Any Ham Can Have A 400' Tower!

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Why and When Might We <u>NOT</u> Want High Antennas?

- To optimize routine HF (high angle) QSOs
- For "Locals" on HF bands
- To minimize VHF-microwave terrestrial interference, e.g. garage repeaters

VHF vs HF WSPR Take-Off Angle



Take-Off Angle Vs. Antenna Height



V_Dipole at .25 λ , 2.5 λ and 25 λ above real ground

Take-Off Angle Vs. Antenna Height



H_Dipole at .25 λ , 2.5 λ and 25 λ above real ground

Why and When <u>Do</u> We Want High Antennas?

- To optimize VHF-microwave terrestrial propagation, most comes from horizon
- To optimize <u>long/DX</u> HF propagation
- For the Joy of it!

SAQ, 250 kW 17.2 kHz



SAQ's six 127-meter high freestanding steel pylons, Grimeton, Sweden

Skyhooks

- We don't really need the tower, just a good feedline to an antenna that is held up high
- Aerostats
 - Kites must have wind
 - Balloons Wind is BAD!
 - Helicopters Wind is manageable

Practical Aerostats: Kites

• Marconi





70cm – 3cm Flying Antenna





YouTube Video of 70cm Test



https://youtu.be/-VWBUDJv2n0

Practical Aerostats: Balloons 2m WSPR Test, Sept 2015



Practical Aerostats: Balloons



Halo@160' Vs. 4 el. Yagi@24'

N6GN 2m WSPR as Spotted at KI6STW

0 09/06/15 09:36 AM 09/06/15 03 М 09/06/15 07:12 PM 09/07/15 12:00 AM 24 09/06/15 07:12 AM 09/06/15 12:00 PM 04:48 PM 09/06/15 09:36 PM 09/06/ -5 Halo Test Period -10 -15 -20 -25

-30

Sept. 6 2015 Balloon supported Halo/SWTL Test

Practical Aerostats: Helicopters



Practical Aerostats: Helicopters

10m test - being published soon in QEX



Practical Aerostats: 10m test

• 10m test - QEXMay/June 2016

0.0 -10.0 -20.0 Excess loss, dB -30.0 -40.0 -50.0 -60.0 0.0 20.0 40.0 60.0 80.0 100.0 120.0 140.0 160.0 180.0 Altitude, meters

Received Signal Relative to Freespace vs. Altitude

Practical Feed Line: SWTL

- Pacificon 2011 Antenna Forum
- QEX May-June 2012
- Patented but available to hams



70 cm Winder/Launcher



Practical Aerostats: Helicopters

Problem!

Flight time 10-20 minutes Maximum

Practical Aerostats: Helicopters

Solution

Power a quad-copter from the ground over the *same* SWTL used as a feedline. Transmit flight power up as RF and rectify it!



Quadcopter Power Source



1.2 kW (1.5 hp) LDMOS 2m Amplifier & Power Supply

Result: An "Active Tower" at 400'

- Can support a variety of ham antennas and bands at the same time it is being ground powered.
- Can Fly Continuously
- High Antennas can provide dramatic improvement for low-angle HF through VHF/microwave DX
- Uses normal ground equipment

Summary

- Tethered by an SWTL, Kites, Balloons and Helicopters can all provide a high platform for supporting and feeding amateur antennas on all amateur bands.
- Antennas supported at these heights can <u>greatly</u> increase signals and DX QSOs.
- position instability caused by wind can be overcome by using a GPS-enabled helicopter, powered from the ground.
- Any amateur can do this.

Thanks for Listening!

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