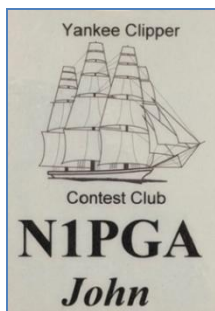


Effective Antennas Without towers

Wires, Quads & Yagi antennas
in the trees

John Vogel, N1PGA
May 15, 2026



John N1PGA

- Grafton, MA
 - 35m west of Boston, MA
 - 45m north of Providence, RI
- Licensed in 1993
- I'm a HF guy, Contester and DX'er
 - Active on 160m – 10m
 - SSB & CW
- Quads, Yagis, Verticals & wires
- Using only trees for supports
- Good performance / results

28-years ago...
It started with these 2 bird feeders



Stout overhanging limbs !

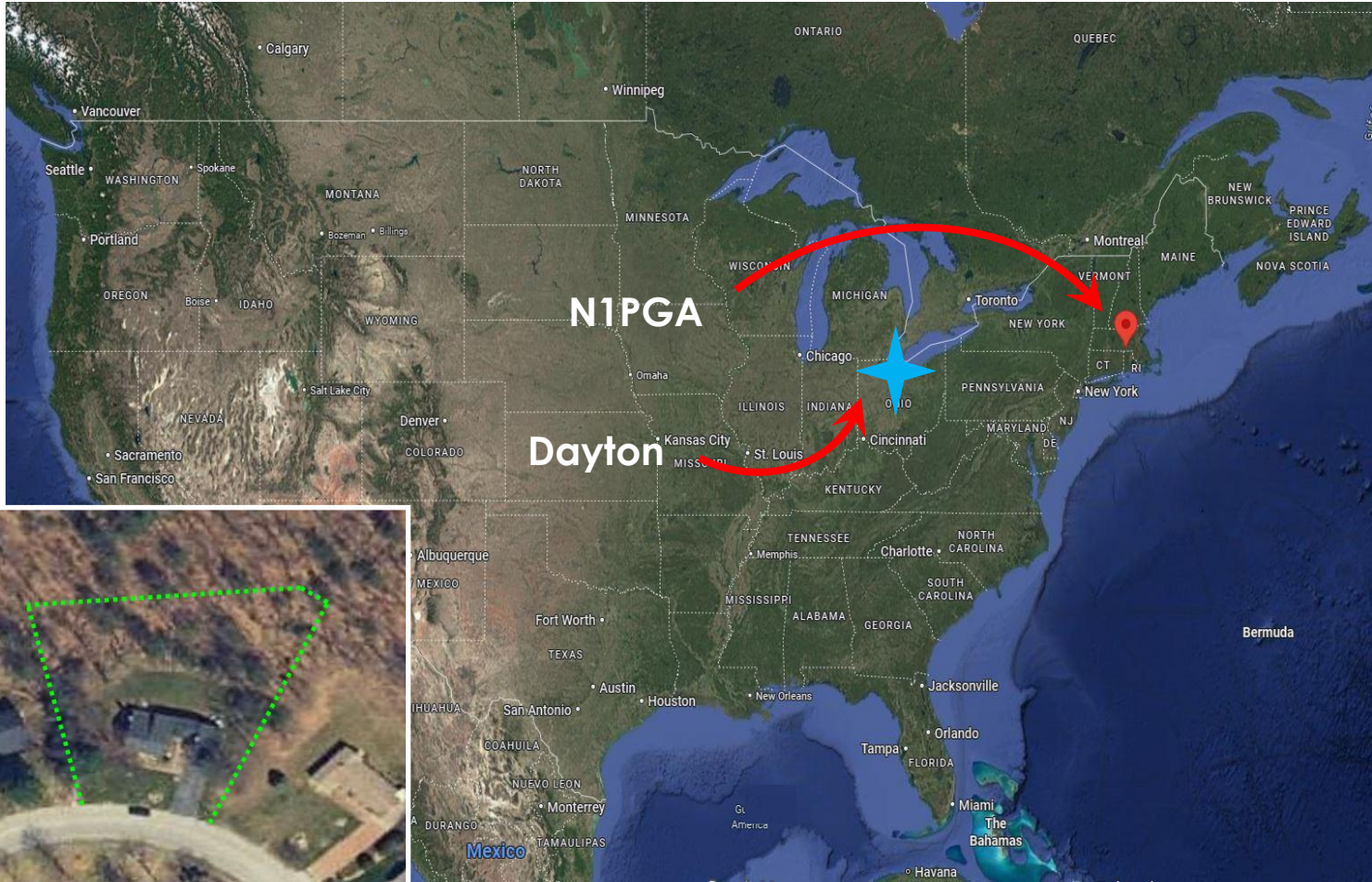


Topics

- QTH & Station
- Antennas
- Performance #s
- How-to's
 - Connections
 - Suspending
 - Options & alternatives
- Windy days
- Fast & Easy
- Other things
- That's a Wrap

QTH & Station

Grafton, MA
0.66ac 485'asl FN42de



N1PGA Station

Antennas

- All under or in-between trees
 - ✓ Under the canopy, crown, umbrella
 - ✓ Shielded from WX elements
 - ✓ Intended to move a bit
- Homebrew (-2) & resonant
- Fixed direction 10-20m
- "Low" mounting heights 30-45'
- Ropes & pulleys
- ~50' min separation
- LMR-400 type feed lines
 - All homerun
 - Manual, push button
 - Longest run ~170'

Shack

- Icom 7610
- Alpha 99 amp
- Daiwa 901HP watt meter
- Heil iCM deskmic - boom mount
- External speaker – not headset
- Homebrew antenna switching
- External aux msg keypad
- N1MM logging

Antennas: SOAB & DXing

- 10-20m
 - 2-ele monoband Quads
 - Tri-bander - fixed SA/Carrib
- 40m 2-ele vertical array
- 80m wire 1/4wl vertical
- 160m Inv-L
- Beverages
- BOG

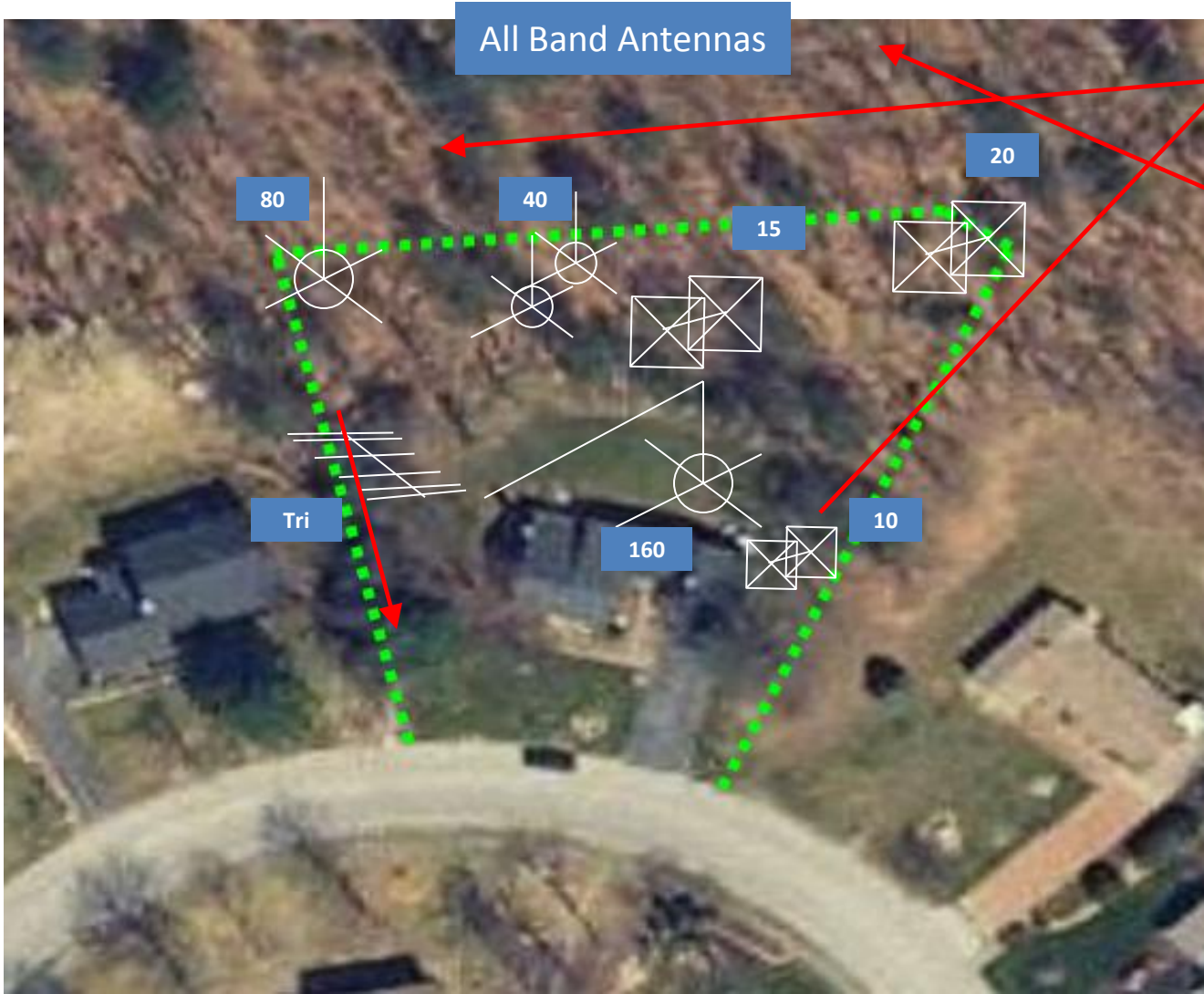
SB10m 2023 - 2026

- EU 6-ele yagi @ 45'
- W 5-ele yagi @ 40'
- S 2-ele quad @ 30'
- NW 2-ele quad @ 45'



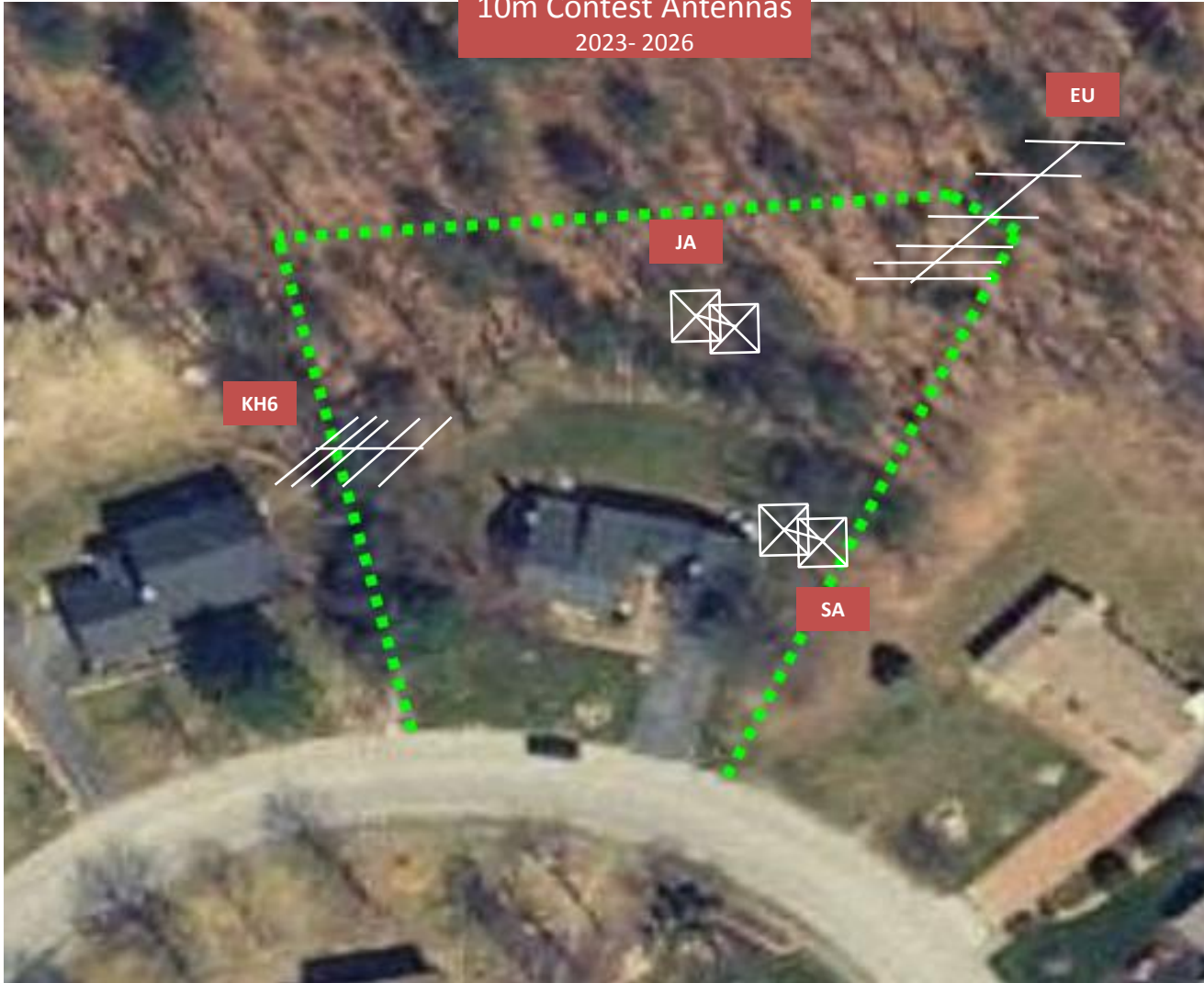
Antennas

Grafton, MA
485' asl 0.66 ac



Grafton, MA
485' asl 0.66 ac

10m Contest Antennas
2023-2026



Tribander

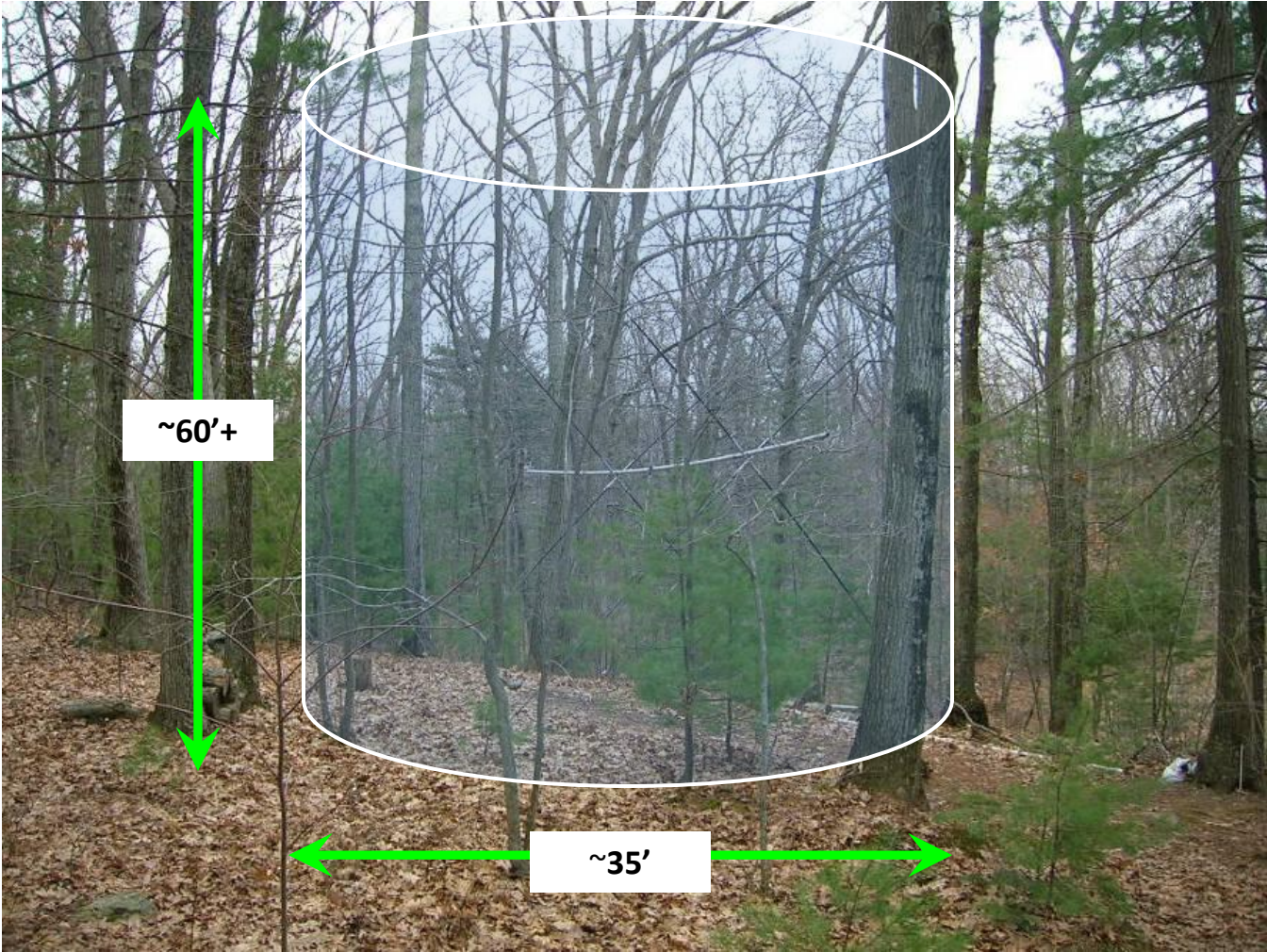


Force12 C3s

- 12' boom
 - 2-ele on 10-15-20
 - @ ~40'
 - Fixed to SA / Carrib.
-
- Single pt suspended
 - Rope & pulley (2:1)



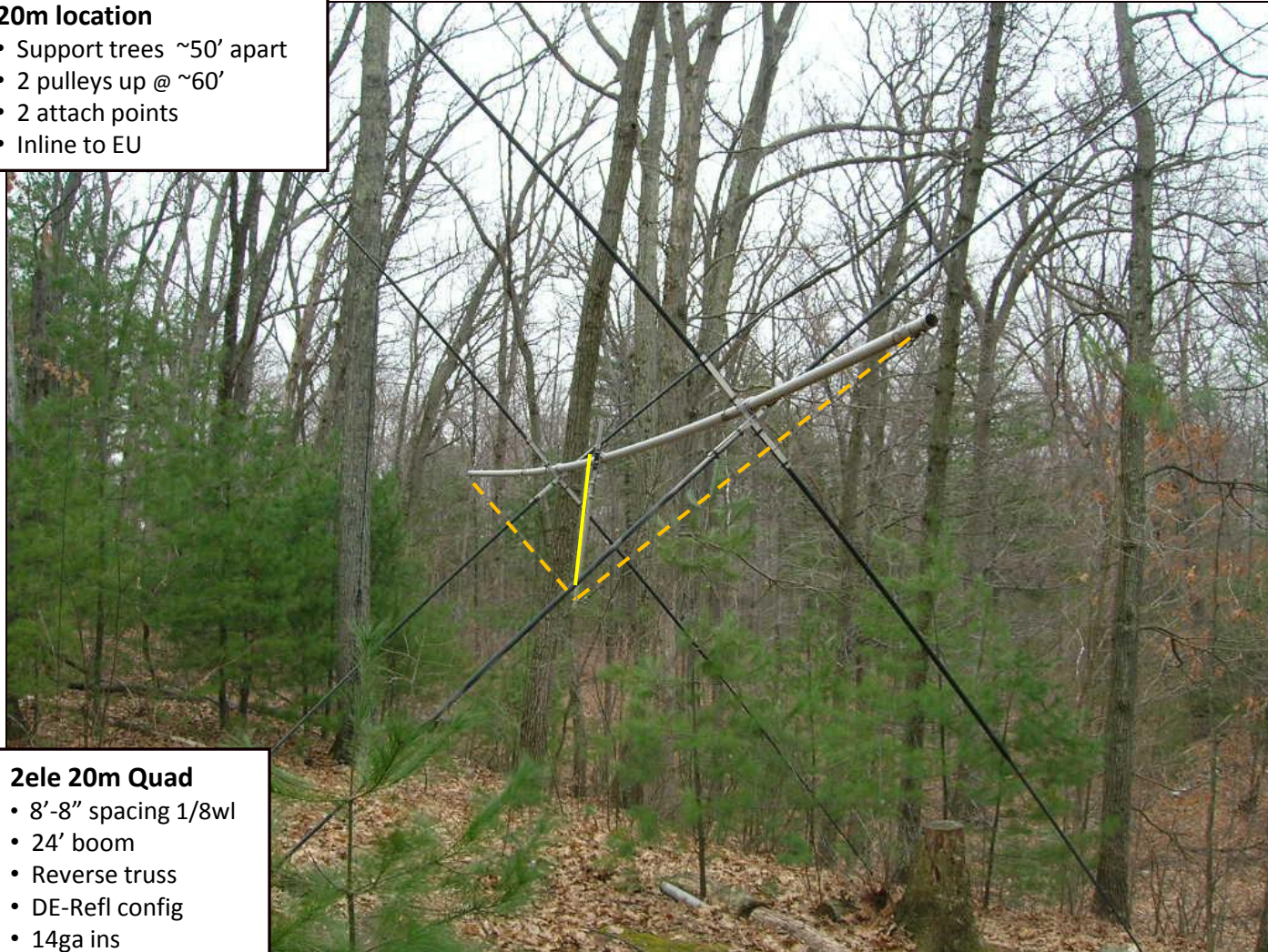
20m location



20m location

20m location

- Support trees ~50' apart
- 2 pulleys up @ ~60'
- 2 attach points
- Inline to EU



