EE 483L/583L Antennas for Wireless Communications (Spring 2025)
Laboratory 8- Yagi-Uda Antenna Construction & Cost

Background

For this project, you or your team (2 students maximum) will construct the Yagi-Uda antenna, designed in previous labs, for a local UHF television (TV) station. It should have a gain ≥ 10 dBi, and VSWR < 1.1 at center frequency and VSWR < 1.75 across the frequency band of the selected UHF TV station when fed using a 50 Ω coaxial transmission line (supplied by instructor).

Project

After consulting with instructor, buy parts, and build the antenna, including the matching network, per your design to meet the specifications listed above. See instructor for tools, coaxial cable, and advice/help. Comment on and describe all work, especially any changes in the design. Some items to consider/do are:

- Start with a **tabulated** summary of the initial matched and boom-compensated design, i.e., where you left off after Lab #7 (w/ any corrections). This should include all lengths, spacings, etcetera.
- Do the diameters, lengths, centering, spacing, and alignment of boom & elements as well as matching network of the antenna actually built conform exactly to this initial design? If not, detail adjustments/changes being made. (e.g., telescoping pieces, changes in *s*, …)
- Is the boom long enough to attach antenna to an antenna mast without interference?
- Is antenna mechanically sturdy? I.e., Can it withstand the *fingernail* & '**FAT PIGEON**' tests?
- Is the antenna presentable to a customer? (consider cleanliness, sharp edges, …)
- Tabulate **estimated costs and parts list**. The table should have columns listing: description of item(s), purchased quantity, overall cost (exclude taxes), estimated quantity used, estimated pro-rated cost (i.e., cost of materials actually used), and supplier(s) with addresses. E.g., if you need 18 inches of 1/8 inch pipe, but the minimum length available is 36 inches costing $6, itemize the 36-inch pipe & cost ($6), amount used (18 inches) & pro-rated cost (18/36*$6 = $3). The coaxial cable and BNC connector will be supplied by the instructor (i.e., SDSM&T EECS department is the supplier). Go on-line to estimate the cable cost (e.g., Amazon). You do not need to list lab/shop materials (e.g., solder, paste flux, …). At the bottom of the table, give the total estimated cost & pro-rated cost of the antenna.

Report (You may work independently or in pairs if jointly building antenna.)

- Following syllabus guidelines, compose a short report on this lab.

Report & logbook due Monday, April 14, 2025 at class.