

Dark Fiber Service (DFS)

The EIS Dark Fiber Service (DFS) is an optical fiber infrastructure that consists of cabling, repeaters, and customer-provided transport light. DFS gives an agency the unconditional right to use a fiber route, which includes transport capacity through a fiber pair in a fiber-optic cable, or through the entire fiber-optic cable. DFS configurations can range from a simple point-to-point connection between two locations to one that interconnects the agency to any number of selected locations.

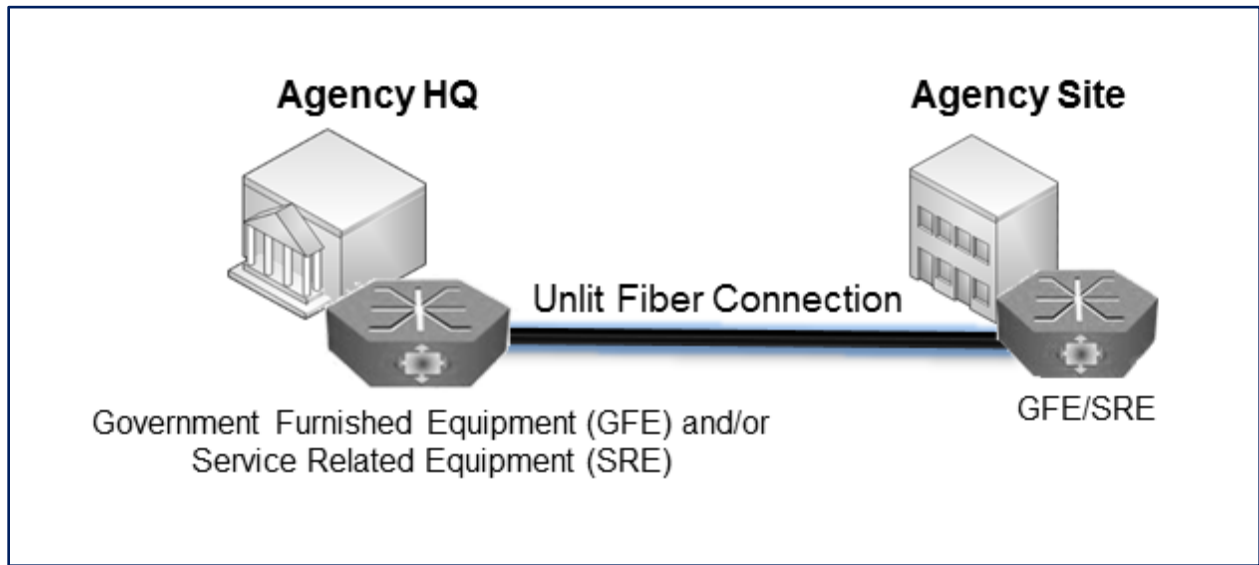
Agencies that acquire DFS may either use their own optronics equipment or lease it from a service provider. An agency that prefers not to design, implement, and manage its own optical network can use Managed Network Service (MNS) as a Managed Dark Fiber Service to have the contractor design, implement, and manage the fiber network per the agency's unique mission requirements.

Category: Data Service

Complementary Services Needed: In order to use DFS, the agency may need one or more of the following EIS services or equivalents: Service Related Equipment (SRE).

Definitions: Please see EIS contract [Section J.12 Glossary of Terms](#) for clarification of technical terms and acronyms.

Figure 1—Sample Dark Fiber Service Setup



1. Why an Agency Might Select DFS

- Allows agencies with in-house optical expertise to manage their own fiber network. Agency personnel can select the equipment best suited to support their applications.
- Delivers virtually unlimited bandwidth at a fixed cost with the potential of capitalizing the agency's network assets.
- Once acquired, DFS networks are controlled by the agency, completely secure, and are tailored to the agency's connectivity requirements.
- DFS allows for the secure storage and transmission of voluminous data blocks across long distances in adherence to federal law.

NOTE: Agencies considering this service may also want to compare this service with Optical Wavelength Service (OWS) and SONET Service (SONETS).

2. Examples of How DFS Could be Used

- **Classified Data Transport:** An agency could use DFS to collect, process, and disseminate intelligence information. DFS could also be used for secure, ultra-high-definition video conferencing for collaboration, communications, research, training, and citizen interaction.
- **Disaster Recovery (DR) and Continuity of Operations (COOP):** An agency could use DFS to transport work related information over the network to a DR facility that is part of the agency's COOP plan. DFS also enables quicker and easier backups, and application virtualizations at COOP sites.
- **Healthcare Solutions:** A healthcare agency could use DFS to deliver specialist care in rural areas using ultra-high-definition audio/video systems that enable physicians to remotely consult with patients face-to-face, or collaborate with other healthcare providers such as the Centers for Disease Control, National Institutes of Health, and other organizations.