2ele 20m Quad

- 8'-8" spacing 1/8wl
- 24' boom
- Reverse truss
- DE-Refl config
- 14ga ins

20m location
Then & Now

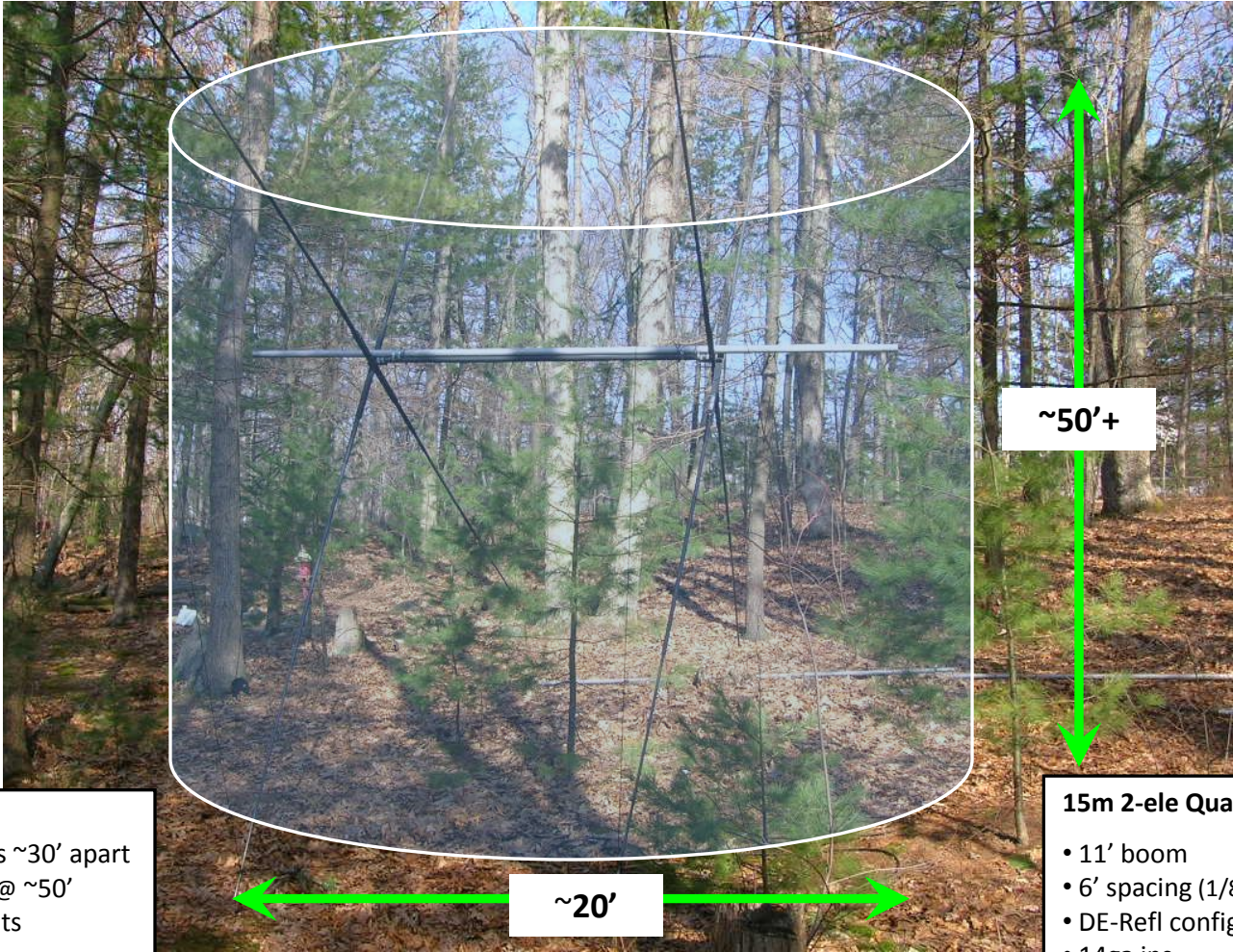


20m Quad
@ ~50'
circa 2000



10m 6ele Yagi
@ ~50'
2025

15m location
EU 15m quad -or- JA 10m quad



15m location

- Support trees ~30' apart
- 2 pulleys up @ ~50'
- 2 attach points
- Inline to EU

~50'+

~20'

15m 2-ele Quad

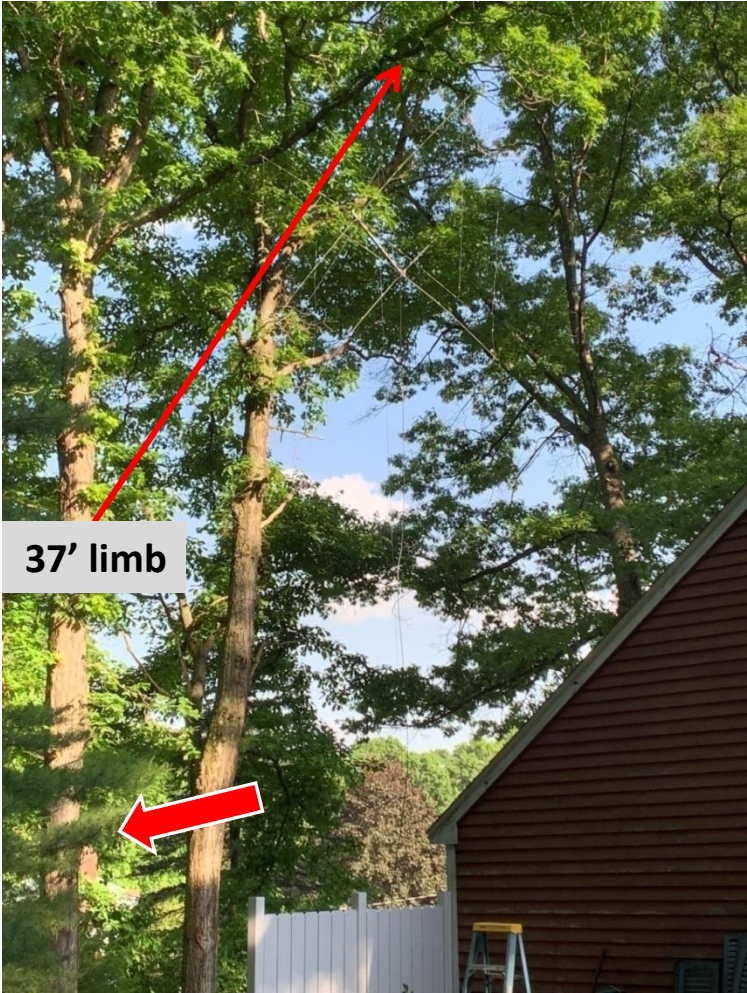
- 11' boom
- 6' spacing (1/8wl)
- DE-Refl config
- 14ga ins

15m 2-ele Quad @ 45'
Then & Now



10m 2-ele Quad
Caribbean / SA

- Typical @ 30' Carrib / SA
- Small turning radius
- 7-1/2 lbs = easy 1 person handling
- Easy assembly in 10-15 minutes
- Easy secure off season storage
- Performance comp: 4-ele yagi 15' boom



10m 2-ele Quad
JA, KL7, VE7

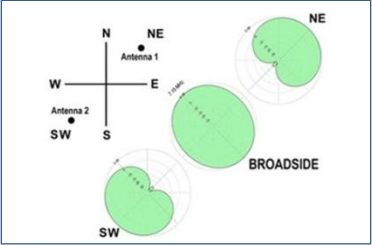
- Typical @ 45-50' height JA / KL7
- Small turning radius
- 7-1/2 lbs = easy 1 person handling
- Easy assembly in 10-15 minutes
- Easy secure off season storage
- Performance comp: 4-ele yagi 15' boom



40m 2 element vertical array



- 33' verticals (NE – SW)
- 33' spacing
- Skinny (1-1/4" bottom sections)
- Un-guyed
- DXE controller
- 90 radials 1/4wl ea



80m 1/4wl wire vertical



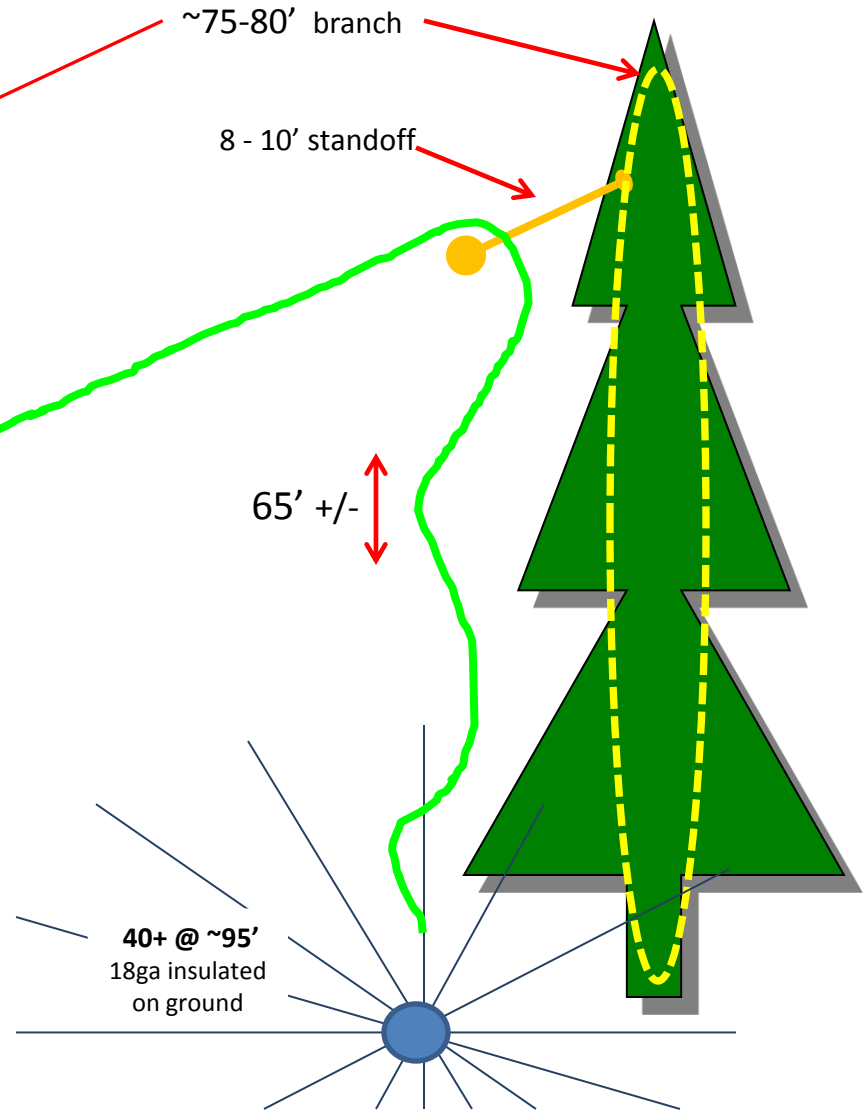
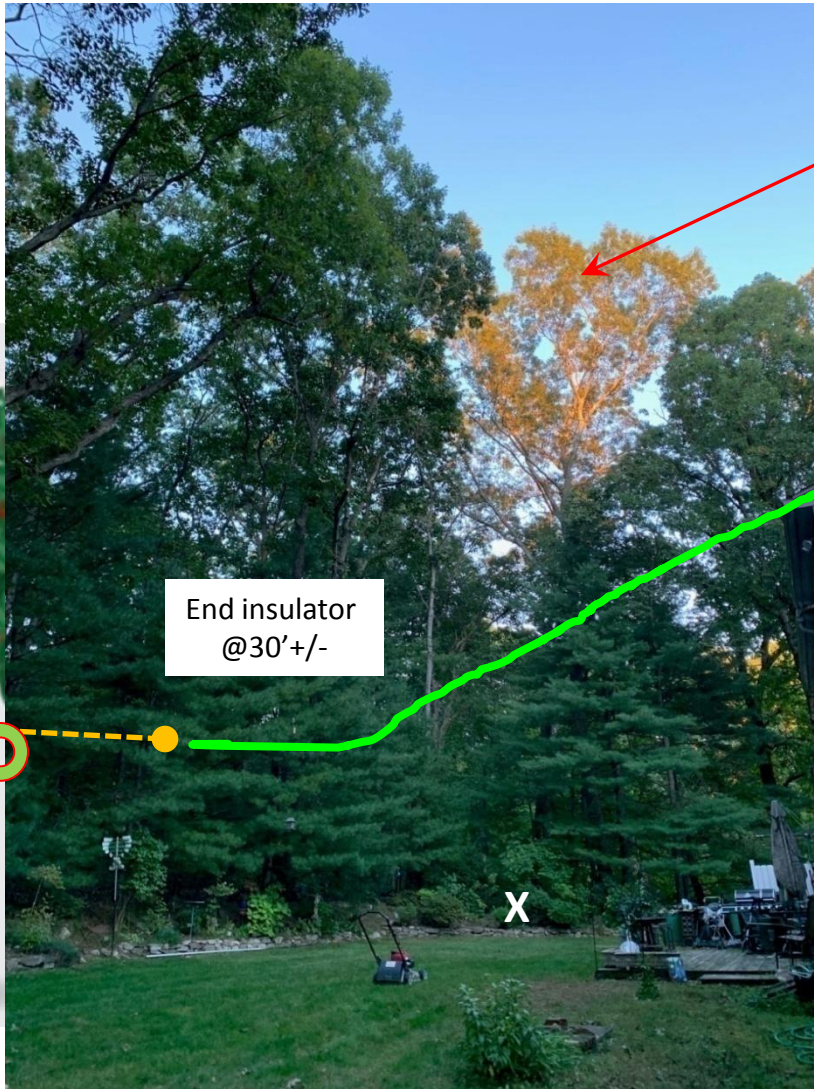
- ✓ Elevated feed point @ ~8'
- ✓ Elevated radials 8 @ ~8'
- ✓ UNUN transformer - 25:50Ω
- ✓ CM choke



Next gen
elevated feed



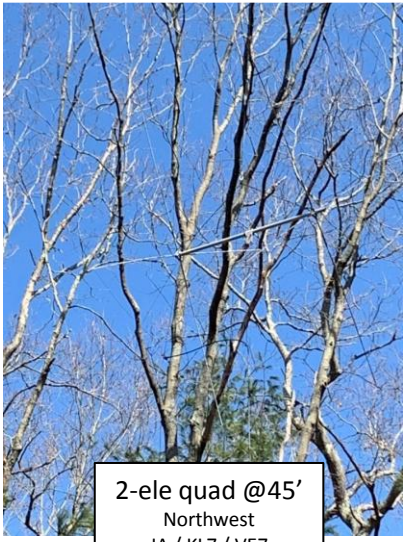
160m Inv-L



10m Antennas



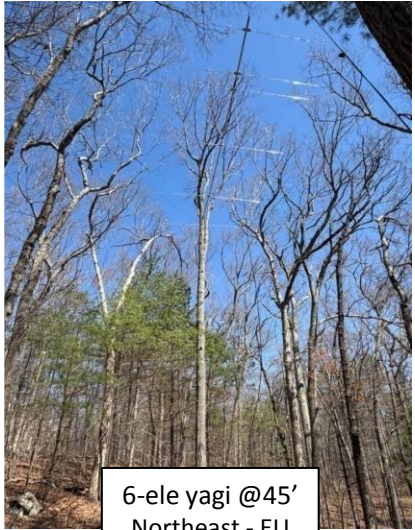
5-ele yagi @45'
West
KH6 / VK / ZL



2-ele quad @45'
Northwest
JA / KL7 / VE7



Tribander
standby



6-ele yagi @45'
Northeast - EU



2-ele quad @30'
Carrib / SA

Performance

Are they effective ?

Contest Results (US scores)

Goal: **#1**

| ARRL DX - SSB | | | |
|---------------|------|---------|----|
| 2026 | # 4 | SOSB 10 | HP |
| 2025 | # 3 | SOSB 10 | HP |
| 2024 | # 2 | SOSB 10 | HP |
| 2023 | # 4 | SOSB 10 | HP |
| | | | |
| 2022 | # 7 | SOAB | HP |
| 2020 | # 8 | SOAB | HP |
| 2019 | # 12 | SOAB | HP |
| 2018 | # 8 | SOAB | HP |

| | | | |
|------|-----|------|----|
| 2016 | # 3 | SOAB | LP |
| 2015 | # 5 | SOAB | LP |
| 2013 | # 2 | SOAB | LP |
| 2011 | # 2 | SOAB | LP |
| 2009 | # 2 | SOAB | LP |

| ARRL DX – CW | | | |
|--------------|-----|----------|----|
| 2022 | # 2 | SOSB 160 | HP |
| 2021 | # 4 | SOSB 160 | HP |

| ARRL 10m | | | |
|----------|-----|--------|----|
| 2025 | # 2 | SO SSB | HP |
| 2024 | # 8 | SO SSB | HP |
| 2023 | # 4 | SO SSB | HP |
| 2022 | # 5 | SO SSB | HP |

| ARRL 160m | | | |
|-----------|---------|----------|----|
| 2023 | #3 YCCC | SOSB 160 | HP |

Goal: **#1**

| CQWW - SSB | | | |
|------------|-------|---------|----|
| 2025 | # 3 | SOSB 10 | HP |
| 2024 | # 3 * | SOSB 10 | HP |
| 2023 | # 6 | SOSB 10 | HP |
| 2022 | # 4 | SOSB 10 | HP |
| | | | |
| 2021 | # 12 | SOAB | HP |
| 2020 | # 17 | SOAB | HP |
| 2019 | # 10 | SOAB | HP |
| 2018 | # 13 | SOAB | HP |

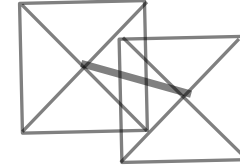
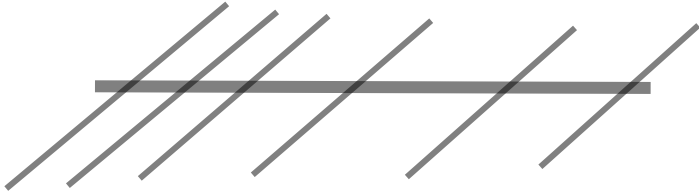
| | | | |
|-------------|-------------|-------------|-----------|
| 2017 | # 1 | SOAB | LP |
| 2016 | # 2 | SOAB | LP |
| 2012 | # 8 | SOAB | LP |
| 2010 | # 7 | SOAB | LP |
| 2005-2009 | #3, 4, 6, 8 | SOAB | LP |

Goal: **#1**

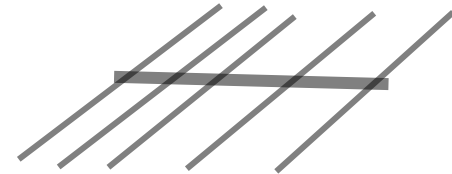
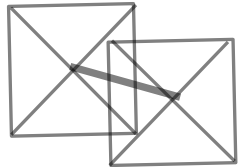
| CQWW – CW | | | |
|-----------|-------|------------|----|
| 2021 | # 3 * | SOSB-A 160 | HP |

