**Inflatable Antenna**

**Project**

Inflatable antennas have been extensively researched for years.
- NASA's Inflatable Antenna Experiment (1996)
- Cubic's Ground Antenna Transmit and Receive (GATR) (2008)

The inflatable antenna presented here is unlike many inflatable antennas.
- Omni-directional
- Miniature
- Single-band (2.4 GHz)
- Folds

The design may be useful for consumers.
- Increased Wi-Fi / Bluetooth range on computers
- Efficient design reduces cost

**System**

Primary system components and their roles:
- Inflatable Antenna (transmit/receive RF signal)
- USB Dongle (translate RF/Digital to Digital/RF)
- Computer (transmit/receive digital signal)
- Air Compressor (antenna deployment)
- Battery/AC Power Adapter (primary power sources)

**Methods**

Monopole antenna design was chosen.
- Omni-directional
- Deployable ground plane

A monopole has a radiation resistance of 75 Ω.
- Implies 1.5 VSWR when connected to a 50 Ω transmission line, which is reasonable for a commercial, low-cost product. No matching circuit means a lower price point for the consumer.

There are several advantages of the ground plane.
- Protects from SMA radiation
- Improves the gain of the monopole
- Aluminum foil folds, allowing collapse and expansion of the inflatable antenna

The ground plane expands as the balloon pulls it upward, then deflates and shrinks for smaller storage space.

**Conclusion**

The Inflatable Antenna succeeds in providing a prototype for a low-price expandable antenna for consumer use.
- 97% efficiency shows effectiveness of the antenna
- Significant difference in linear size between collapsed and deployed balloon

Future research has many directions.
- More efficient deployment systems
- More collapsible and/or more rigid designs
- Finding new applications for inflatable antennas

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