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# Senior Design Project Description

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|---|---|---|---|
| **Company Name** | *CommScope Inc.* | **Date Submitted** | *11/5/2020* |
| **Project Title** | *Sustainable Alternatives to Fiber Optic Cable Disposal* **(COMMS_OPTIC)** | **Planned Starting Semester** | Spring 2021 |

## Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

| Discipline | Number | Discipline | Number |
|---|---|---|---|
| Mechanical | 3 | Electrical | 1 |
| Computer | | Systems | 1 |
| Other | | | |

## Company and Project Overview:

CommScope is a global provider of infrastructure solutions for communication and entertainment networks. Our solutions for wired and wireless networks enable service providers including cable, telephone and digital broadcast satellite operators and media programmers to deliver media, voice, Internet Protocol (IP) data services and Wi-Fi to their subscribers and allow enterprises to experience constant wireless and wired connectivity across complex and varied networking environments. Our solutions are complemented by a broad array of services including technical support, systems design and integration. We are a leader in digital video and IP television distribution systems, broadband access infrastructure platforms and equipment that delivers data and voice networks to homes. Our global leadership position is built upon innovative technology, broad solution offerings, high-quality and cost-effective customer solutions, and global manufacturing and distribution scale

We have a team of approximately 30,000 people to serve our customers in over 150 countries through a network of world-class manufacturing and distribution facilities strategically located around the globe. Our customers include substantially all the leading global telecommunication operators, data center managers, leading multi-system operators (MSOs) and thousands of enterprise customers, including many Fortune 500 companies.

CommScope https://www.commscope.com/ is a manufacturer of fiber optic and coaxial cables engineered for satellites, security, closed-circuit TV, video, residential and commercial structures, and cell towers. You will find our solutions in the largest buildings, venues and outdoor spaces; in data centers and buildings of all shapes, sizes and complexity; at wireless cell sites; in cable head-ends and telco central offices; and in airports, trains, and tunnels. Vital networks around the world run on CommScope solutions.

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We have manufacturing and distribution facilities all over the world. North Carolina is home to our headquarters in ***Hickory*** and three manufacturing facilities: ***Catawba*** (1,000,000 sq ft); ***Claremont*** (590,000 sq ft) and ***Greensboro*** (196,000 sq ft).

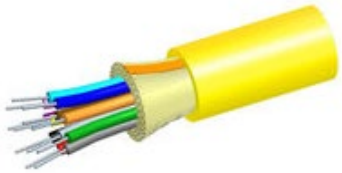
Our products are sold in many forms and under countless brand names. You likely use some of our products every day!

CAT 6 Cables

Coax Cables

Waveguide Cables

Cable in Conduit

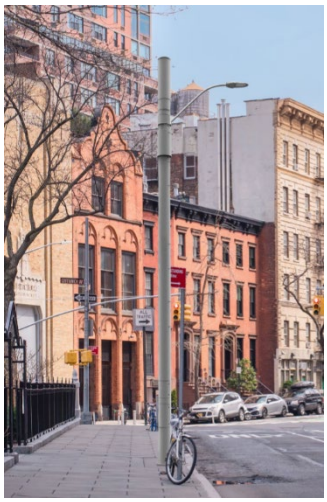


Fiber Optic Cables

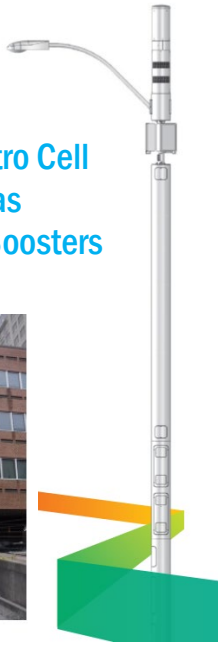

Network Solutions

ARRIS

RUCKUS™
an ARRIS company



Macro & Metro Cell Antennas
Hidden WiFi Boosters

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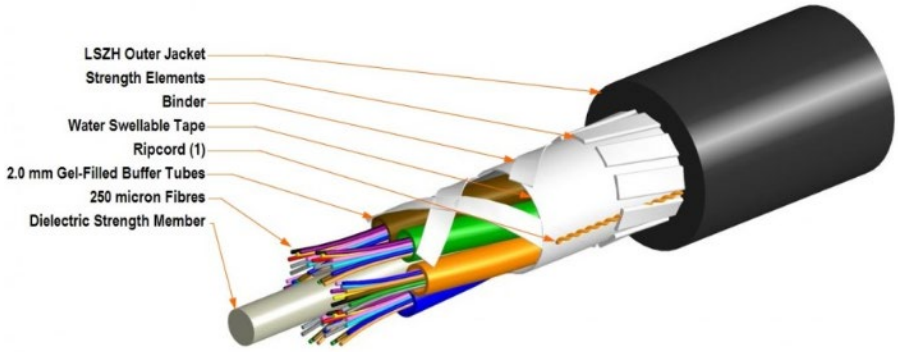
**Project Requirements:**