*** 1st Call Area Records**





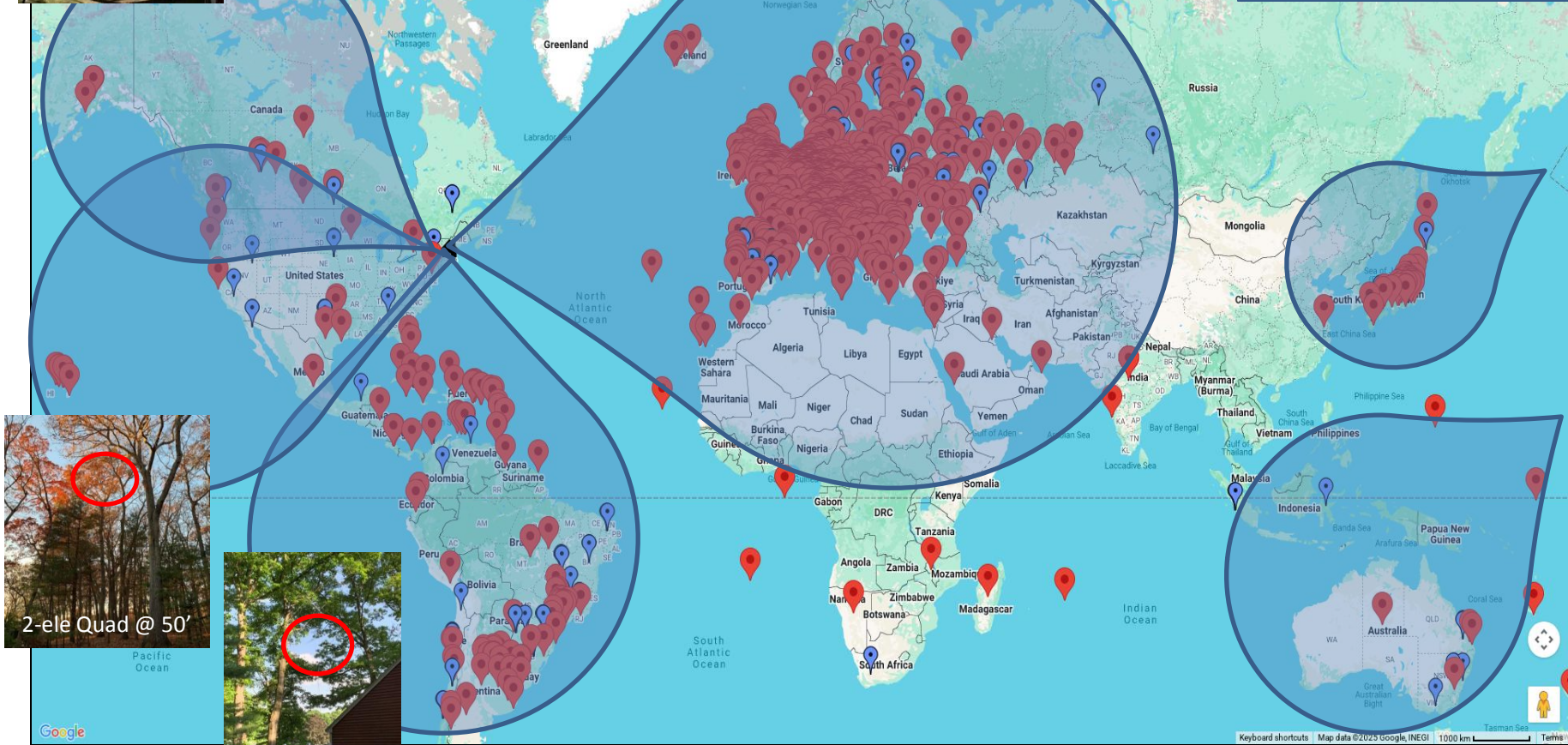
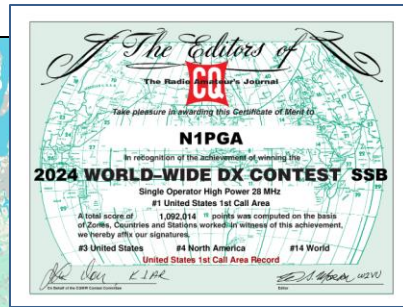
On the N1W team



World #3 Activator
10m SSB 6288 Qs



CQWW SSB 2024 SOSB HP 10m #3 US



2-ele Quad @ 50'



N1PGA, K5ZD, W3LPL

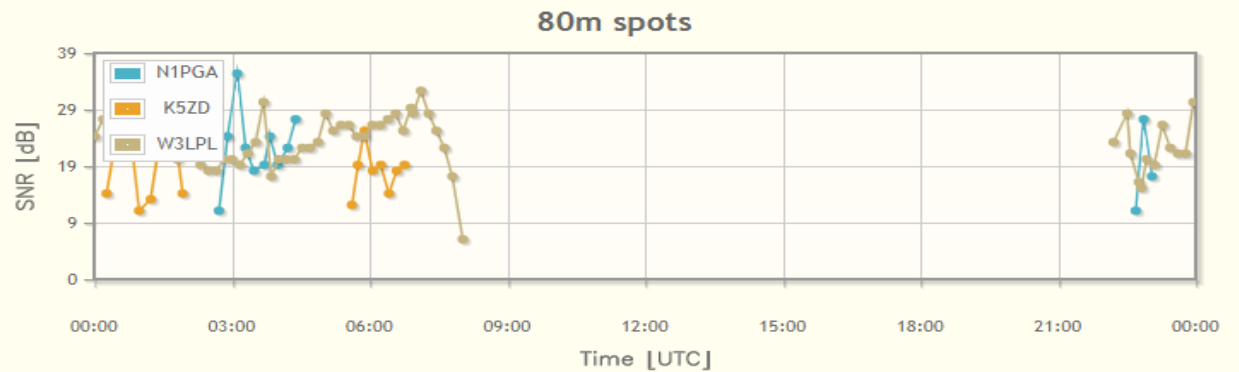
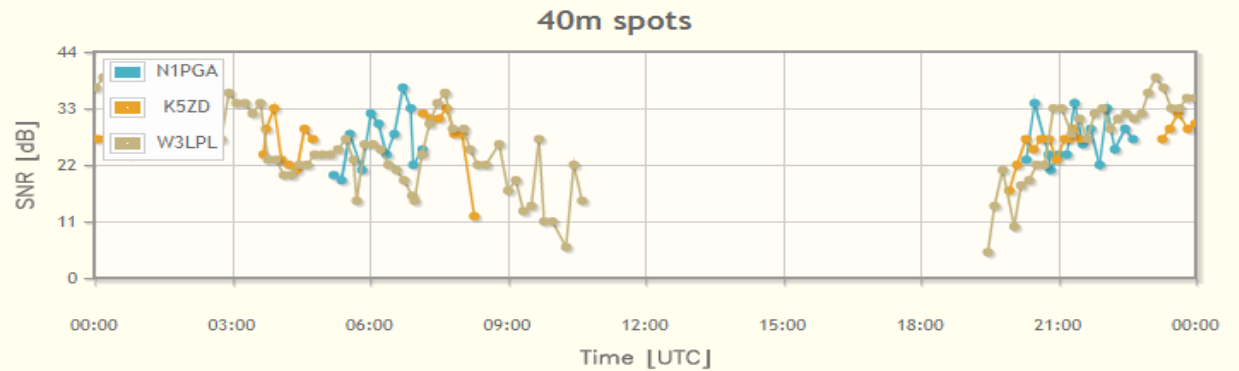
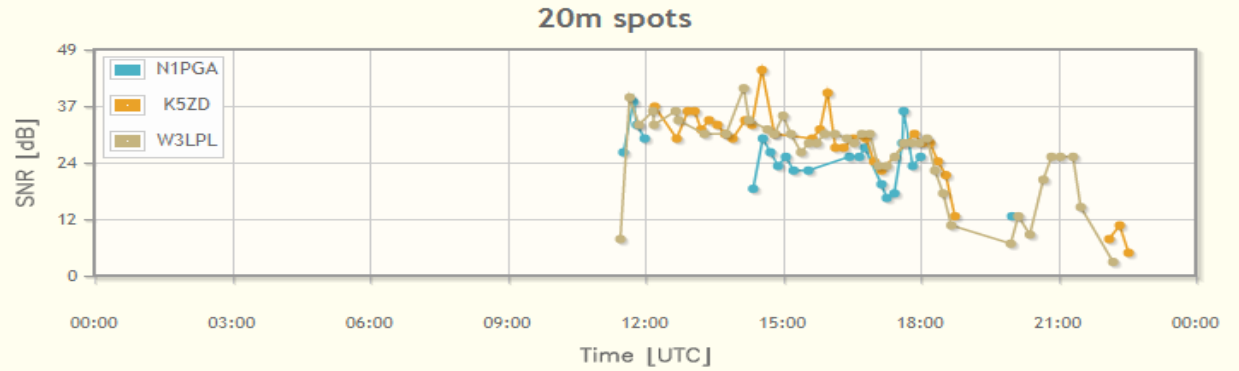
2020 ARRL DX CW

1st 24-hours

RBN - Spots Analysis Tool

EA5WU data

Valencia Spain



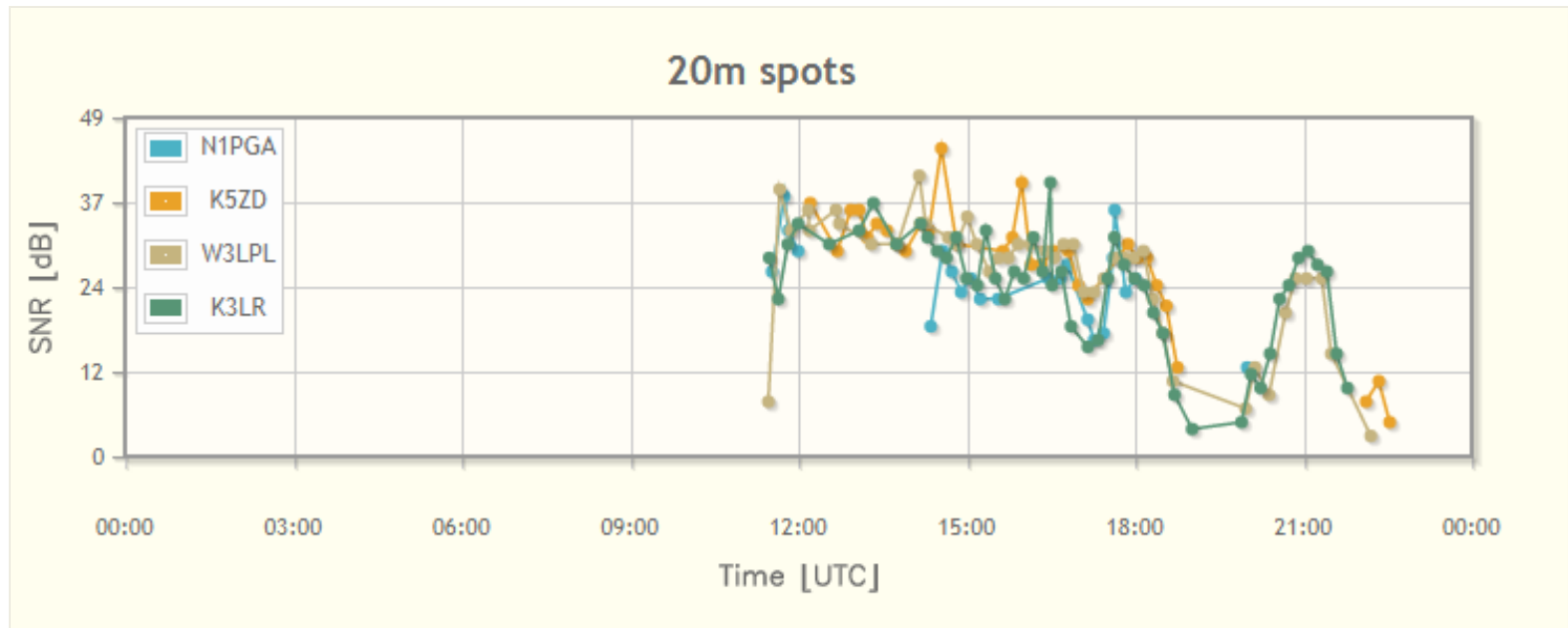
N1PGA, K5ZD, W3LPL & K3LR

2020 ARRL DX CW

1st 24-hours

RBN - Spots Analysis Tool

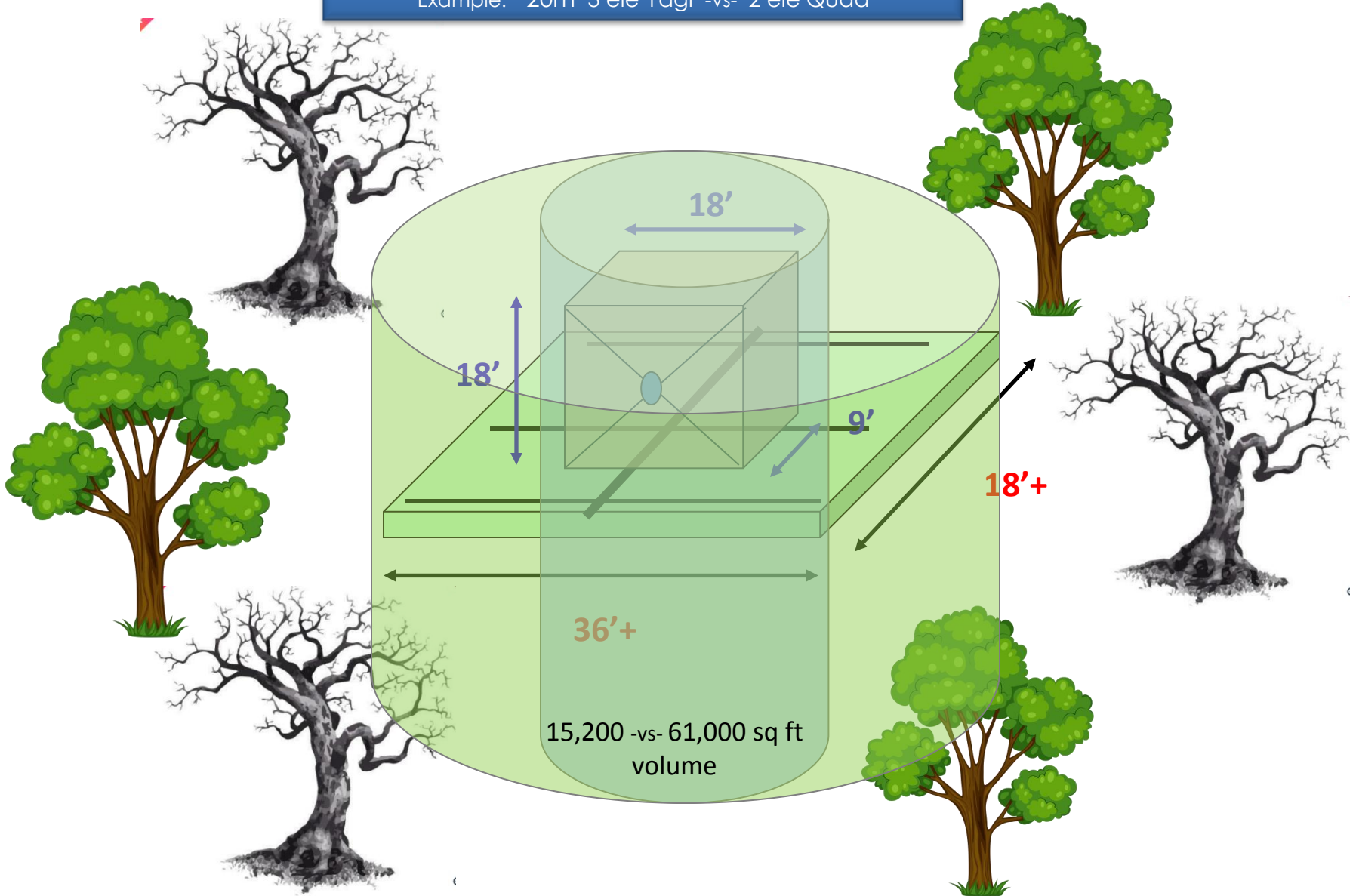
EA5WU data



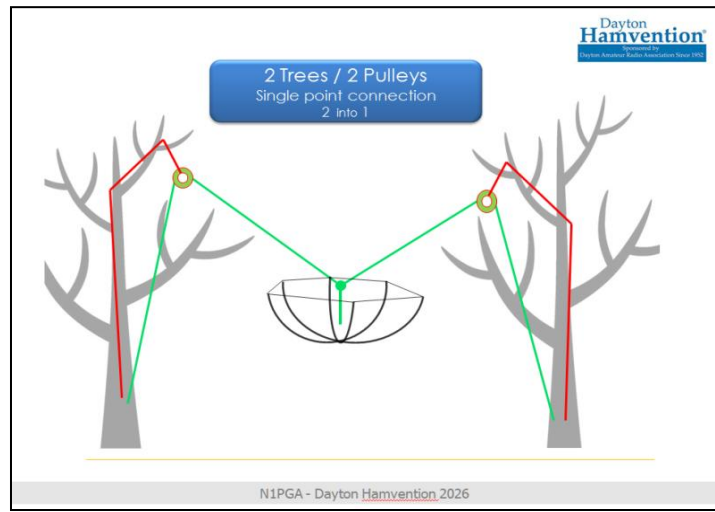
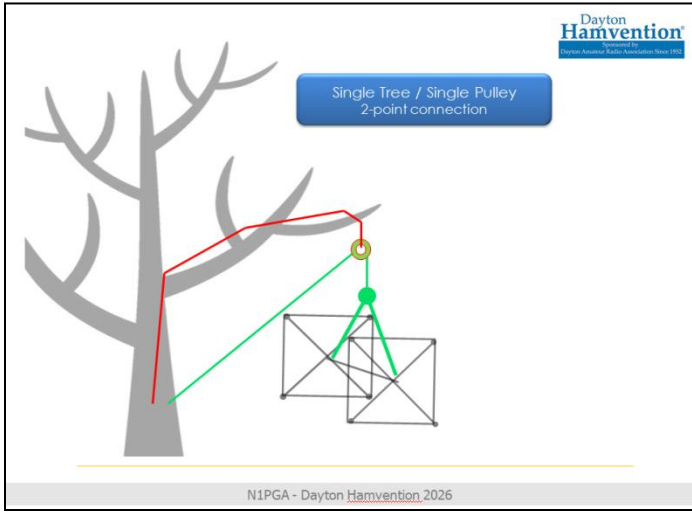
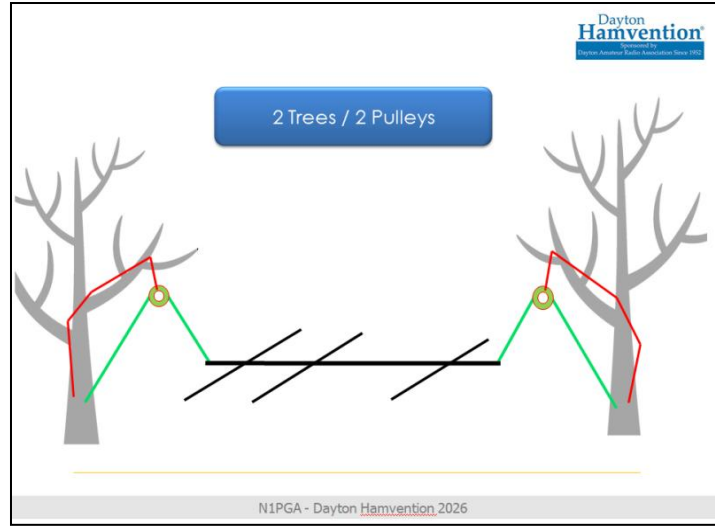
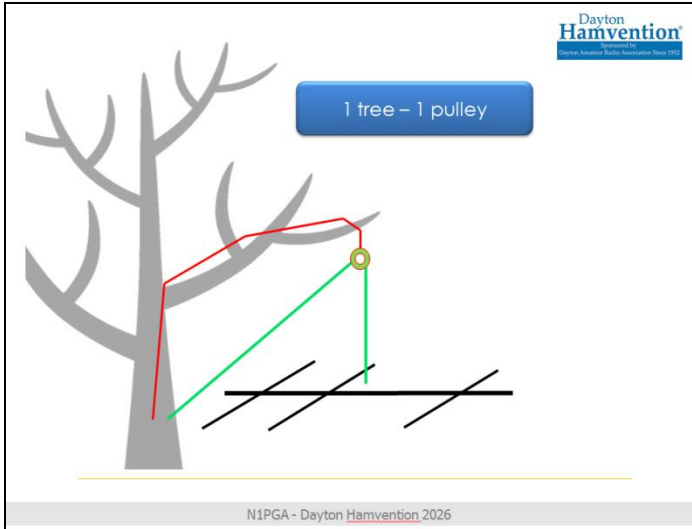
Antennas in trees

