Lake Nona, Florida

Building a Smart Community

17 Square Miles of Gigabit Community

Tavistock Development Company had a vision for the immense amount of land it owned in Southeastern Orlando. It was ideally located 10-minutes from the Orlando International Airport, 20 minutes from Downtown Orlando and 30 minutes from the Space Coast and the Atlantic Ocean. The land was an open canvas of farmland and lakes.

Key to realizing the dream was a focus on a few core elements:

1. Public Private Partnerships (PPP’s) would be the most efficient way to scale successfully.
2. Telecommunications Infrastructure was necessary to provide the services of the future.
3. Active Lifestyle and Human Well Being were differentiators and essential.
4. Sustainable community practices would be in demand and be the responsible way to grow.
During the past 12 years Lake Nona’s 17-square-mile, master-designed development has seen billions of dollars of investment in construction across 10 million square feet of residential and commercial facilities, infrastructure and amenities. Some of the impressive results include:

- The 650-acre Lake Nona Medical City, with more than 2.6 million square feet of clinical, institutional and laboratory buildings.
  - University of Central Florida (UCF) Health Sciences Campus
  - UCF, College of Medicine
  - Nemours Children’s Hospital
  - University of Florida Research & Academic Center
  - Orlando VA Hospital and Sim Learn Center
  - Sanford Burnham Medical Discovery Institute

- Commercial and Residential Real Estate

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<tr>
<th>COMMERCIAL</th>
<th>EXISTING</th>
<th>TO BE DEVELOPED</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>Commercial/Office/Retail (SF)</td>
<td>3,010,783</td>
<td>7,633,493</td>
<td>10,644,276</td>
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<tr>
<td>Hotel (By Room) Total</td>
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<table>
<thead>
<tr>
<th>RESIDENTIAL</th>
<th>EXISTING UNITS</th>
<th>TO BE DEVELOPED</th>
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<tr>
<td>Single Family</td>
<td>3,200</td>
<td>4,400</td>
<td>7,600</td>
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<tr>
<td>Townhomes</td>
<td>800</td>
<td>1,244</td>
<td>2,044</td>
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<tr>
<td>Multi-Family</td>
<td>560</td>
<td>1,220</td>
<td>1,780</td>
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<tr>
<td>Total</td>
<td>4,560</td>
<td>6,864</td>
<td>11,424</td>
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- The Lake Nona Sports & Performance District
  - The USTA National Campus, the largest tennis campus in the world
  - J&J’s Human Performance Institute
  - Orlando City Lions Major League Soccer’s training facilities

- Transportation Hub
  - City Investment of $80 Million to build roads
  - Adjacent to Orlando International Airport
  - Future Brightline Rail Station
  - Intersected by North South and East West State Highways

This remarkable Smart Community’s growth was very carefully planned and at its core is Wireless Infrastructure and Fiber Optics which enable the super high-speed communications needed to ensure ubiquitous bandwidth coverage and capacity throughout the community. This fundamental building block was only achieved through partnership with companies who’s core business is networks.
Public Private Partnerships (PPP’s)

- Medical City-University of Central Florida, City of Orlando, Tavistock
- Created DAIS Technologies Partnership
  - Tavistock and Summit Broadband
  - 1st Cisco Iconic Smart and Connected City
  - 1st Gigabit Community in Florida
  - 3 Towers/4 Carriers
  - DAS serving 3,000,000 sq. ft of in building
  - Fiber to all Homes, Offices, Schools, and Medical Facilities
  - Key Tech Partners: Cisco, GE, Summit Broadband, Corning
Technology Infrastructure DAIS Technologies (www.daistechnologies.com) was formed as a partnership between Tavistock Development Company and Summit Broadband as a for profit high capacity network provider to all facilities in the community. Summit Broadband provides fiber optics to every home and business to ensure up to a 1 gigabit of connectivity for Internet as well as phone and cable video services.