3. Key Technical Specifications

NOTE: This portion of the service guide has been abridged due to space considerations. For full technical details on DFS, please refer to EIS contract [Section C.2.1.6 Dark Fiber Service](#).

Table 1—DFS Technical Capabilities

Capability	Description
Geographical Coverage	<p>DFS coverage is specified in the following regions when required as part of a task order (TO):</p> <ul style="list-style-type: none"> a) CONUS b) Non-domestic (NOTE: May not be available from all contractors.) c) OCONUS (NOTE: May not be available from all contractors.)
Configuration Alternatives	<p>The following network topologies are supported:</p> <ul style="list-style-type: none"> a) <u>Point-to-point</u>: This configuration connects any two points in the contractor's network b) <u>Route Diversity Ring/Single Drops</u>: This configuration is possible when the terminating equipment provides equipment and/or line Route Diversity Ring/Dual Drops protection schemes. c) <u>Route Diversity Ring/Dual Drops</u>: This configuration is possible when two diverse paths are available end-to-end to prevent service interruptions caused by a failure in either path. d) <u>Star Configuration</u>: This configuration allows an agency to have a single location that functions as a hub that provides connectivity to other agency locations.

<i>Capability</i>	<i>Description</i>
<p>Hybrid Configurations [These are custom-tailored solutions formed by combining two or more of the above Configuration Alternatives.]</p>	<ol style="list-style-type: none"> 1. Fiber Service Delivery Point (FSDP): The contractor will support the Service Delivery Point (SDP) at either the fiber patch panel where the fibers terminate at a government location, or the collocation facility where the agency has installed its optronics, as required by the agency. <ol style="list-style-type: none"> (a) Optical Fiber: The provided fiber will meet the standards specified in EIS contract <u>Section C.2.1.6.1.2 [DFS] Standards</u>. The number of fiber strands specified by the agency will be delivered to the FSDP. 2. Ducting: The contractor will provide the number of ducts between connecting locations and the number of fiber strands running in each duct, as specified by the agency. 3. Future Growth. The contractor will include an additional duct running in parallel to the working duct(s) to provide room for anticipated growth. (NOTE: May not be available from all contractors.) 4. Channel Count: (a) Deployed fibers will support a minimum of 80 DWDM wavelengths or user data with spacing as specified in ITU-T G.694.1, and (b) Will be capable of operating in the "C", "S" and "L" bands. 5. Gateways. The contractor provides the ability to add and drop traffic via gateway locations. The contractor will meet the following requirements and provide updates on improvements or expansions throughout the life of the contract: <ol style="list-style-type: none"> (a) Gateway locations are equipped with backup power capability and will operate for at least 8 hours without interruption (b) Lock cabinet spaces are provided (c) 24x7 access to the gateway locations is provided to authorized personnel (d) Gateway locations are equipped with surveillance and highly secured systems (e) The contractor will indicate if gateway expansion is possible (f) The contractor will indicate if gateway locations are monitored remotely (g) Environmental monitoring is supported 6. Service Components. DFS service components include the following: <ol style="list-style-type: none"> (a) Trunks. Trunks are main fiber cables that may carry hundreds of fiber strands, which may be shared and owned by a variety of contractors, government agencies, universities, etc. (b) Laterals. Laterals are fiber cables from the agency's premises to the nearest splice point on the cable trunk. Their length may vary from a few meters to several kilometers. (c) Building Entrances. Facilities within the agency's premises for the termination of fibers, i.e., fiber panel terminations.