How-To's

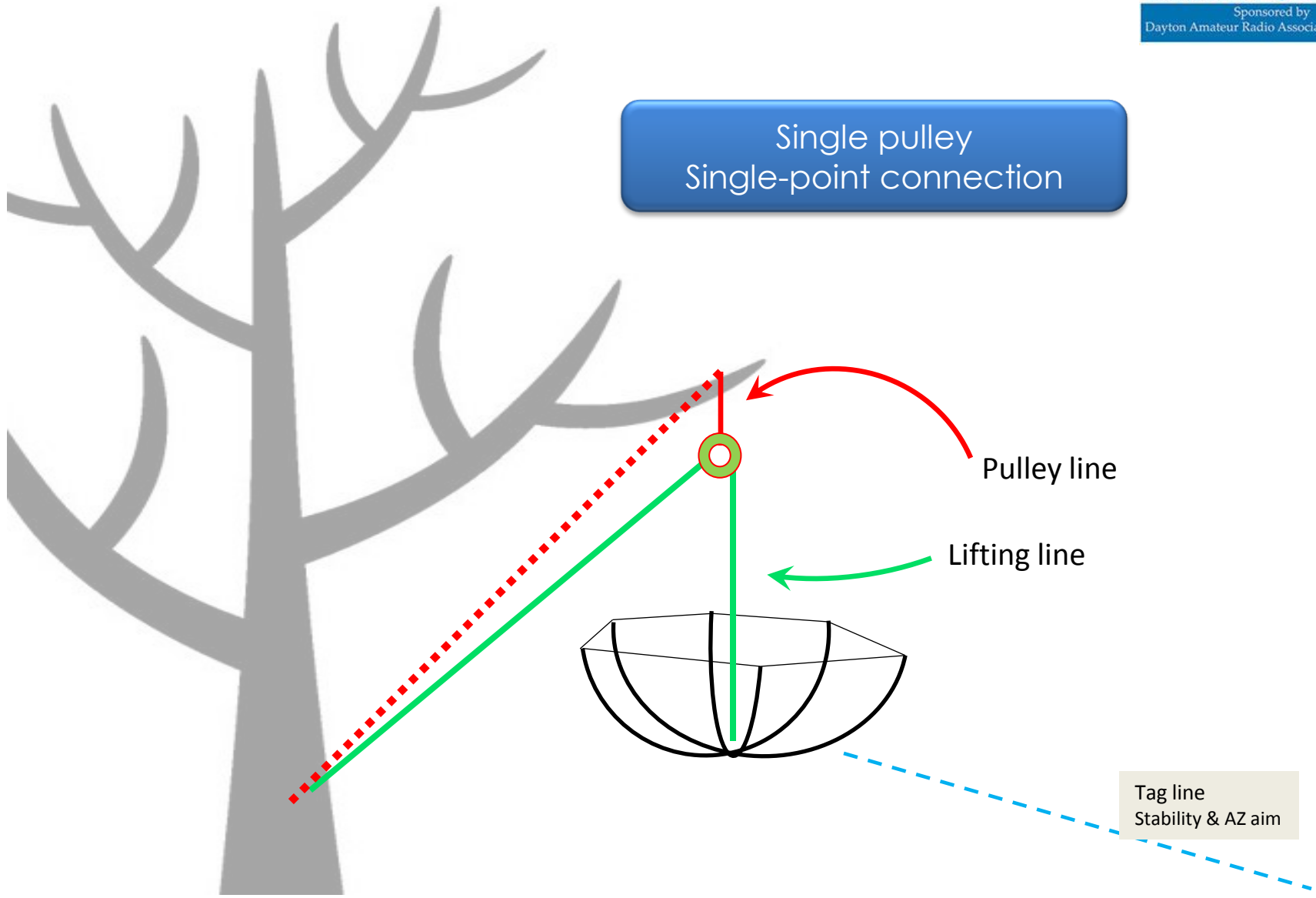
Spatial / dimensional view
Example: 20m 3 ele Yagi -vs- 2 ele Quad



Suspending & Connecting to antennas
 2 main methods – 2 variations



Single pulley
Single-point connection



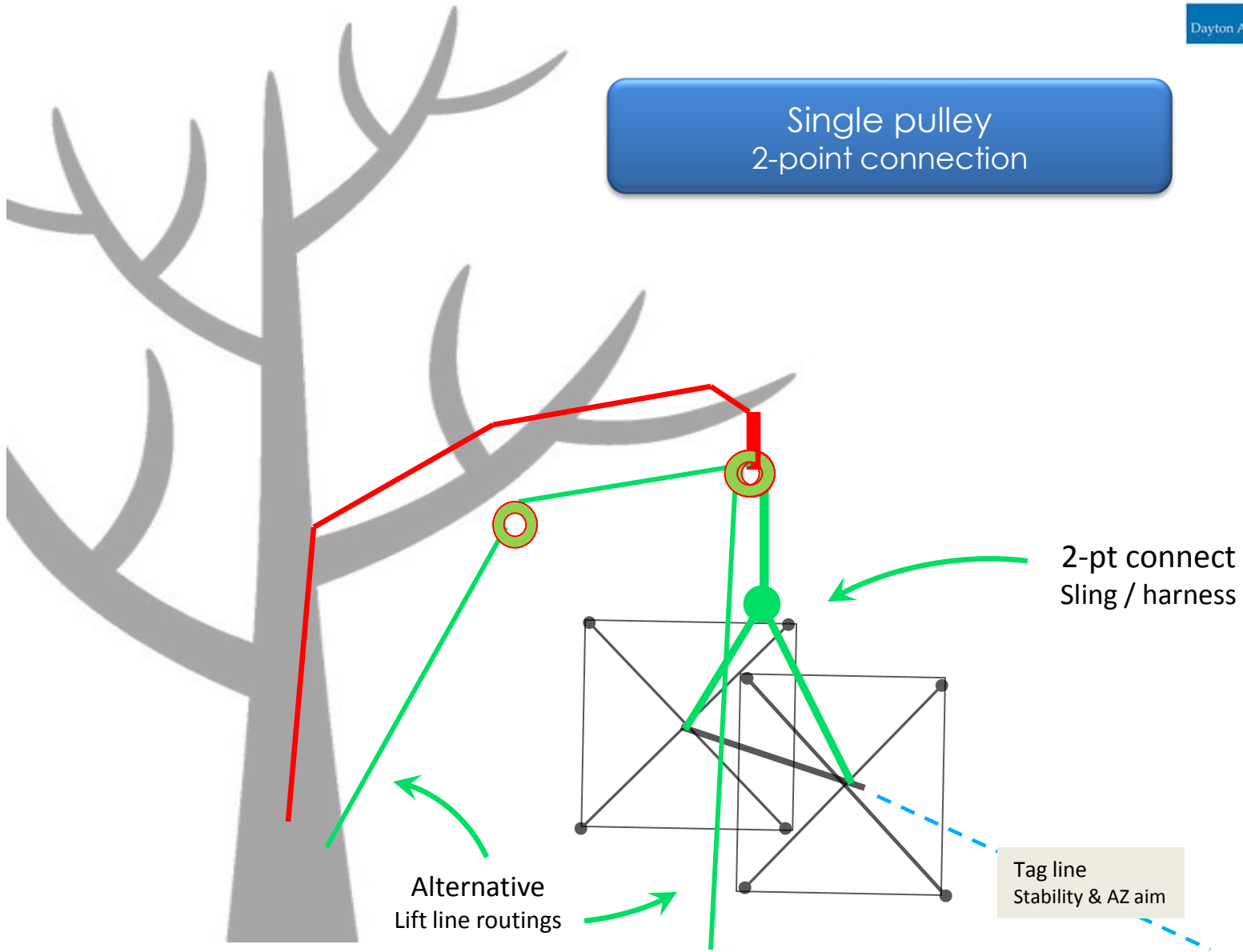
Single pulley
Single-point connection

“As best as you are able...”

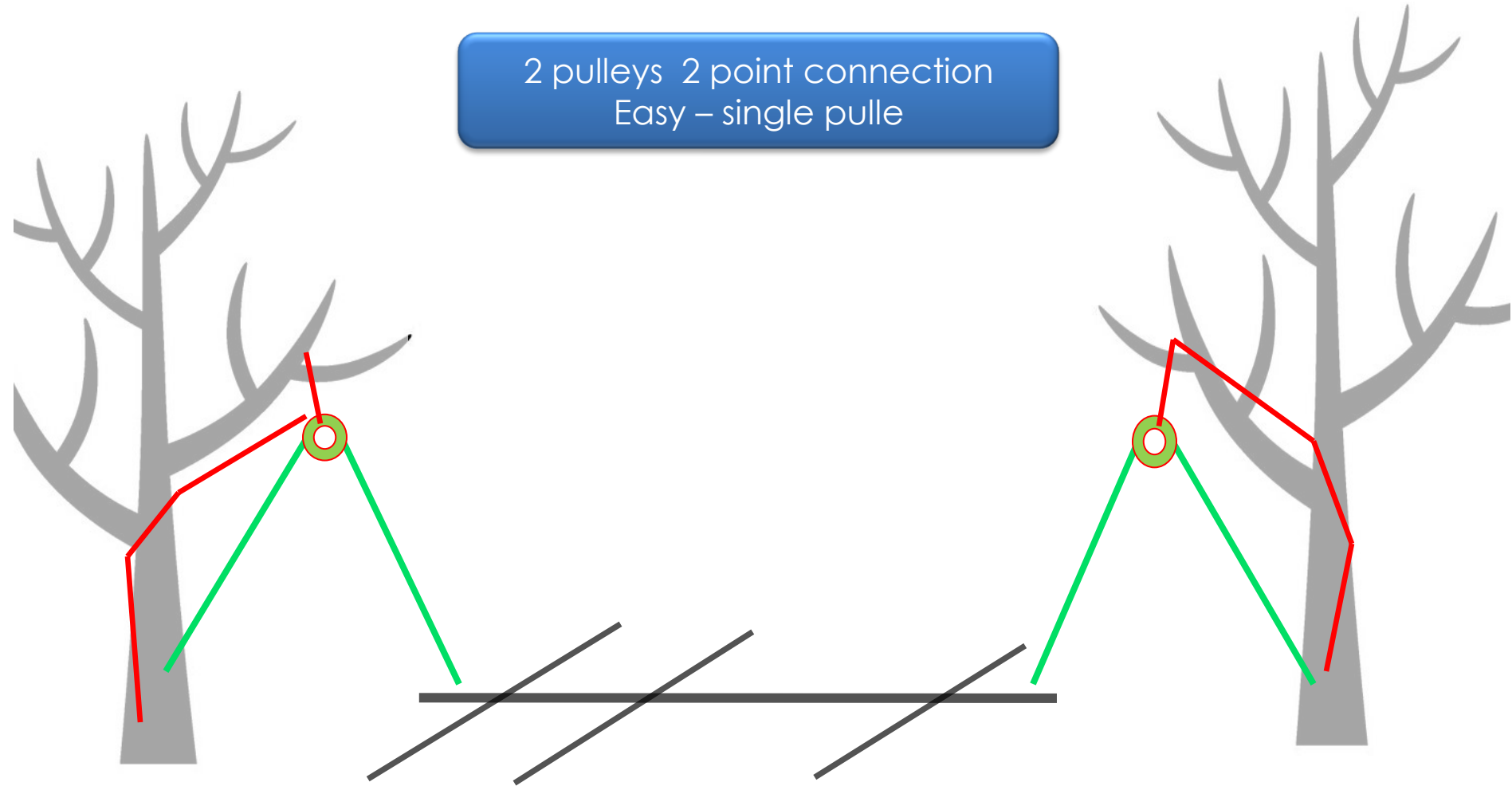
- Route the pulley line along the limb / spar / lead / trunk
- ✓ Limits line tension
 - ✓ Limits bark / limb damage
 - ✓ Clearance

Tag line
Stability & AZ aim

Single pulley
2-point connection

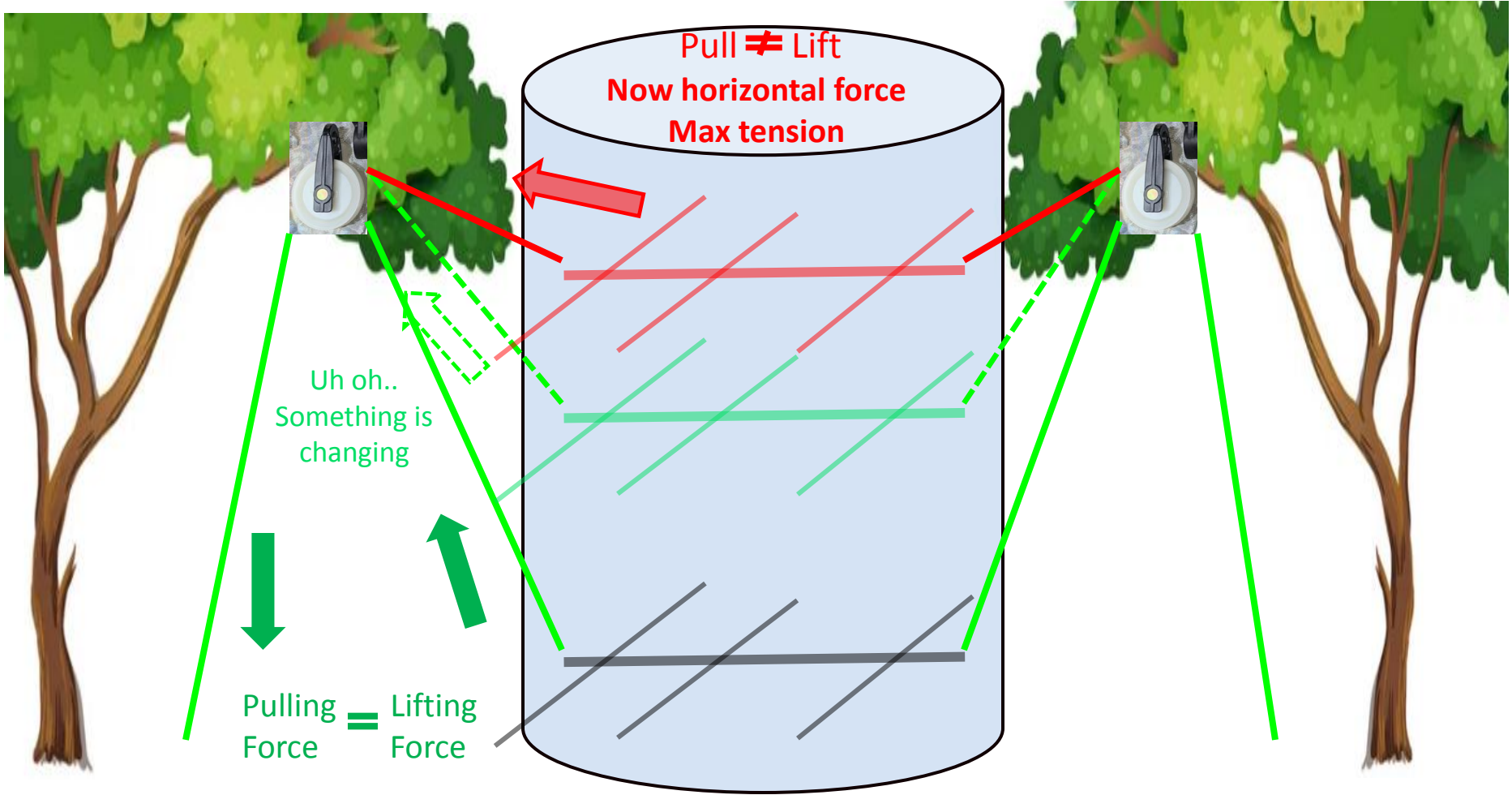


2 pulleys 2 point connection
Easy – single pulle



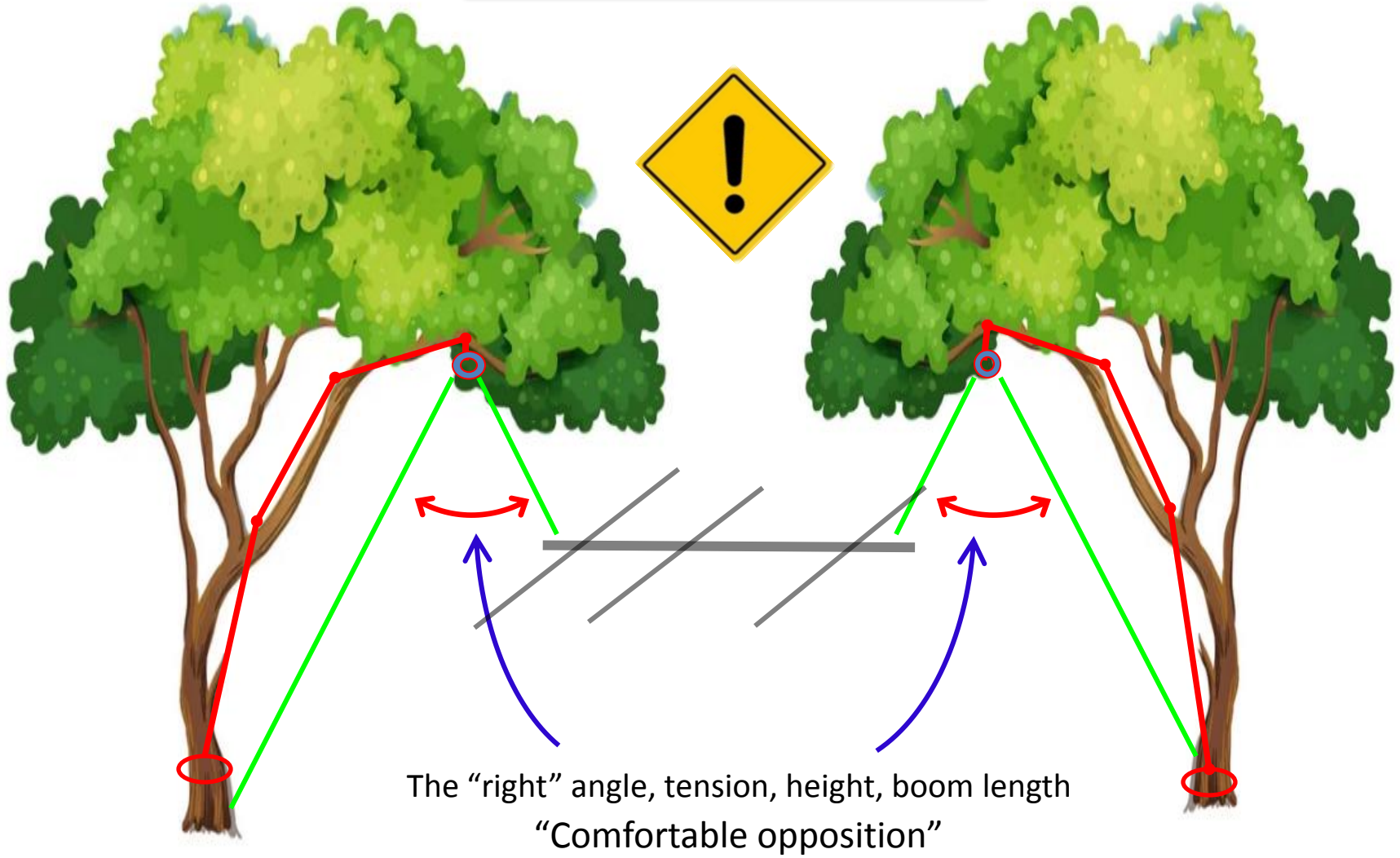
Lesson learned: 2 trees 2 pulleys

Sky is not the limit...

