 3 SIPRNet Drops
4 Lock Box with 4 SIPRNet Drops

PHASE III SITE DRAWING



EMT and Holocom Comparative Costs

PHASE I

Initial PDS Installation in a Transitional Facility

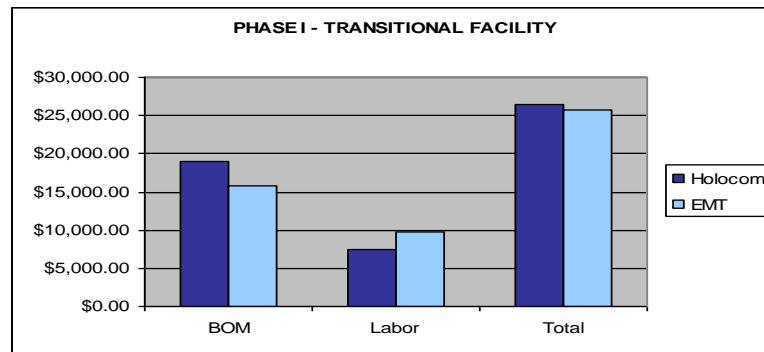
PHASE I PDS deployment consists of:
 12 drop boxes with 2 SIPRNet drops in each box
 Total SIPRNet drops = 24

PHASE I - EMT Solution

Bill of Materials	\$15,861
Labor	<u>\$ 9,830</u>
Material + Labor	<u>\$25,691</u>

PHASE I – Holocom Solution

Bill of Materials	\$19,007
Labor	<u>\$ 7,458</u>
Material + Labor	<u>\$26,465</u>



PHASE II

Moving the PDS to a Permanent Building

Phase II PDS deployment consists of:
 33 SIPRNet drops arranged as follows:
 - Three drop boxes with 2 SIPRNet drops in each box
 - Five drop boxes with 3 SIPRNet drops in each box
 - Three drop boxes with 4 SIPRNet drops in each box
 Total SIPRNet drops in the Permanent Building = 33

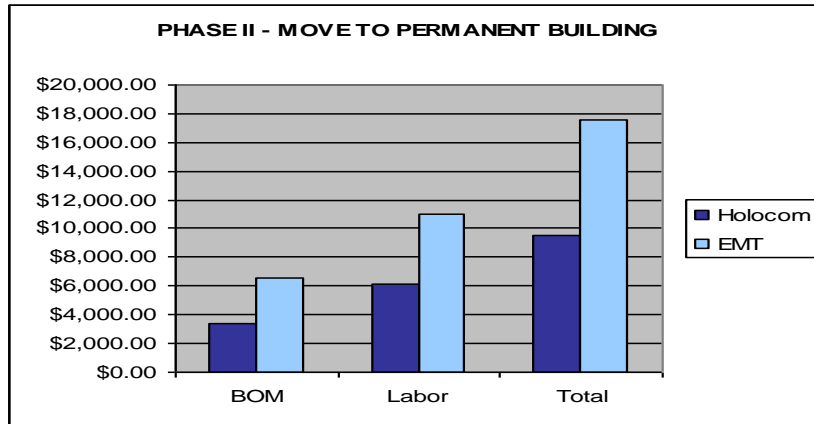
PHASE II - EMT Solution

Bill of Materials	\$ 6,549
Labor	<u>\$11,055</u>
Material + Labor	<u>\$17,604</u>

PHASE II – Holocom Solution

Bill of Materials	\$ 3,381
Labor	<u>\$ 6,145</u>
Material + Labor	<u>\$ 9,526</u>

PHASE II - MOVE TO PERMANENT BUILDING



PHASE III

Adding SIPRNet Drops to the Permanent Building PDS

Phase III PDS deployment consists of:

20 new SIPRNet drops arranged as follows:

- Four new drop boxes with 1 SIPRNet drop in each box
- Three new drop boxes with 2 SIPRNet drops in each box
- Two new drop boxes with 3 SIPRNet drops in each box
- One new drop box with 4 SIPRNet drops in each box