Table 2—DFS Features

Feature	Description
Colocation Service	Provides the ability to add/drop traffic (gateways) and to regenerate and amplify traffic where needed.
Duct	Supports the number of ducts (conduits) as specified by the agency. (NOTE: May not be available from all contractors.)
Dark Fiber Local Loop	Dark Fiber connection between the agency's location and the contractor's wire center or outside plant (hut or regeneration location). (NOTE: May not be available from all contractors.)
Diverse Route Single Drop	This feature ensures that two diverse paths are available on the network to prevent service interruptions if a fiber on either of two paths is damaged. A single Add/Drop-Location network element is used in this arrangement with automatic protection switching capabilities. (NOTE: May not be available from all contractors.)
Diverse Route Dual Drop	Provides two diverse paths end-to-end to prevent service interruptions caused by a failure either in the contractor's network or at the drop's path. Should the agency require full diversity for protection, and the working link provider is unable to provide that, a second contractor will provide the diverse route. (NOTE: May not be available from all contractors.)
Inter-city Connectivity	Supports a dark fiber connection between agency locations in metro areas both in and outside the continental U.S. (NOTE: May not be available from all contractors.)
Multiple Duct	This service includes the ability to upgrade to multiple ducts (conduits). (NOTE: May not be available from all contractors.)
Splicing	Supports joining two or more lengths of optical fiber cables by way of fusion or mechanical splicing.
Off-Net Laterals	Provides fiber cables—at the agency's expense—from the agency's premises to the nearest splice point on the cable trunk. The cable length may vary from a few meters to several kilometers.

4. Pricing Basics for DFS

Please visit the [EIS Resources Listing](#) and locate the [Basic EIS Pricing Concepts Guide](#) to gain an understanding of EIS pricing fundamentals.

4.1 Access Arrangements

Appropriate access arrangements must be selected for each endpoint. Please visit the [EIS Resources Listing](#) and locate the [Access Arrangements Guide](#) for more detailed information.

4.2 Service Related Equipment (SRE)

- SRE must be chosen based on equipment required at each location. NOTE: SRE uses catalog-based pricing.
- Request that contractor provide pricing for any SRE that would be required, in addition to the agency's existing infrastructure, to deliver the service.
- Please visit the [EIS Resources Listing](#) and locate the [Service Related Equipment Service Guide](#) for more detailed information.

4.3 DFS Price Components

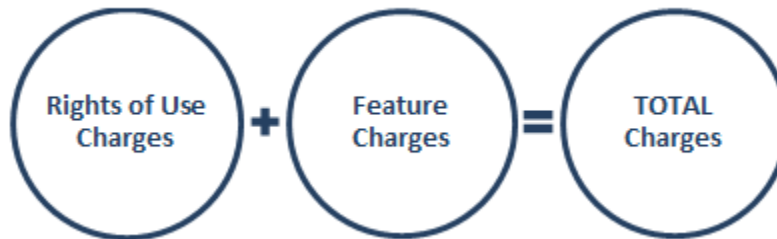
The price structure for DFS consists of the components shown in *Table 3* below.

Table 3—DFS Pricing Components

Component	Charging Unit
Rights of Use Charges (MRC)	Fiber Pair
Feature Charges	Gateway

Figure 2 below shows how the pricing components in *Table 3* are combined to produce the total cost for the service.

Figure 2—Dark Fiber Service Pricing Diagram



The “Feature Charges” in *Figure 2* are calculated using details provided in EIS contract [Section B.2.1.6 Dark Fiber Service](#). (Please visit the [EIS Resources Listing](#) and locate the [Basic EIS Pricing Concepts Guide](#) for information on how to compute prices.)

NOTE:

- (1) All DFS services are priced by contractors on an individual case basis (ICB).
- (2) A contractor may offer a custom variation of the service to meet an agency’s unique requirements. Such a customization would be identified with a Task Order Unique CLIN (TUC), and would include charges that would have to be added to the components in *Figure 2* to determine the total cost of the service.

4.4 DFS Pricing Examples

NOTE: No pricing examples are provided for DFS, as all DFS services are priced by contractors on an individual case basis (ICB).

Service Related Equipment (SRE)

- Choose CLIN EQ90001, “SRE Catalog Item” (see EIS contract table *B.2.10.2.3 SRE Instruction Table*).
- Request that contractor provide SRE pricing based on equipment that would be needed to deliver the service in addition to agency’s existing infrastructure.
- Please visit the [EIS Resources Listing](#) and locate the [Service Related Equipment Service Guide](#) for more detailed information.

Service Related Labor

Request that contractor propose appropriate labor CLINs and hours mix needed to deliver service.

5. References and Other Sources of Information

- For more technical details and information on DFS, please refer to EIS contract [Section C.2.1.6](#); for pricing details, [Section B.2.1.6](#).
- For more information on service-related items, please see:
 - EIS contract [Section B.2.10 Service Related Equipment](#)
 - EIS contract [Section B.2.11 Service Related Labor](#)
- Please refer to a contractor's individual EIS contract for specifics on the contractor's DFS offerings.
- For additional EIS information and tools, visit the [EIS Resources Listing](#).
- For guidance on transitioning to EIS, please visit [EIS Transition Training](#) where you'll find several brief video training modules.