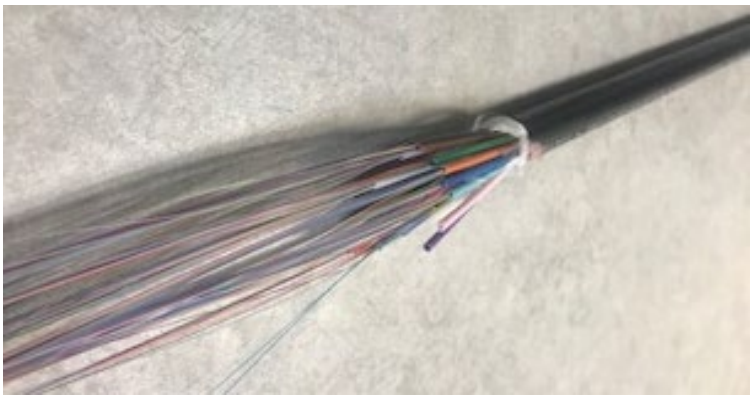
Whether you are streaming your favorite Netflix show, posting some Instagram pics, or giving a presentation over Zoom, you want your connection to be clear, fast, and consistent. Your connection is likely using a fiber optic cable. Fiber optic cables deliver quality at a fast speed, but the cables are currently not recyclable. Fiber optic cable waste is generated in the manufacturing process and by our customers during cabling upgrades and replacements. The greater the need for speed, the greater the impact to our global environmental footprint.

Typical fiber optic cables consist of glass fiber optics, dry or gel-filled PP buffer tubes, water blocking tape, filler rods, nylon binders, aramid yarn, glass reinforced plastic rods, steel tape, ripcords, and polyethylene (PE). The recycling of fiber optic cable is an industry wide problem. The interior composition of the cable gets caught in recycling equipment, the gel gums up the teeth of the equipment, and the individual components have a low recovery value. As such, fiber optic cable is disposed of in the landfill. During the manufacturing process, a significant amount of waste is generated due to the time required to sync the process during startup. On the consumer side of the business, fiber optic cable is landfilled during building and venue upgrades or cable damages from storms and outages.

In the long term, CommScope recognizes recycling solutions are contingent upon modifying the life cycle product design. However, in the short term, CommScope is seeking sustainable alternatives to divert the volume of fiber optic cables from our landfills.




***Typical Fiber Optic Cables***



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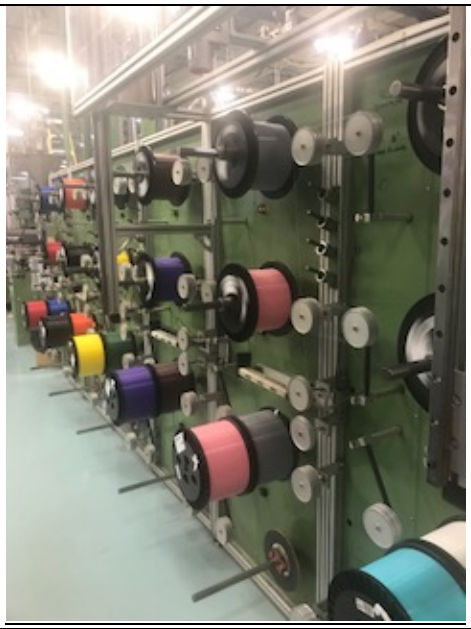

The photos above show some of the equipment that pulls wire bundles together with wires, sheaths and jacketing material. Waste generated in starting these processes is desired to be recycled.

**Project Scope:**

Fiber optic cable is disposed of in large coils (without metal holder) as shown below.

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We seek options for reuse/repurpose/reallocation of the fiber optic cables in their current state. These options could include mechanical separation, reuse as another material, or other real-world alternatives.

**Expected Deliverables/Results:**

Semester 1

1. Identify immediate options for reuse/repurpose/reallocation of cables in the current state
2. Determine what our competitors are doing to divert from landfills for reuse options
3. Benchmark with the Recycling Industry
4. Provide real work alternative reuse options
5. Develop other creative solutions that utilize this product and avoid sending it to landfills
6. Design a process which will implement ideas for recycling this product by physical separation of individual components which can be recovered and reuse.
7. Select which cables will be part of the piloting process in semester 2.

Semester 2

1. Build and test a pilot system for the recycling ideas (as limited by time and money)
2. Establish the economics of the process when scaled up to determine if the process is a cost center or a profit center.
3. Based on test/verification, develop and document process design changes for a production scale process.

**Disposition of Deliverables at the End of the Project:**

Provide documentation and pilot test apparatus to supporter after the completion of the Expo.

**List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):**

- Ability to travel to Claremont, NC for a site visit to the manufacturing plant.
- Interest in the design of sustainable practices.