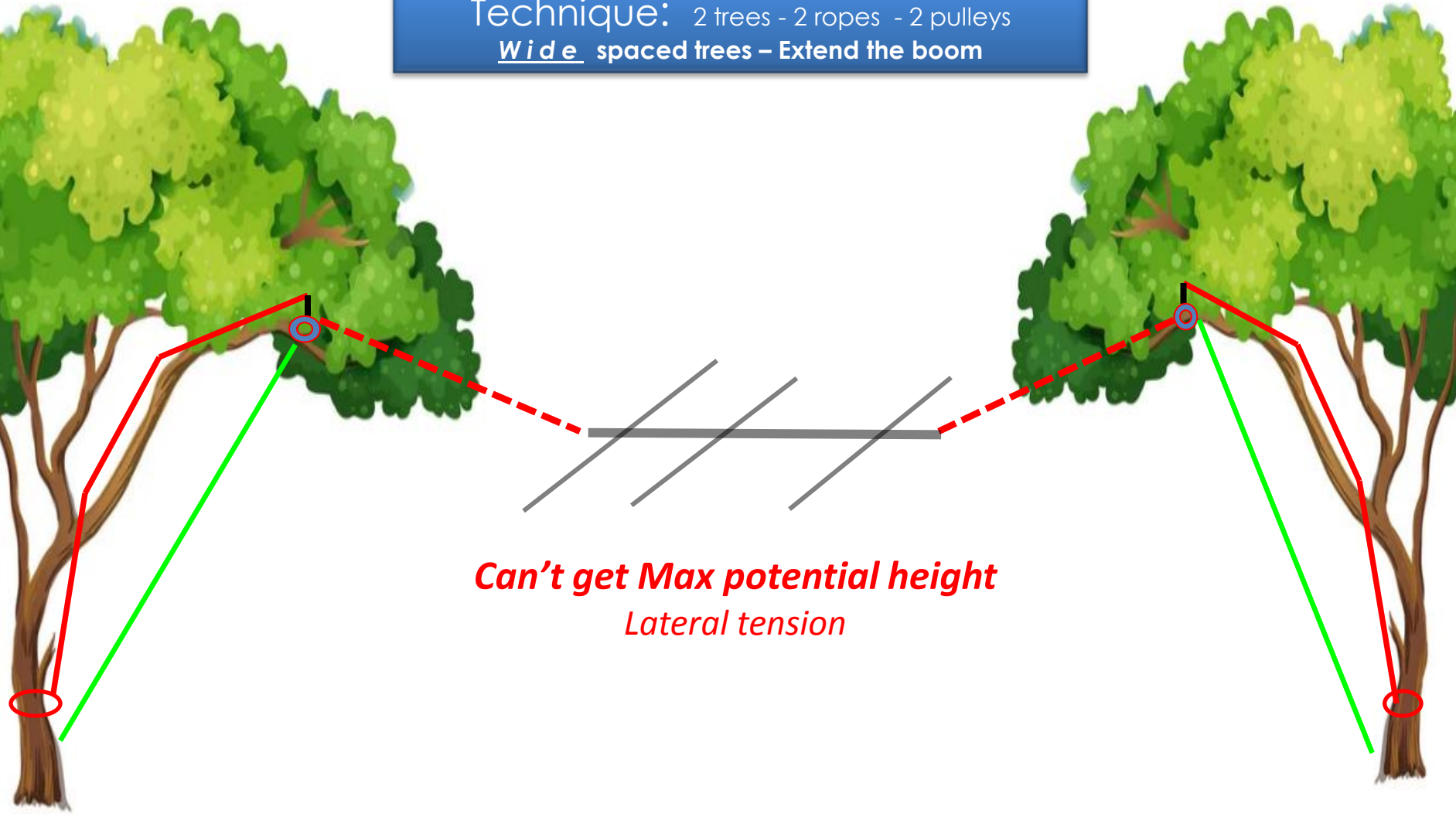


Technique: 2 trees 2 pulleys

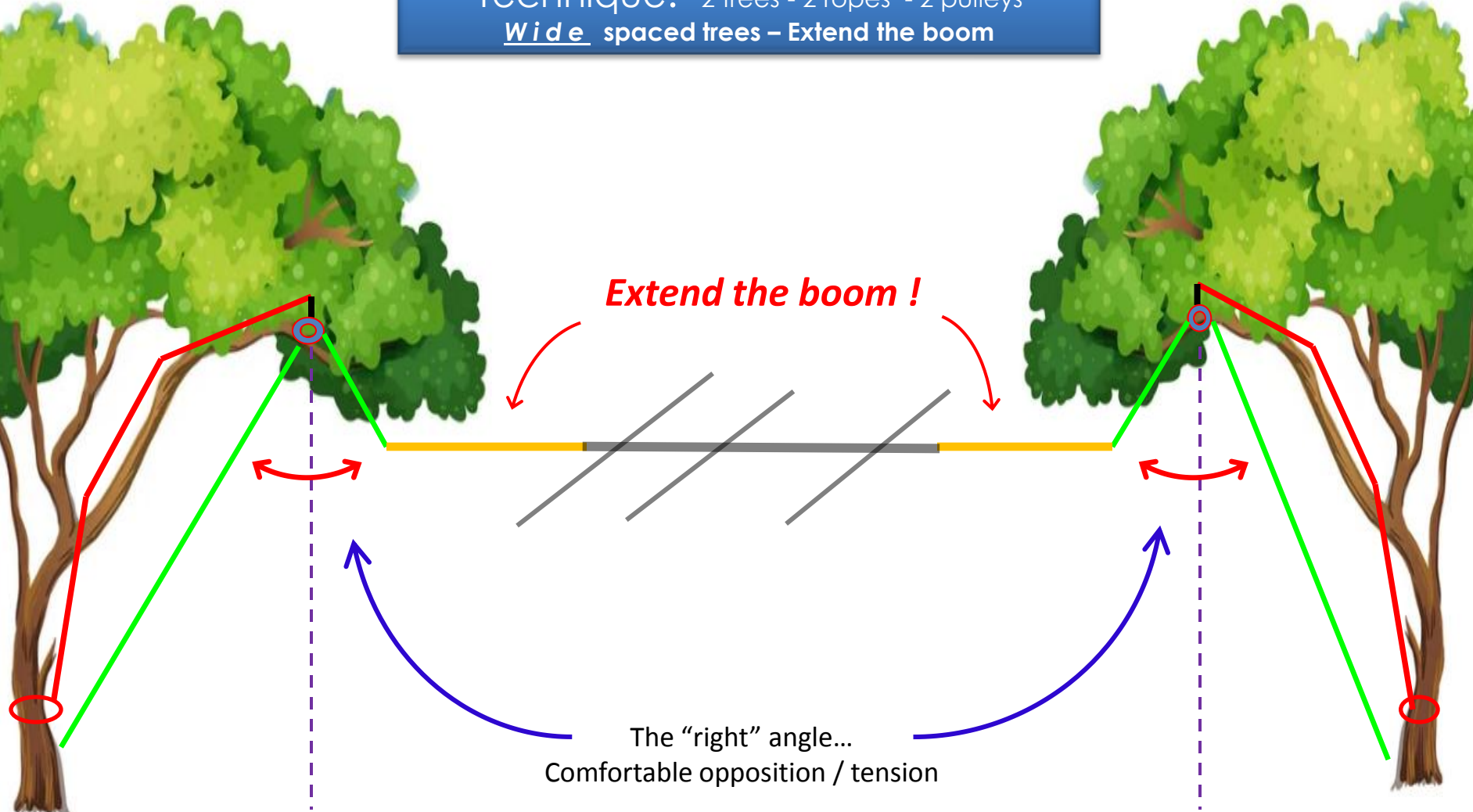
In a good spot: close spaced



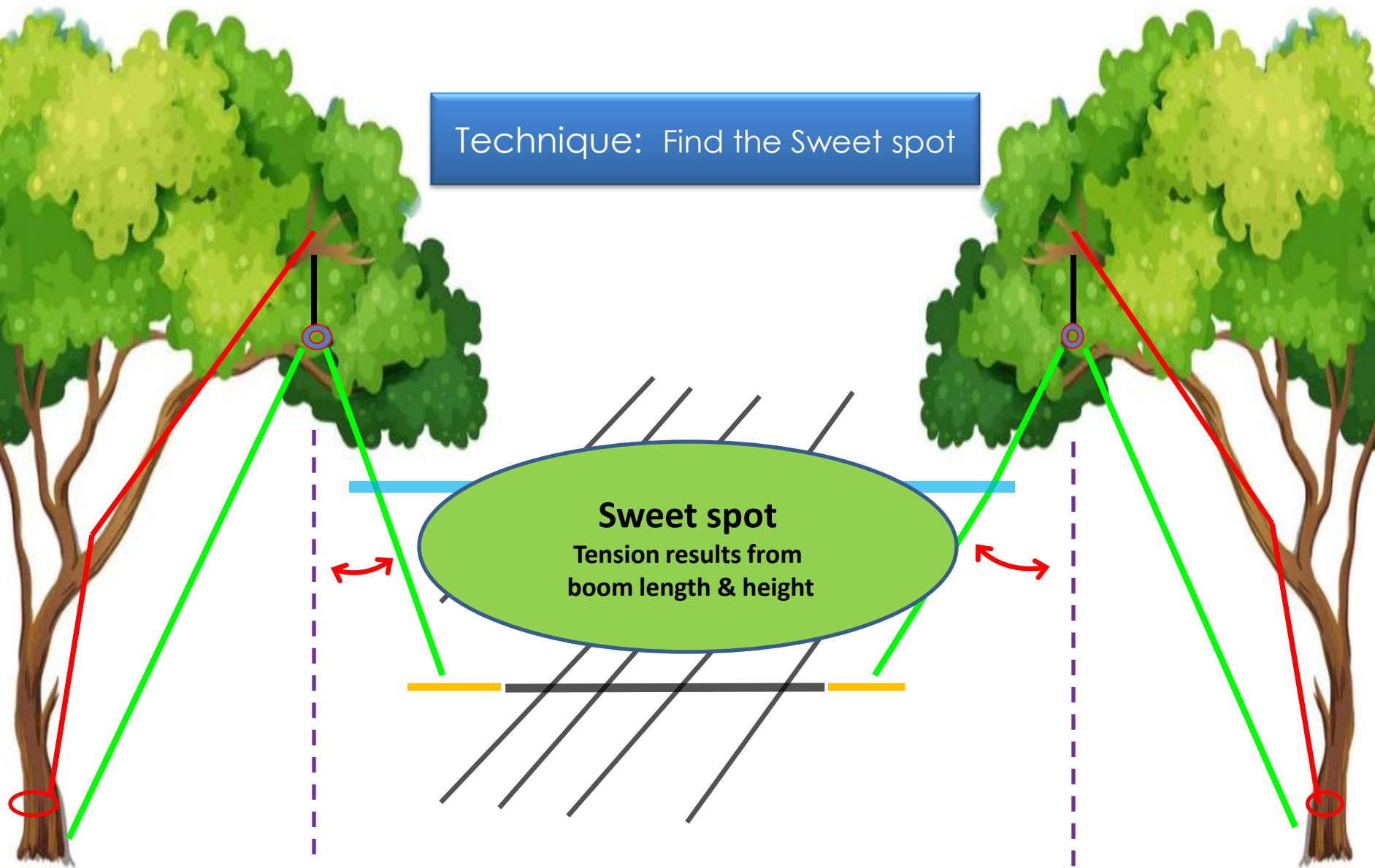
Technique: 2 trees - 2 ropes - 2 pulleys
Wide spaced trees – Extend the boom



Technique: 2 trees - 2 ropes - 2 pulleys
Wide spaced trees – Extend the boom

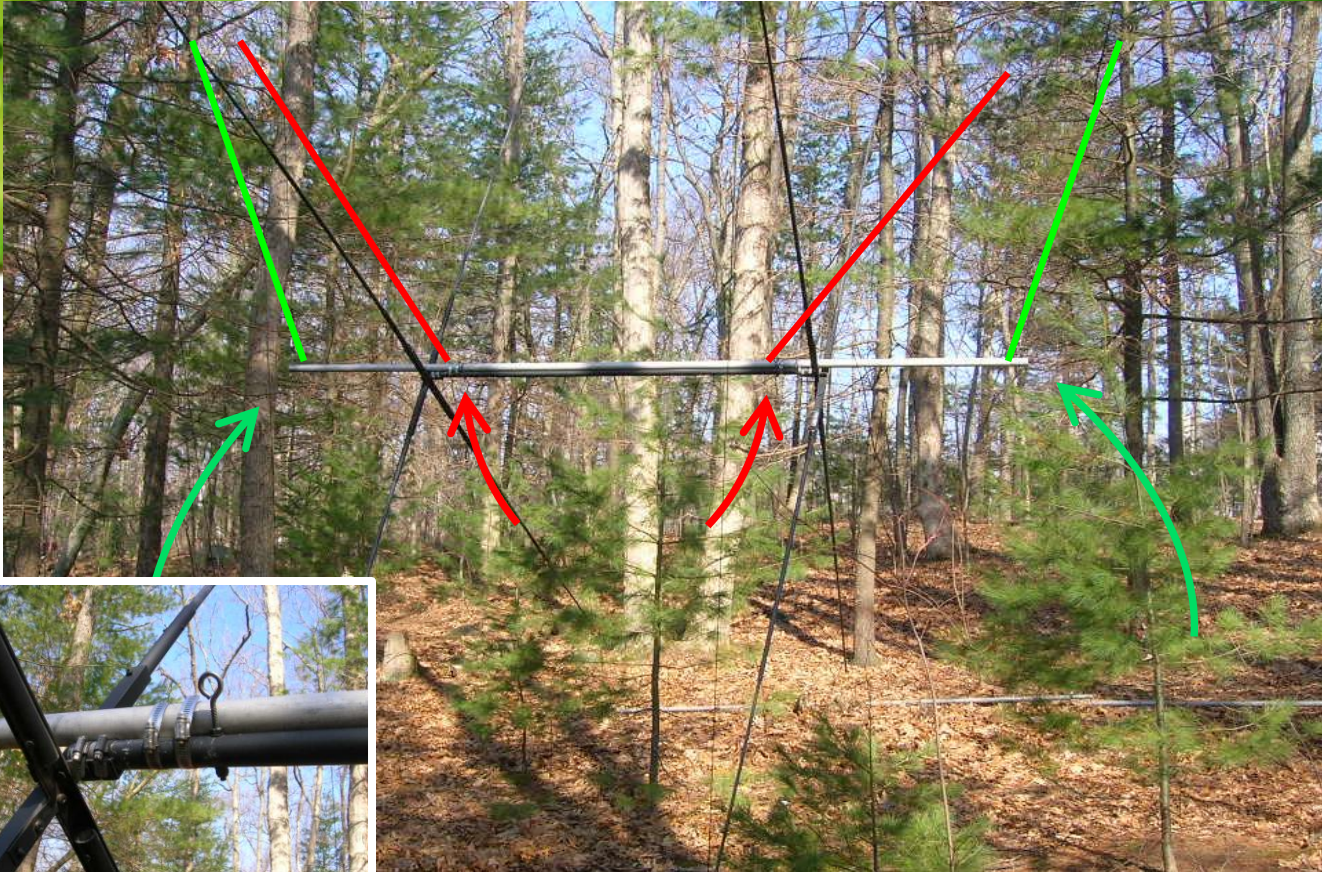


Technique: Find the Sweet spot



The Sweet spot is a great height for day-to-day

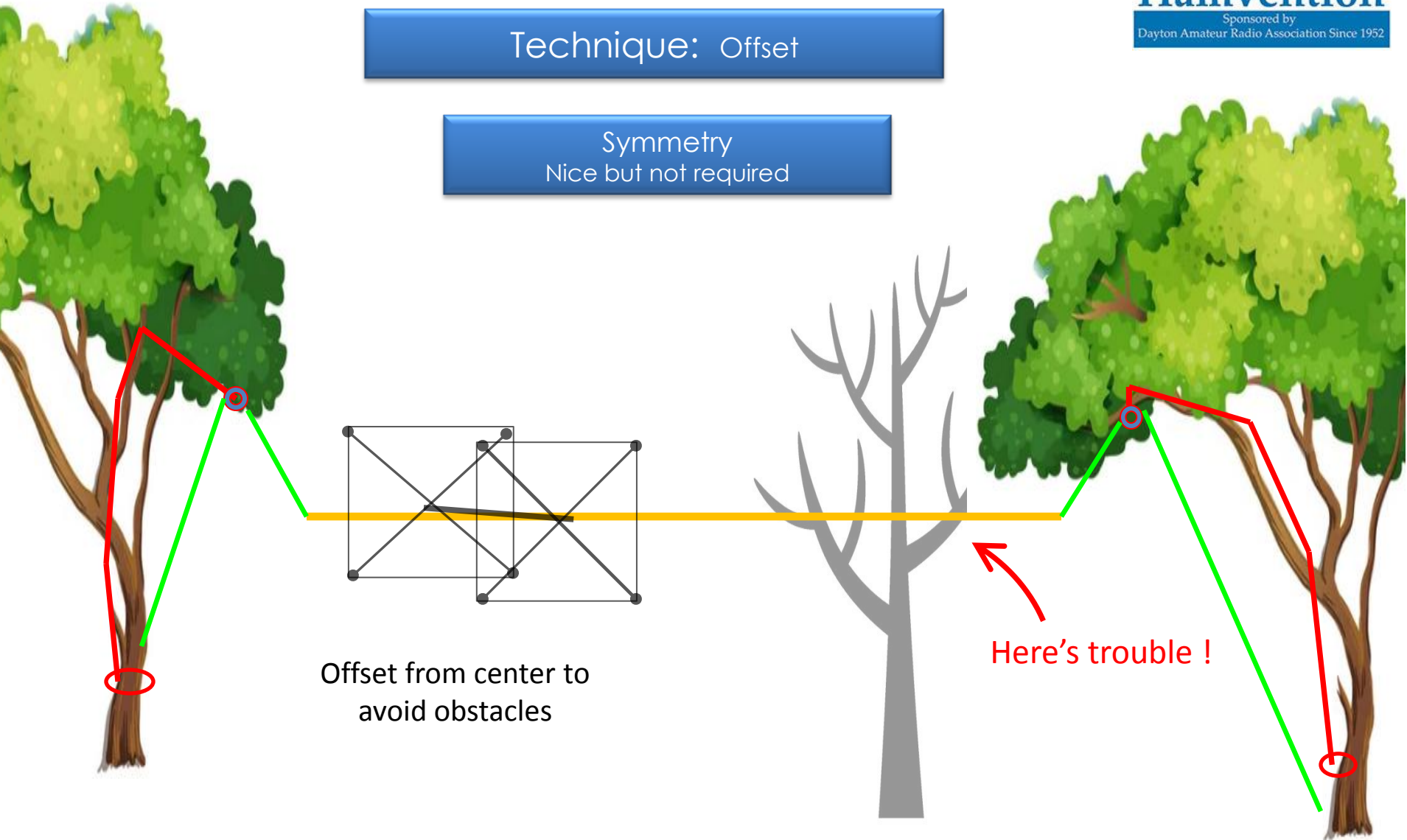
Example: 2 trees - 2 ropes - 2 pulleys
Extend the boom to achieve MAX height



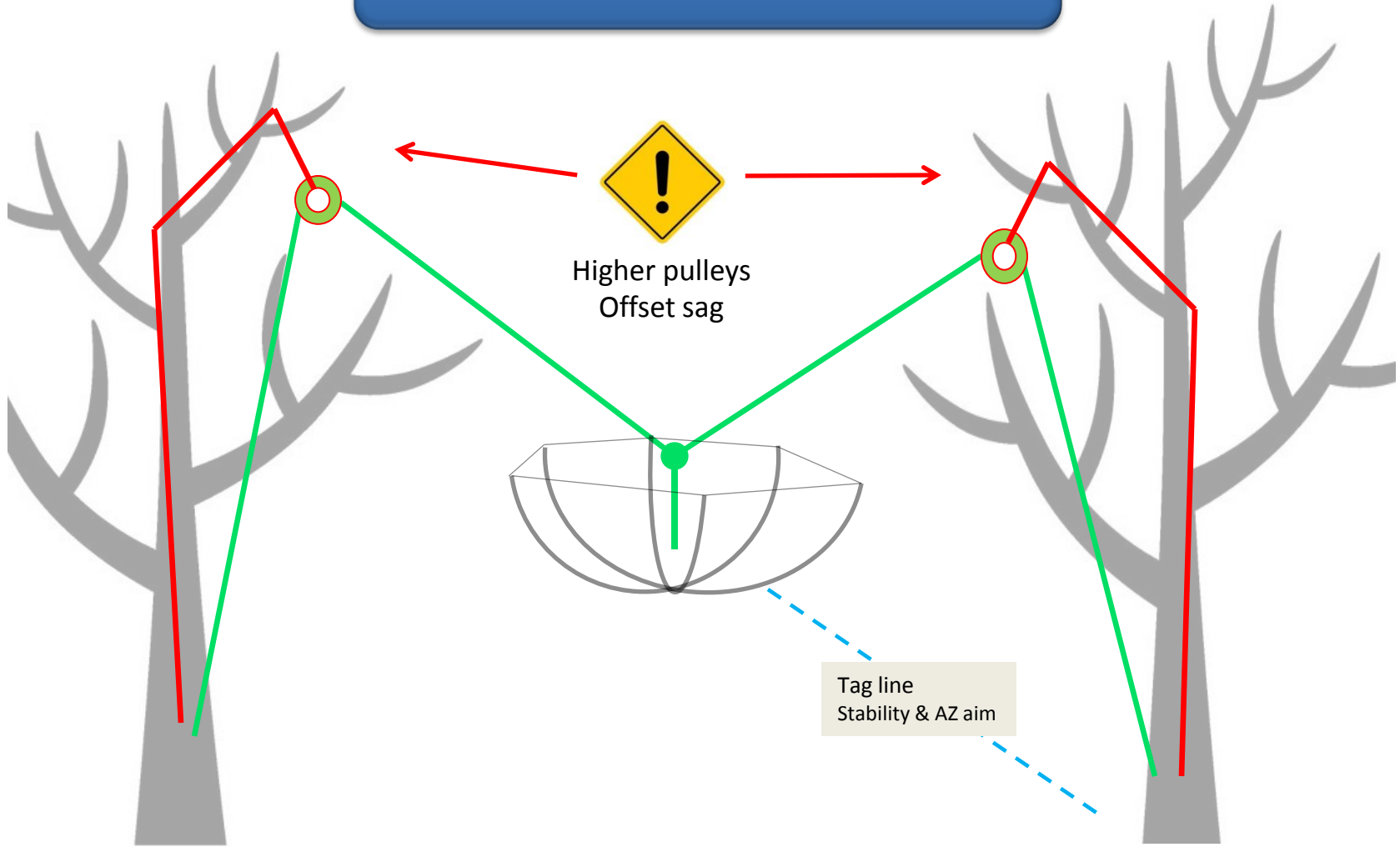
V1.0 Strapped to aux. boom

Technique: Offset

Symmetry
Nice but not required



2 pulleys - single point connection
2 into 1



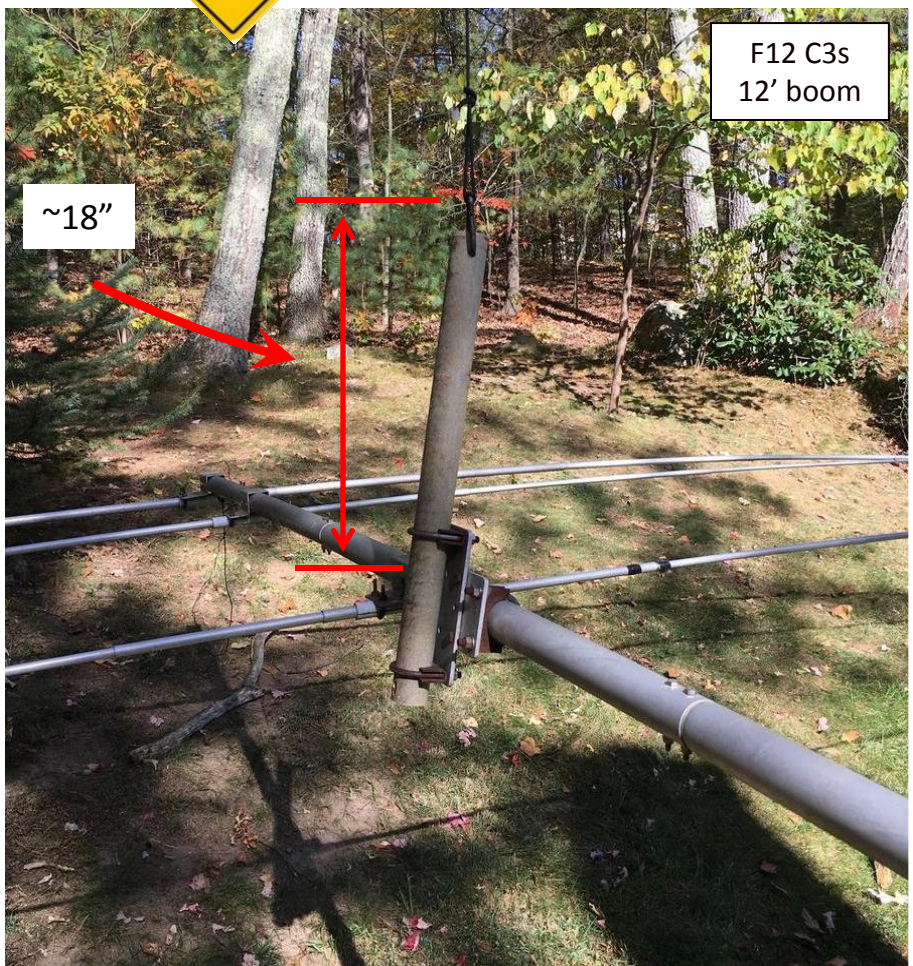
Connecting up

Above the boom

- Physics ?
- Gravity ?
- Lever arm ?
- Pivot point ?