Total SIPRNet drops in the Permanent Building = 53

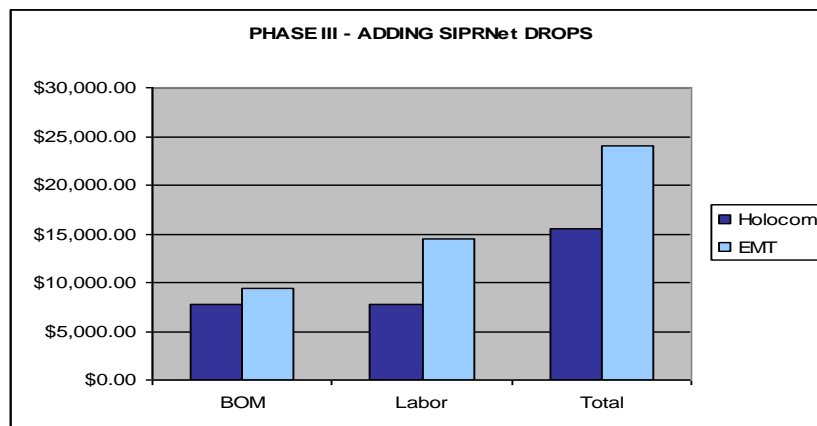
PHASE III - EMT Solution

Bill of Materials	\$ 9,466
Labor	<u>\$14,513</u>
Material + Labor	<u>\$23,979</u>

PHASE III – Holocom Solution

Bill of Materials	\$ 7,766
Labor	<u>\$ 7,709</u>
Material + Labor	<u>\$15,475</u>

PHASE III - ADDING SIPRNet DROPS



Moves, Adds and Changes (MACs)

PLANNING AHEAD

Recognizing that change to an existing protective distribution system is the norm rather than the exception, Holocom engineers designed the Holocom PDS with the ability to make changes without dismantling and discarding the entire system. The system is expandable when additional drops are required, and most of the material is reusable if the PDS is moved to a different location.

Holocom's PDS was also designed from an installer's perspective and offers a variety of labor-saving, and thus cost-saving features. The ability to lay cable instead of pulling cable, as in an EMT system, is one example of a labor-saving technique that contributed to the reduced labor cost for the Holocom solution.

The Holocom channel-type raceway also contributes to a reduction in material cost by eliminating the need for most pull boxes (enclosures), associated GSA-approved locks, and the security management cost for these locks. In EMT installations, industry best practices dictate the use of pull boxes with 180 degrees of turn (or two 90-degree turns) at every 100 feet of continuous run. Because the Holocom solution is a cable lay-in installation, it eliminates the requirement for most of these costly pull boxes. Additionally, the cable lay-in allows for a much higher fill ratio than that allowed in EMT. In our example, the higher cable dimension required larger EMT, thereby increasing the EMT material cost.

MOVES

Holocom PDS is removable and largely reusable. The system can be removed from the wall, disassembled, stored, and reinstalled at a different time and location. During the reinstallation, usually minor parts, components, and cabling are all that are needed for replacement. All or most of EMT-based PDS, by contrast, must be discarded and replaced during moves, negating the value of the initial investment.

In the example, the Holocom PDS in the PHASE I transitional facility was moved to the permanent building. Most of the material from the original 24 SIPRNet drops, including user drop boxes and raceway, were used in the permanent building PDS.

ADDS and CHANGES

Additions and changes to an existing PDS are greatly simplified when modifying The Holocom PDS compared to EMT. For example, when adding a third drop between two existing drops, the EMT installer must cut the existing pipe and cable, add the new drop, pull three new cables, terminate, and test. This process can take days to complete and requires taking down the network for the two existing users. (It is possible to run an entire new EMT raceway for the new drop from the CAA closet or nearest pull box, however, this is generally not a preferred method due to the unattractive aesthetics of an additional steel pipe on the wall.)