The team recognized technology infrastructure and services were the enabler of the community. Lake Nona invested heavily in the fiber infrastructure, built a network of cell towers, operates a DAS system serving 3M+ sq. ft feet of clinical and office space and a communications head end that houses all 4 major carriers and the cable video services transmission center. The focus has been on providing the best network services of any community. They focused on:

1. Dense Network Architecture, Wireless and Fiber Optic Ubiquity
2. Smart Homes
3. Smart Buildings

The Dense Fiber Optic Backbone also serves as the backhaul for the 3 towers and the Centralized DAS System located at the redundant headend/central office. Each of the 4 Wireless Carriers has its own fully enclosed hut to store the electronics necessary to power the network.

Globally, the United States trails many other countries in Broadband speeds. DAIS Technologies ensured that the community would have the highest level of internet speed available both for residential and commercial structures.
Dense Network Architecture

Community Fiber Distribution Network to the Home

Each Home is served via a GPON network on a single fiber optic cable.
Backbone Fiber Optic Network-144 Strand Cables

The Network covers over 17 square miles of Real Estate. This is a portion of the network that feeds the individual community distribution networks.
As part of the core strategy of building a Smart community, Tavistock partnered with corporate partners to create a living lab within a livable home.
The Smart Home integrates 1 gigabit of connectivity and apps throughout the home to help manage security, scheduling, sleep, nutrition, pediatric and senior care.

Specifically, the Laureate Park Neighborhood was designed in conjunction with the Environments for Living program. It operates at a 32% more efficient Energy use level than standard homes.

Health and Aging in place are areas where Network Connectivity and Sensors are used to monitor vital functions and communicate with healthcare providers. Johnson and Johnson Wellness Solutions has engaged in a long term multi-million dollar study on wellness as part of the Lake Nona Life Project. Each participant’s vitals can be monitored remotely. The data is used anonymously as part of the study while the patient and their doctor get their specific results regularly.

The high bandwidth capability to each home was essential as well to the concept of relaxation and entertainment. Every home has cable/internet in each room and because of the enhanced cellular coverage 4G throughout the community. DAiS is working with the major carriers to be ready to upgrade to 5G both through the addition of 5G Macro Electronics but also through upgrade of the DAS and future Small Cell Deployments. The fiber rich community infrastructure is expected to save thousands of dollars on the cost as well as time frame to deploy.
Smart Buildings

Lake Nona was founded on the premise that if they could create a “jobs factory” the rest would take care of itself. As part of that strategy, Tavistock understood that one of the keys to successful commercial real estate projects was connectivity. As part of that plan, Tavistock locates every commercial building on its fiber optic ring network and provides a centralized Distributed Antenna System in the clinical, hospitality and larger commercial buildings to help boost cellular coverage and capacity.

![Diagram of RF signals blocked or absorbed](image)

The power saving Low E glass used to construct these energy efficient buildings also blocks the RF signal from penetrating the buildings. The DAS system brings fiber optics to the building and then has remote units located throughout the building that power antennas located inside the walls and windows. This brings the signal closer to the users and provides better capacity and coverage inside the buildings.

Additionally, the buildings are networked with sensors for energy, water and waste consumption. These functions are tied into a centralized system to ensure optimization.
Lessons Learned

Lake Nona has been one of the fastest growing communities in America and has been recognized by the New York Times, Fortune Magazine and many other global opinion leaders for its blend of technology, healthy lifestyle, and sustainability to create a work/life balance desired by many and achieved by few.

It started as a greenfield opportunity and leveraged public private partnerships to gain attention and capability. It attracted anchor commercial and medical tenants through location, real estate cost and guaranteed high capacity connectivity.

Key to the plan was the recognition that the community did not have the technical prowess to go it alone. In this model they created a partnership to serve the community exclusively. They also built their own network infrastructure to assure that the wireless carriers would have the key network infrastructure in place to deploy 4G and future IoT and 5G networks.

This business model is still a one off. We will explore other business models such as Privatization of Assets, Neutral Hosts, City and State Joint Venture Owned Networks, Carrier Partnerships, and Leased Services Models.