“Above the boom”
Single pulley / single connection
Achieves remarkable stability

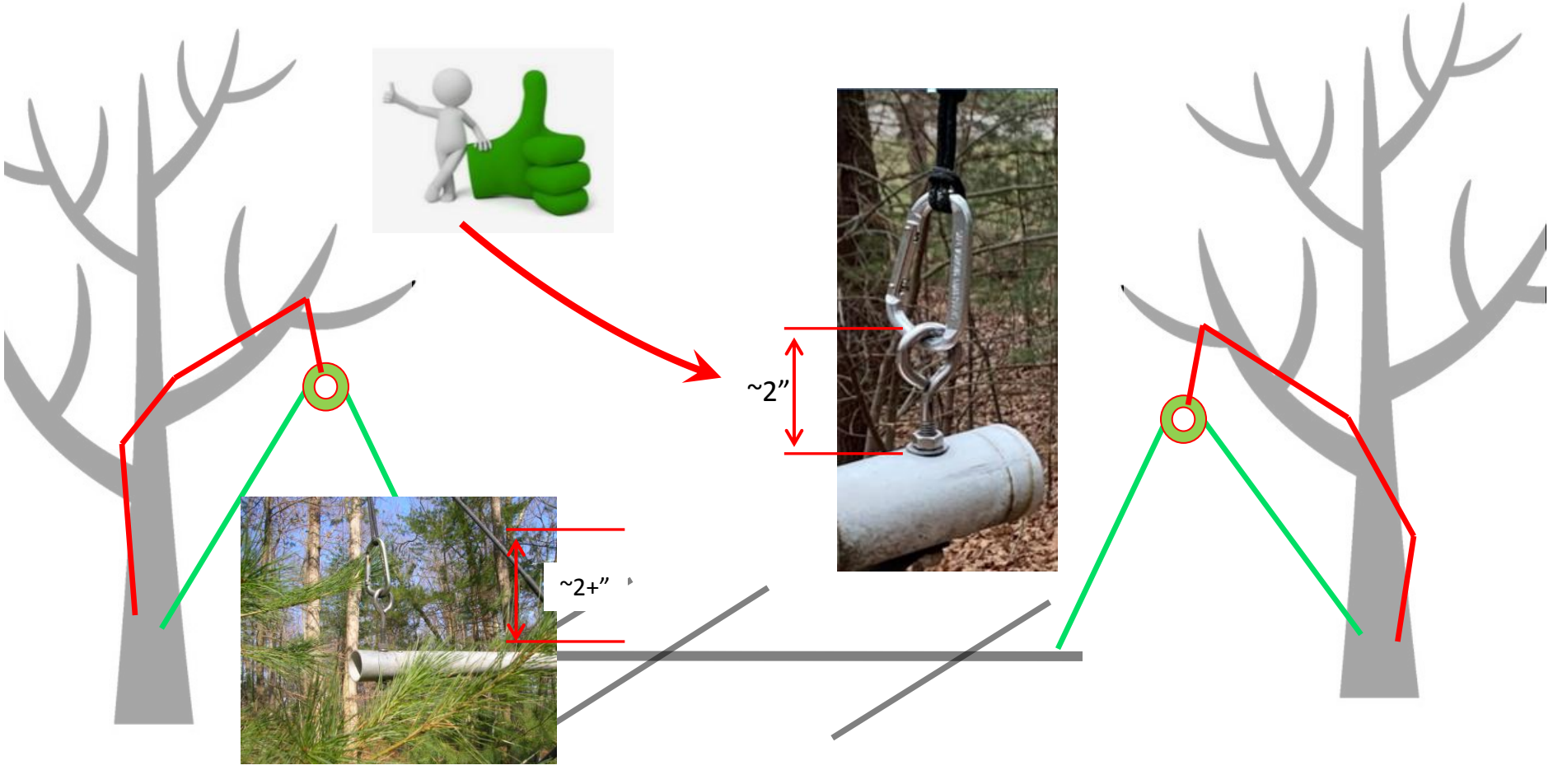


Example: "Above the Boom"
Single pulley / 2 point connection

Achieves remarkable stability
No axial rotation



“Above the Boom”
2 pulleys / 2-point connection
Achieves remarkable stability
No axial rotation



Dealing with the wind



Under the canopy, in and amongst the trees

- Not exposed directly to WX
- Intended to move in the wind



EI3GIB Gary
County Meath



Suspended antennas
Limited movement
“a good thing...”

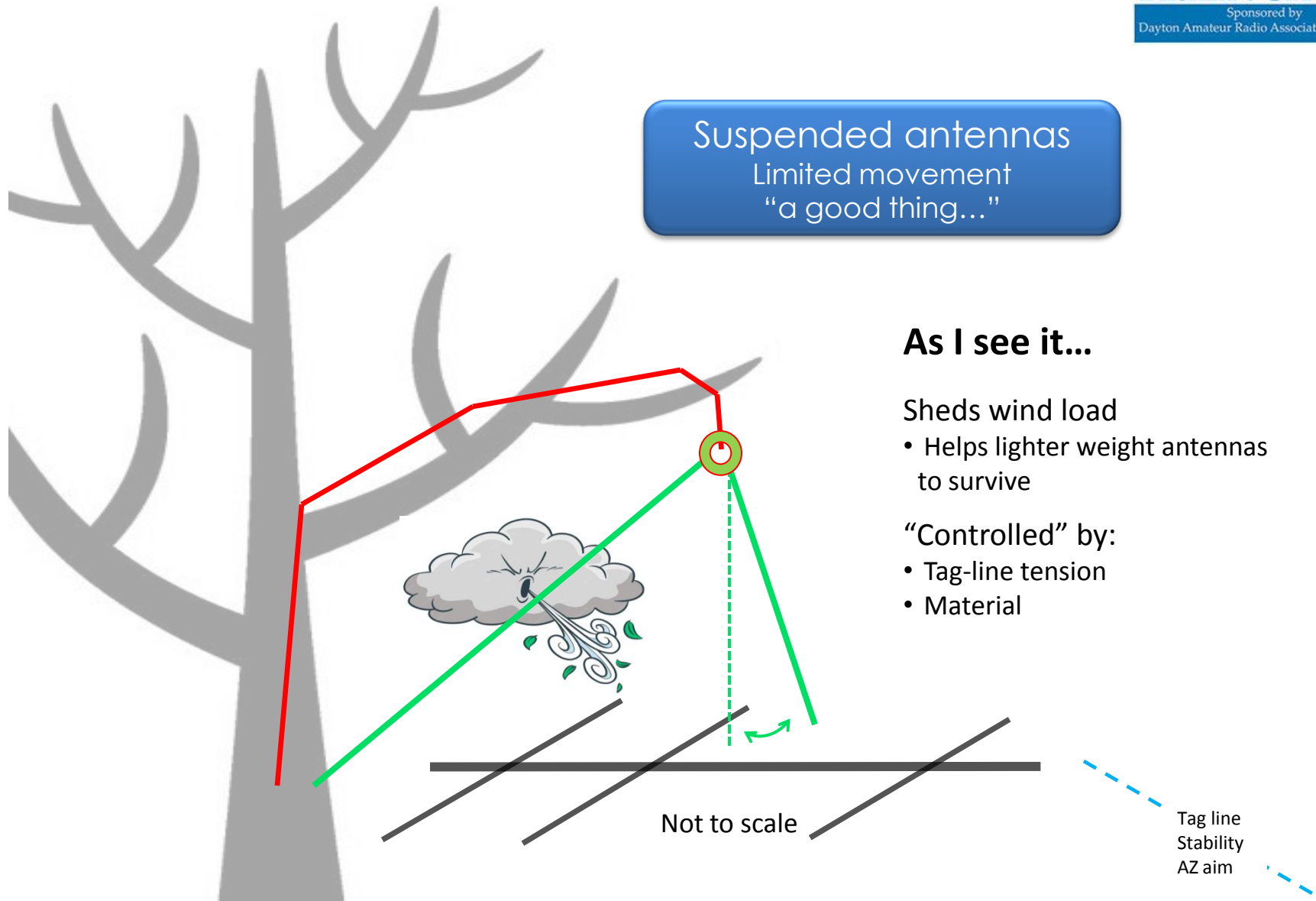
As I see it...

Sheds wind load

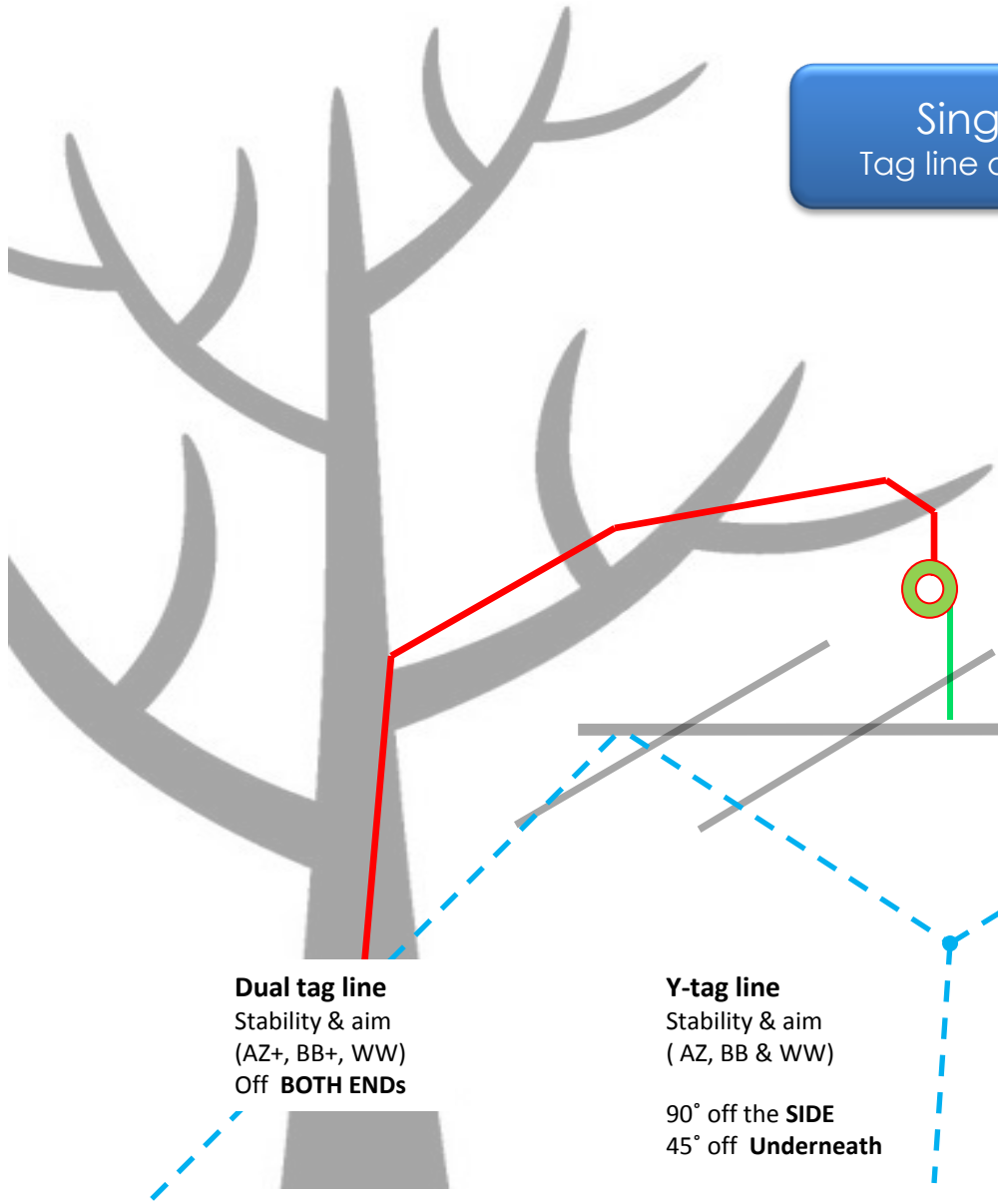
- Helps lighter weight antennas to survive

“Controlled” by:

- Tag-line tension
- Material



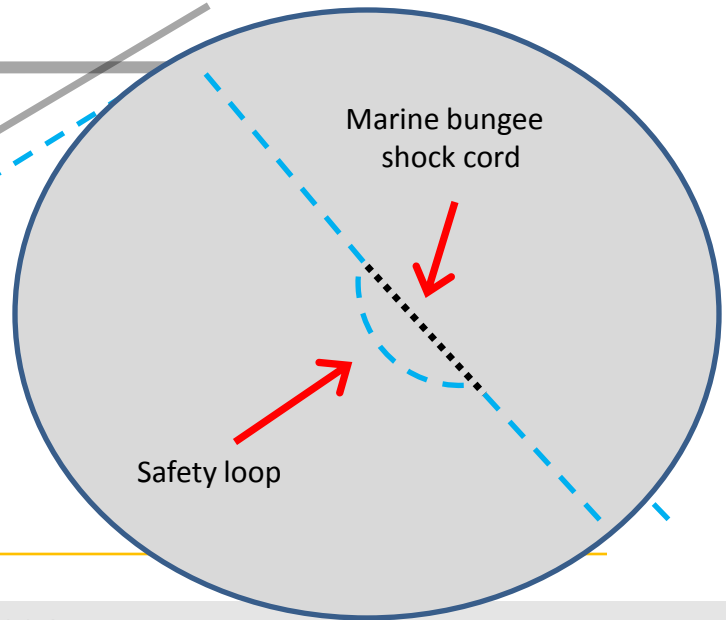
Single connection
Tag line options: Single, Dual or Y



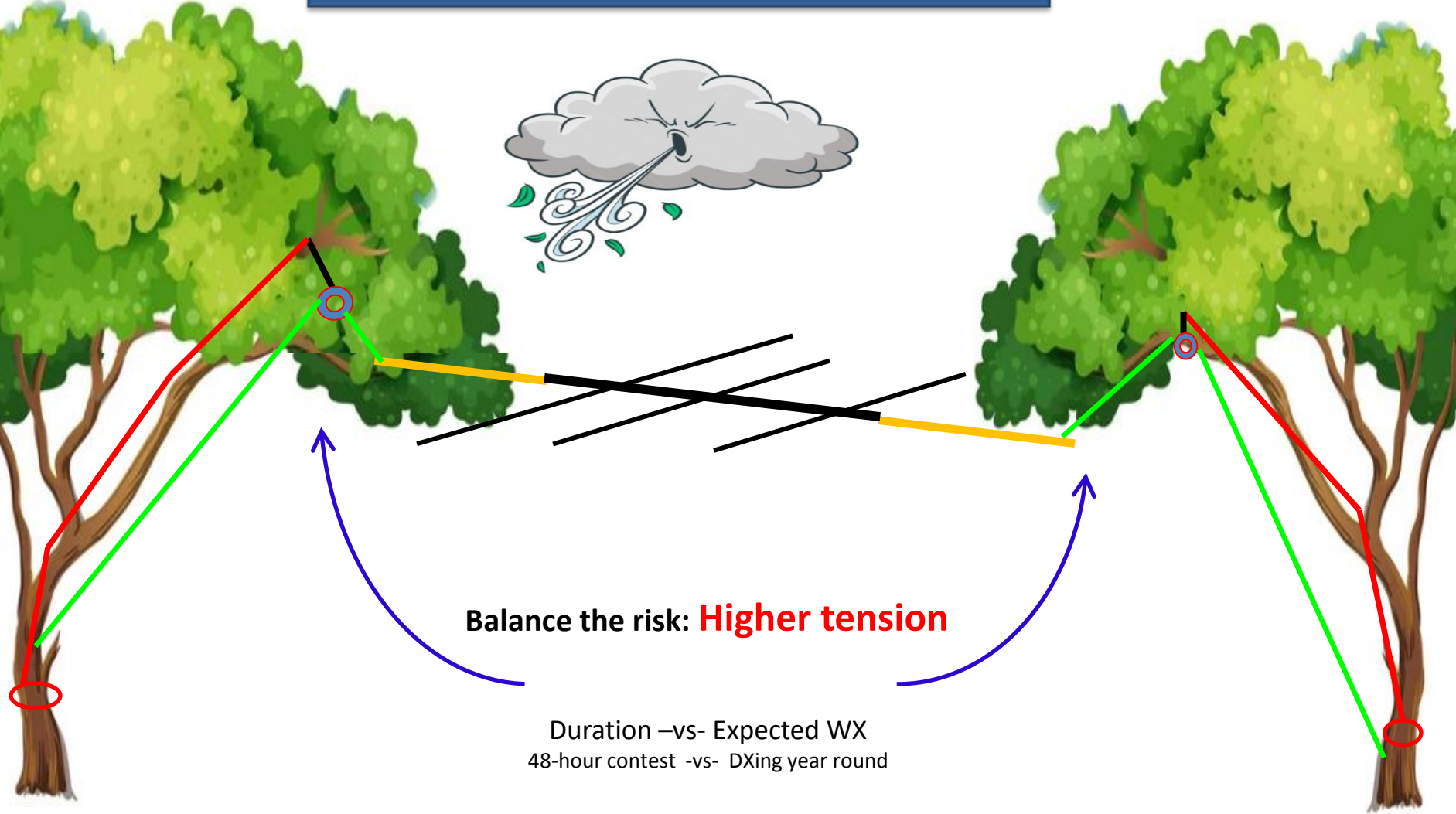
AZ: Azimuth aim
BB: Boom Bounce
WW: Wing Waggle

Dual tag line
Stability & aim
(AZ+, BB+, WW)
Off **BOTH ENDS**

Y-tag line
Stability & aim
(AZ, BB & WW)
90° off the **SIDE**
45° off **Underneath**