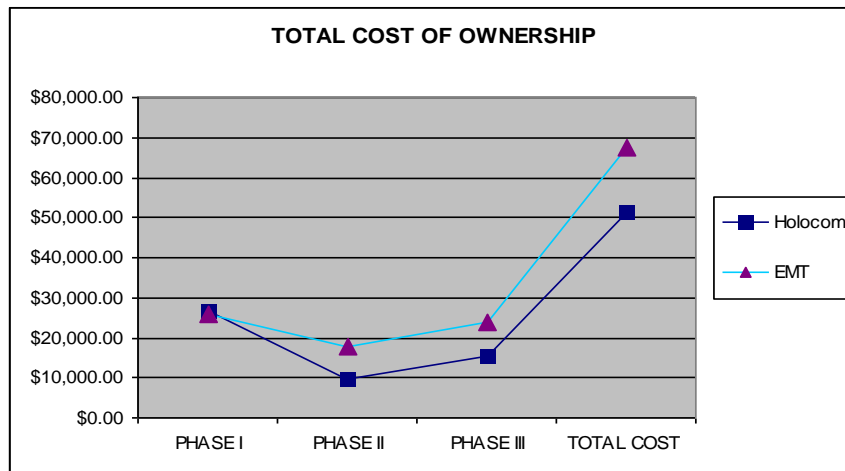
With Holocom PDS, the installer simply removes the top cap, lifts out the cable slack, splices in a "T" connector, lays in one new cable, and terminates and tests. This takes only a few hours without disrupting the existing users.

Total Cost of Ownership

SUMMARY

The rapidly increasing requirement for additional classified network drops is forcing organizations to reconsider the methodology used to install protective distribution systems (PDS). This paper compares the cost of traditional EMT PDS and Holocom PDS in a real-world example of a three-phase installation: an initial temporary installation, moving the PDS to a permanent building, and adding new SIPRNet drops to the existing PDS.

Phase I, the initial installation in the transitional facility, consists of 24 SIPRNet drops arranged in 12 user drop boxes. The total installation cost (material and labor) using EMT was 3% lower than Holocom PDS. In moving the PDS to the permanent building, however, the Holocom solution cost a remarkable 45% less than EMT. When the site required adding 20 new SIPRNet drops arranged in 10 additional drop boxes, the Holocom PDS was 35% less. The total cost of PDS ownership (the cost for all three phases) was 23% lower with the Holocom solution.



In most initial installations, the material cost for PDS is less when using EMT. This paper demonstrates, however, that the lower EMT material cost represents a partial view of the true cost of PDS ownership. In addition to lower labor costs for Holocom installation, there is a significant overall cost reduction when an existing PDS is subjected to moves, adds and changes. Considering that changes to an existing PDS are, for all intents and purposes, inevitable, it seems prudent to anticipate changes to the PDS and consider the total cost of ownership when selecting a PDS solution.

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¹ To learn about Holocom's worldwide industry partners, go to www.holocom.com and click on "Partners."

² Department of the Army, United States Army Information Systems Engineering Command, Fort Huachuca, Arizona 85613-5300, Technical Guide for the Integration of Secret Internet Protocol Router Network (SIPRNet) Version 5.0, August 2008



ABOUT HOLOCOM®

Holocom manufactures the leading protective distribution system (PDS) for SIPRNet and other networks transmitting highly sensitive data. Holocom PDS meets the requirements of NSTISSI 7003 and is modular and expandable, enabling customers to adjust to changing requirements. In addition to its end-to-end product line, Holocom offers its customers proven expertise to analyze their classified network requirements and a worldwide partnership network that supports network implementation. Holocom PDS is installed for all branches of the military, numerous federal agencies and private facilities across the globe.

Toll Free: (888) 465-6266 | customerservice@holocom.com | www.holocom.com

HEADQUARTERS

8360 Camino Santa Fe

Suite F

San Diego, CA 92121

Tel: (858) 222-6430

Fax: (858) 222-6431