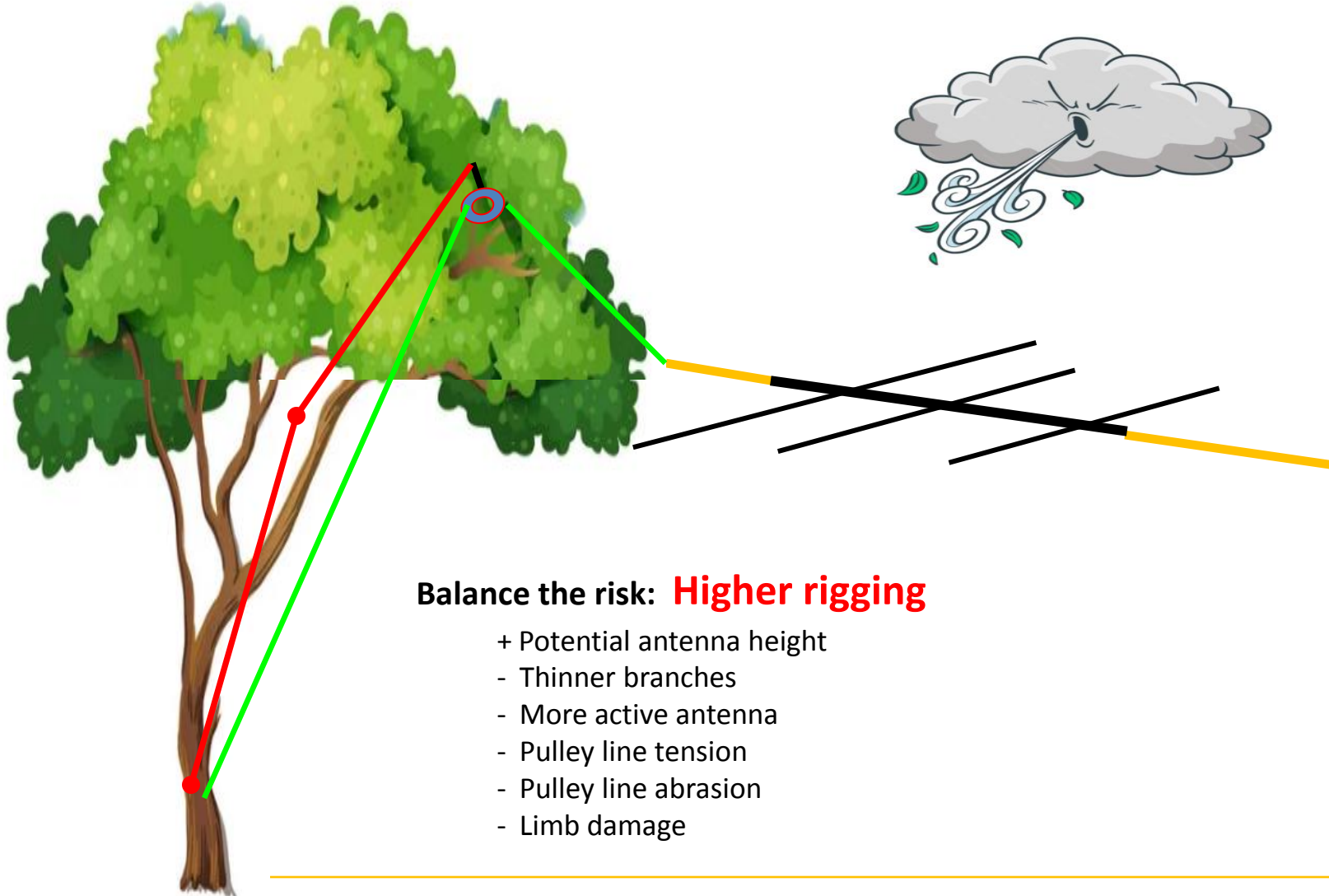
Get 'em up high... but maybe not too high
2 trees – 2 ropes – 2 pulleys
2 point connection



Balance the risk: **Higher tension**

Duration –vs- Expected WX
48-hour contest -vs- DXing year round

Get 'em up high... but maybe not too high
Lower may be good enough – long term



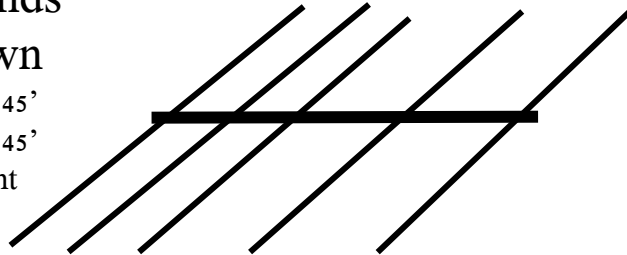
Balance the risk: **Higher rigging**

- + Potential antenna height
- Thinner branches
- More active antenna
- Pulley line tension
- Pulley line abrasion
- Limb damage

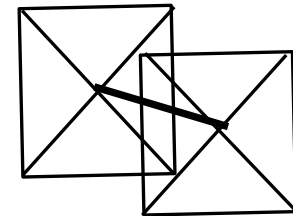
Fast & Easy

Fast & Easy...
To raise or lower

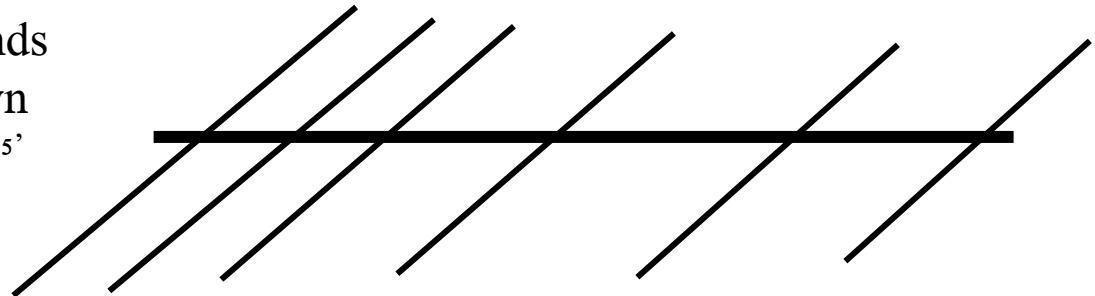
~ 15-seconds
up or down
15' boom @ 45'
22' boom @ 45'
Single point



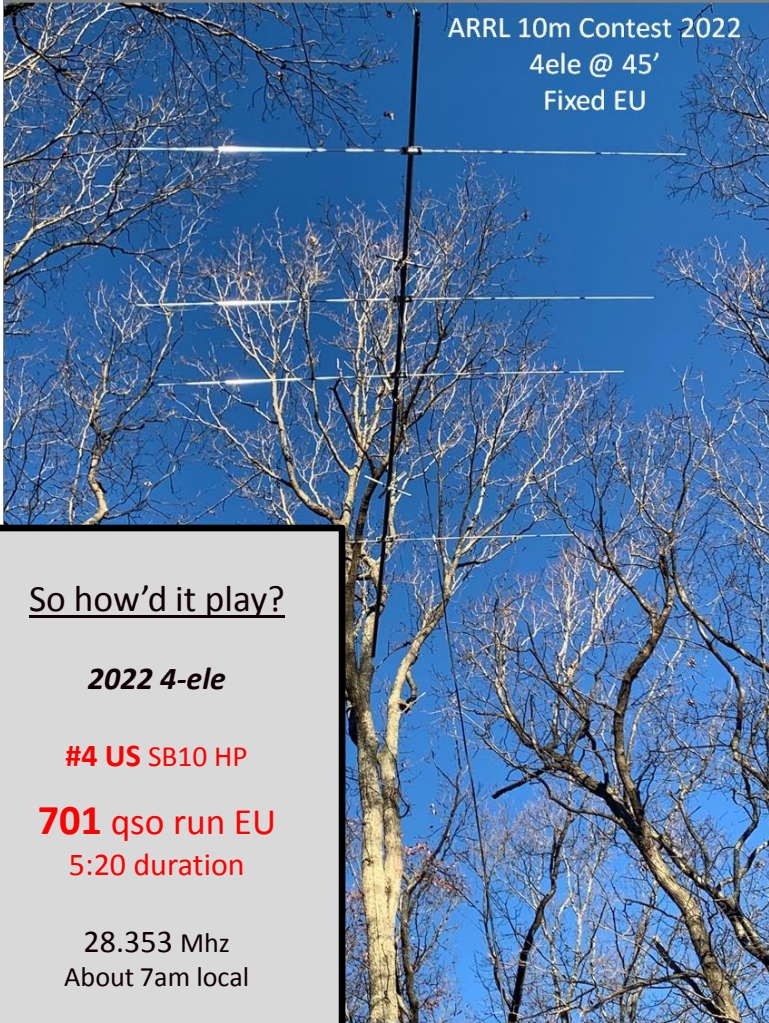
~ 15-seconds
up or down
5' boom @ 45'
Single point



< 60-seconds
up or down
35' boom @ 45'
2 point



Fast & Easy
The great Yagi experiment !!
~ 20 minute change over... from 4 to 5 to 6 elements



ARRL 10m Contest 2022
4ele @ 45'
Fixed EU

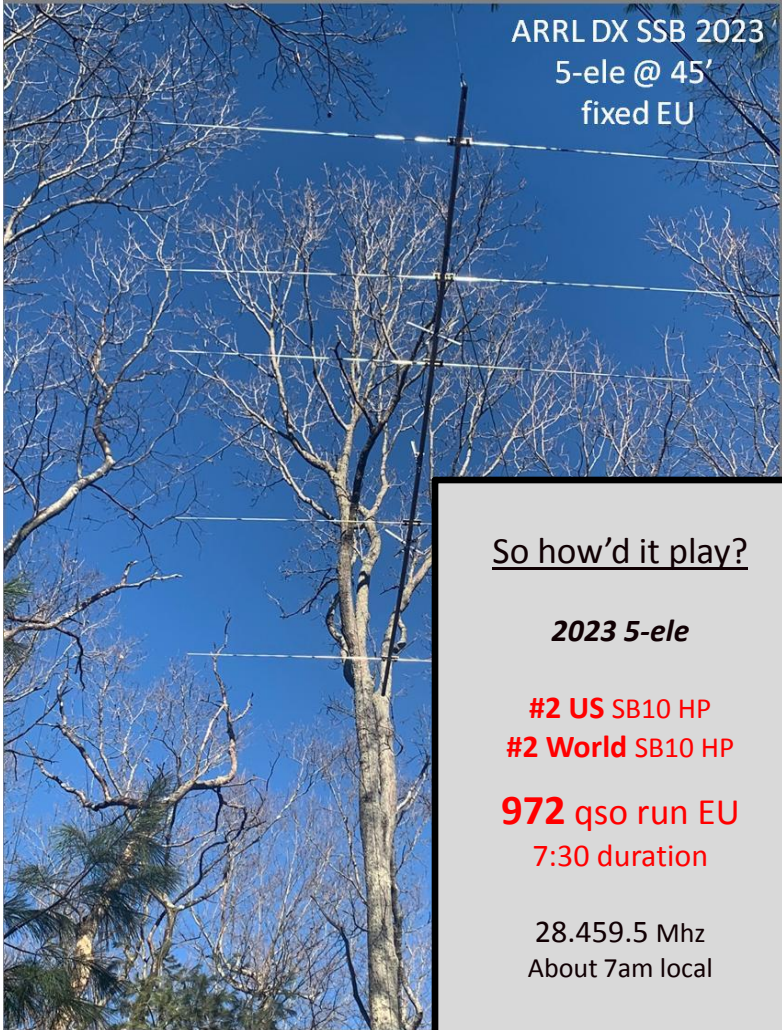
So how'd it play?

2022 4-ele

#4 US SB10 HP

701 qso run EU
5:20 duration

28.353 Mhz
About 7am local



ARRL DX SSB 2023
5-ele @ 45'
fixed EU

So how'd it play?

2023 5-ele

#2 US SB10 HP
#2 World SB10 HP

972 qso run EU
7:30 duration

28.459.5 Mhz
About 7am local

Fast & Easy
The great Yagi experiments !!
~ 20 minute change over ... 4 to 5 to 6 elements





Fast & Easy...

Initial setup:

- ✓ Build: at ground level & shoulder height
- ✓ Setup: dims, spacings, balance
- ✓ Trial fitting: in-place
- ✓ Tuning iterations: analyzer runs

Variations:

- ✓ Was a Quad, is now a Yagi
- ✓ Was a 4, then 5, now a 6 ele
- ✓ Was SOUTH is now WEST

✓ Year-round Fast & Easy access

Multiple presets:

- ✓ Year round DX'ing
- ✓ Windy day counter measures
- ✓ Foul WX procedures
- ✓ Max height battle stations

Options:

- ✓ Something's "off"
- ✓ Apparent damage
- ✓ Pre-event check outs
- ✓ Feedline exchange
- ✓ Regular PMs

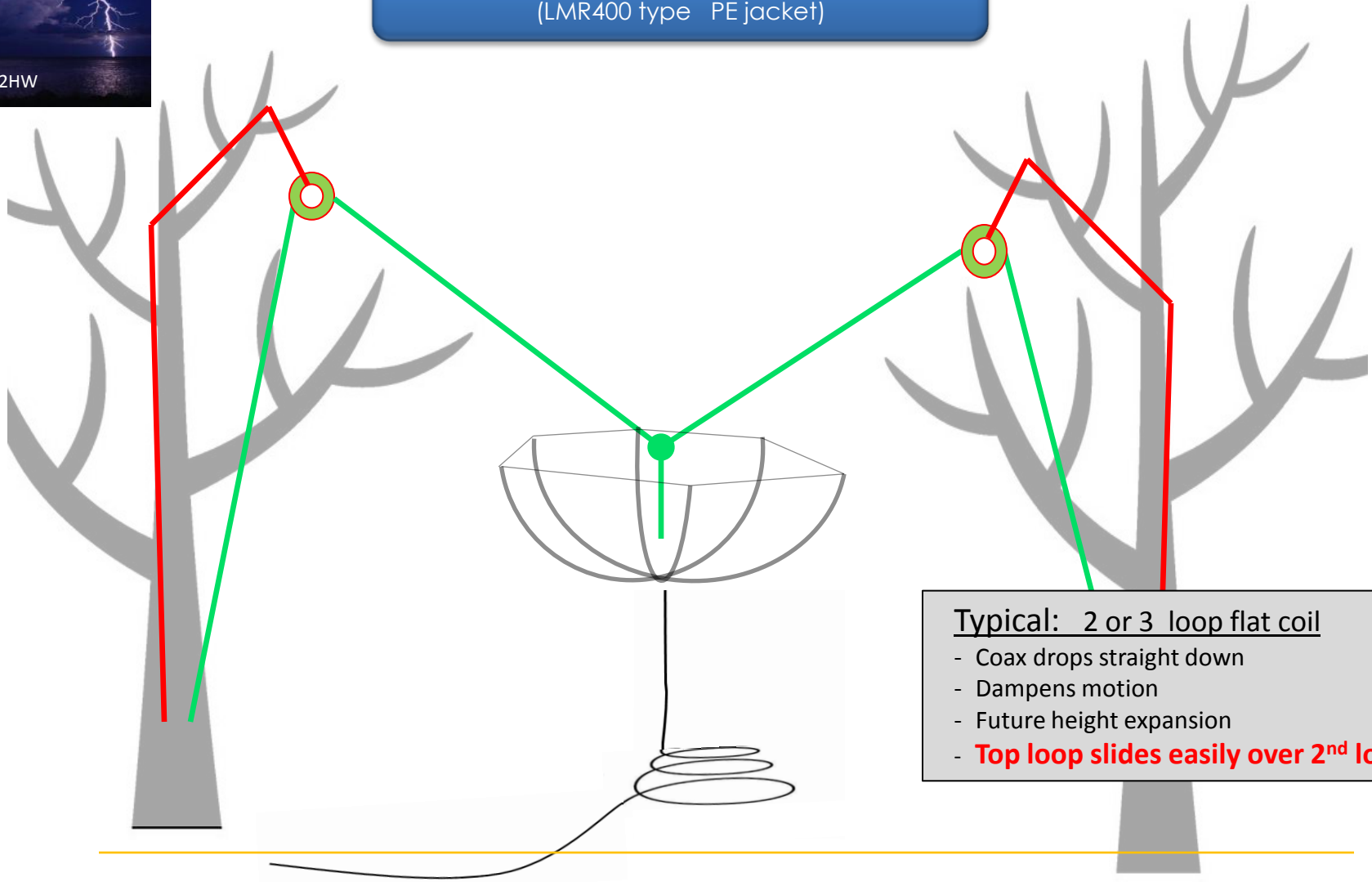
The 1-minute Lightning round!

A few other things... quickly





Feed line dressing
(LMR400 type PE jacket)



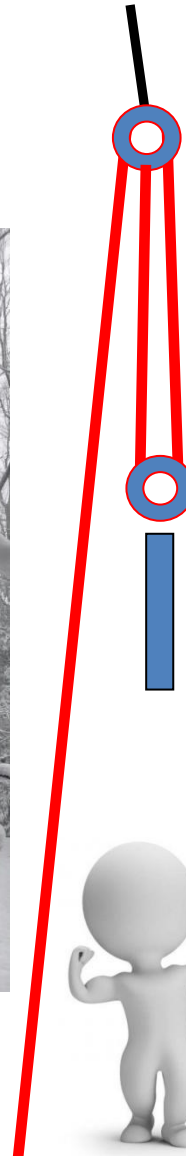
- Typical: 2 or 3 loop flat coil
- Coax drops straight down
 - Dampens motion
 - Future height expansion
 - **Top loop slides easily over 2nd loop**



The problem



Part of a solution



Mechanical Advantage

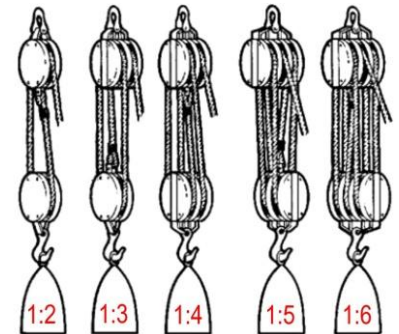
Pulley travels with the load !

2: 1

Antenna weighs
“about ½ as much”

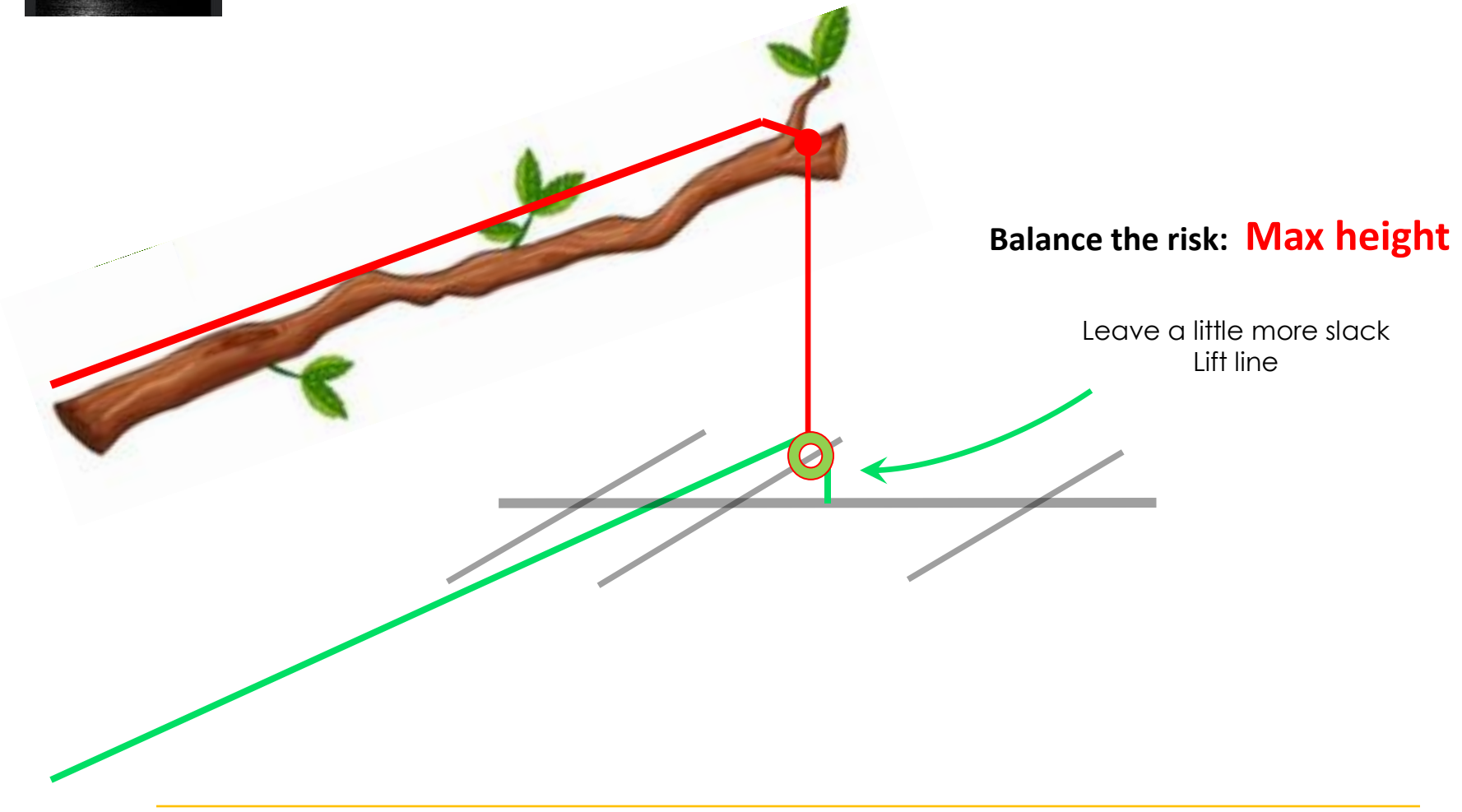
Costs:

- ✓ 1 extra pulley
- ✓ extra 45' rope
- ✓ 1 extra carabiner



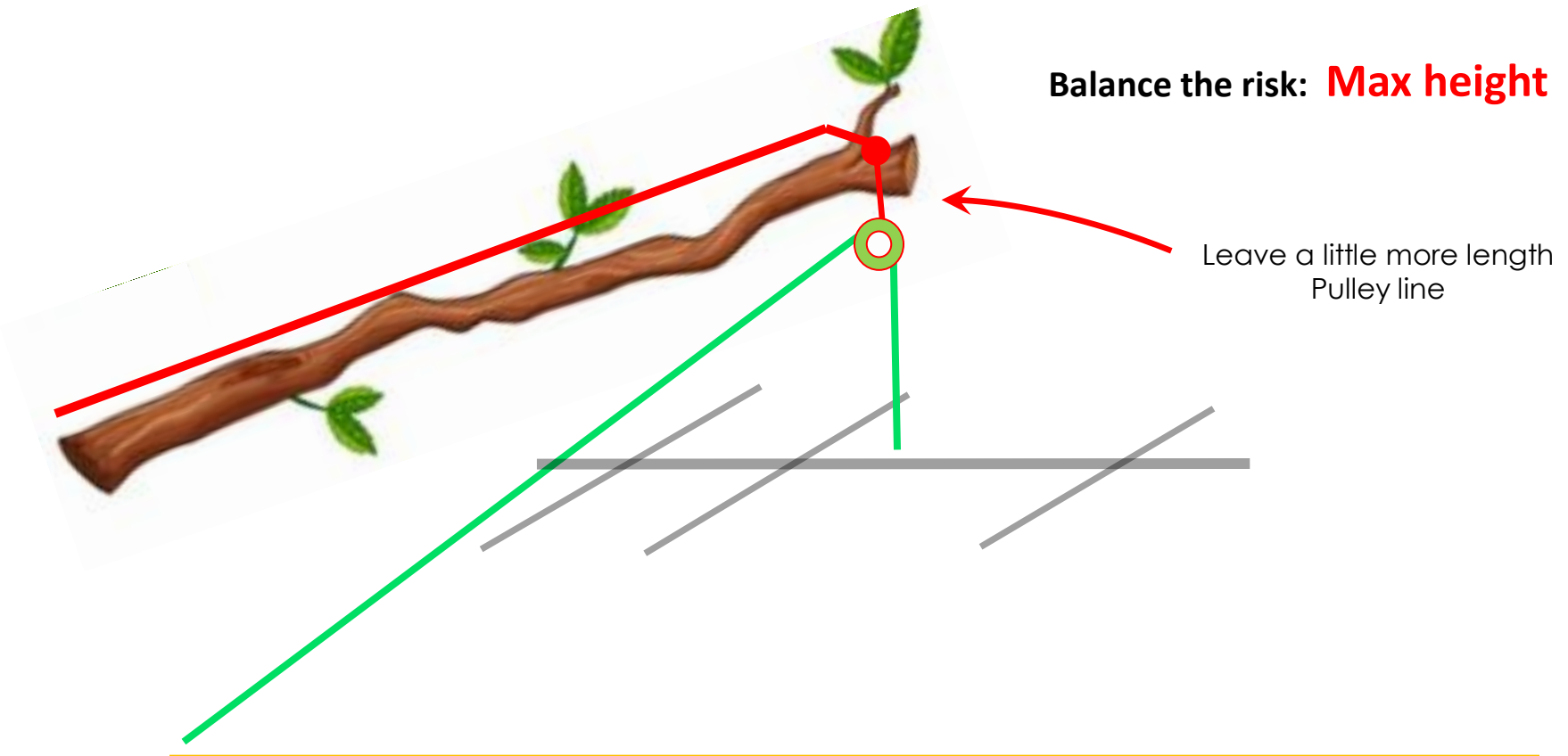


Get 'em up high...
but maybe not too high



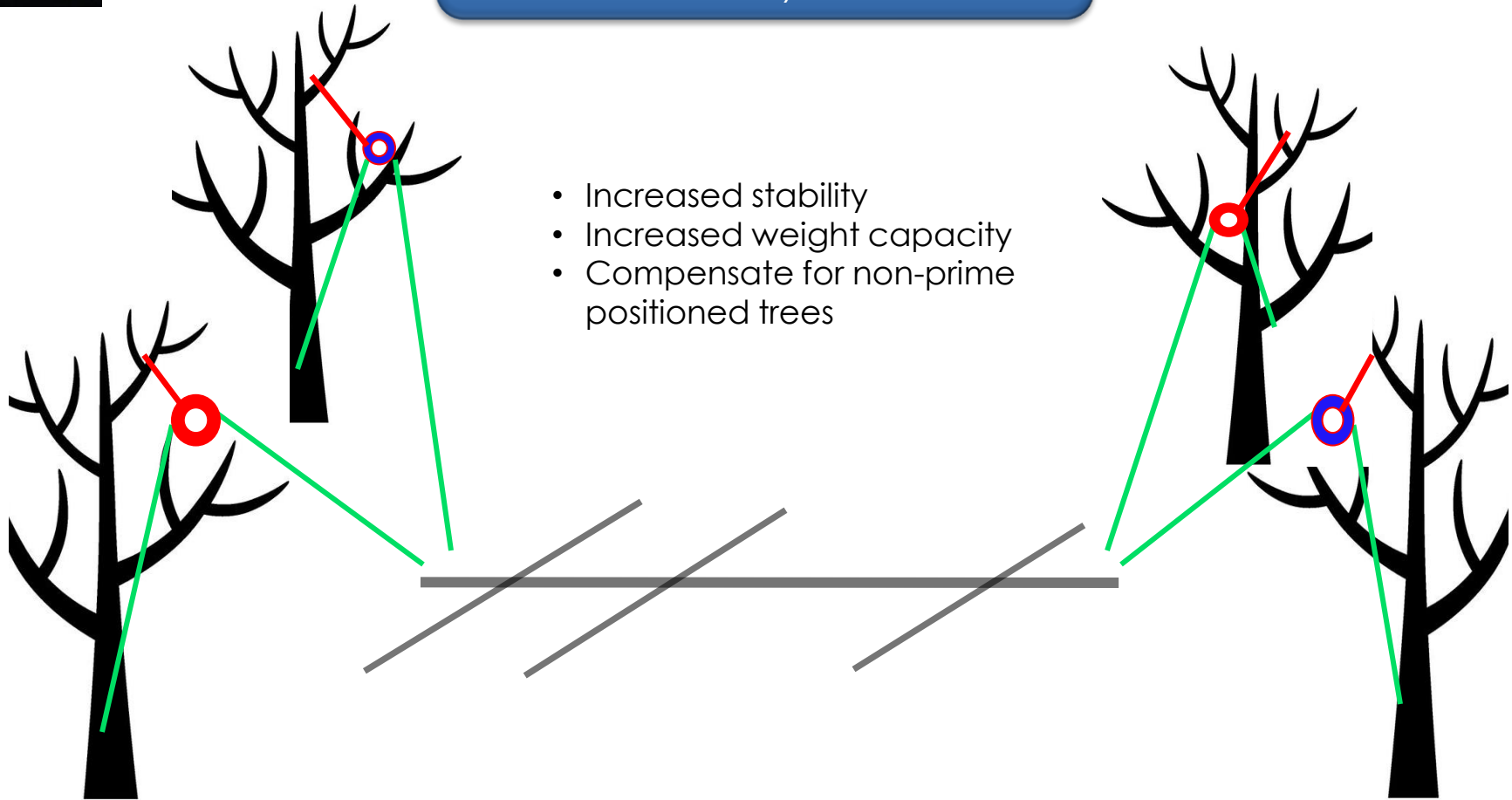


Get 'em up high...
but maybe not too high





2-point suspended
4 trees cradle
2 times Easy times 2

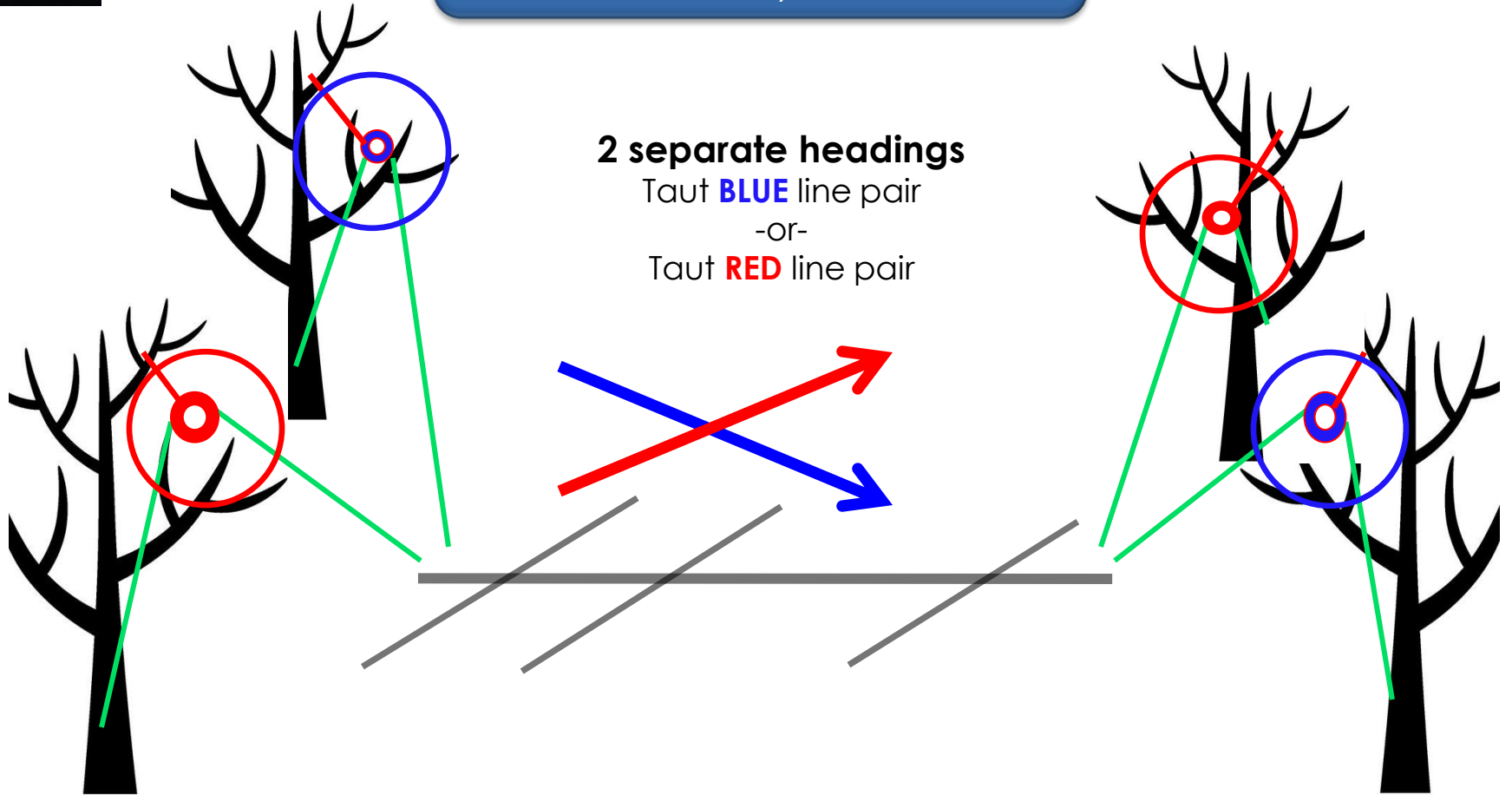


- Increased stability
- Increased weight capacity
- Compensate for non-prime positioned trees



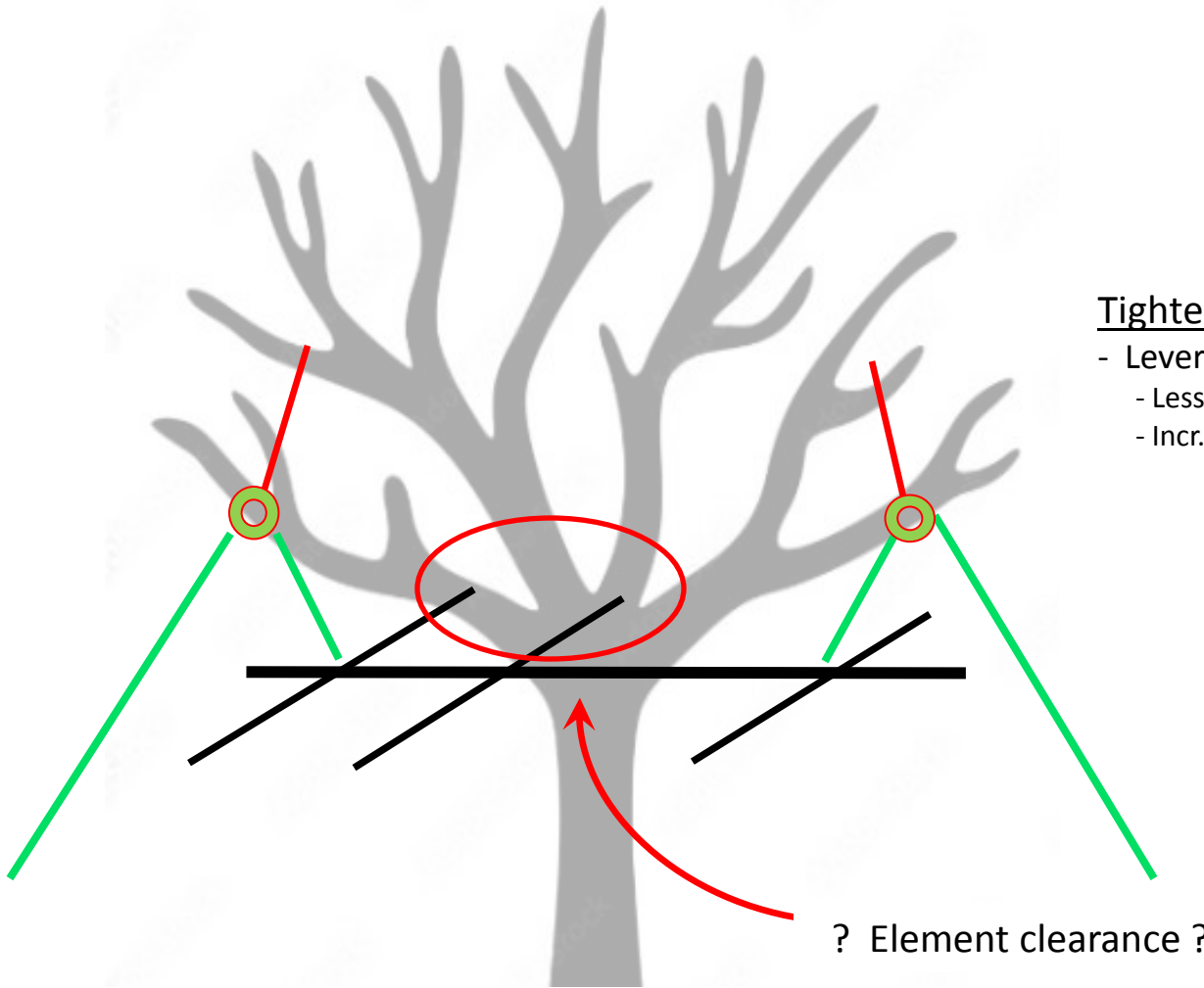
2-point suspended
4 trees cradle
2 times Easy times 2

2 separate headings
Taut **BLUE** line pair
-or-
Taut **RED** line pair





Alternative
2 pulleys in 1 tree



Tighter pulley spacing?

- Leverage stouter limbs
 - Less wind motion
 - Incr. weight capacity

? Element clearance ?



Sometimes you need to come at things
from a different angle...
Tram to avoid obstacle





Top Secret R&D Department

TOP SECRET

Opportunity !!

5 over 5 stack

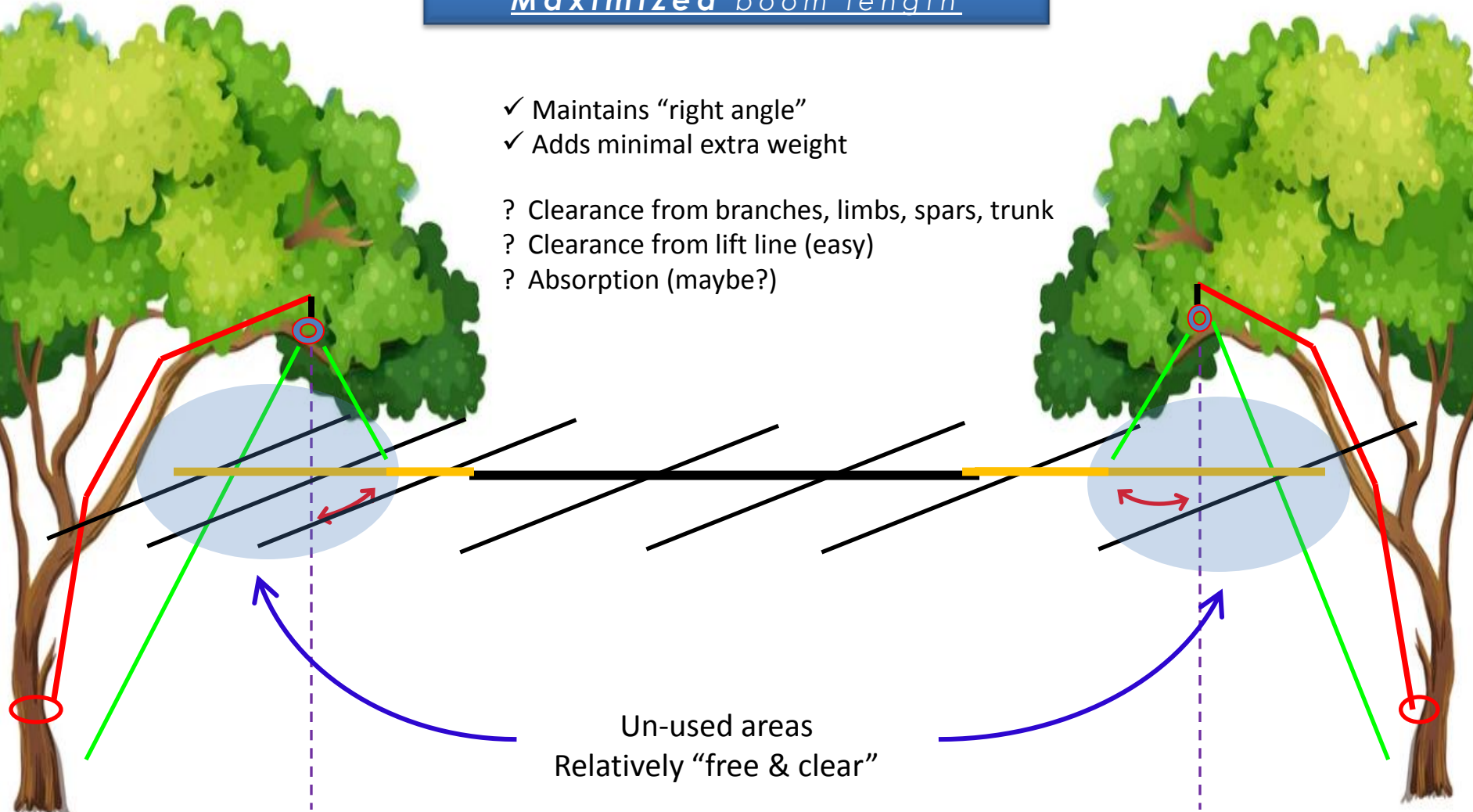
More db's to EU
More angles to EU

55'+

~40'

Technique: 2 trees 2 ropes 2 pulleys
Maximized boom length

- ✓ Maintains “right angle”
- ✓ Adds minimal extra weight
- ? Clearance from branches, limbs, spars, trunk
- ? Clearance from lift line (easy)
- ? Absorption (maybe?)



Un-used areas
Relatively “free & clear”



Not a hypothetical
Maximized boom length project

6'+/- free space available each end

At this height the yagi is under &
clear of the pine tree.



Wrap it up

Okay, okay I think I got it...

Effective Antennas without towers

Anything else?



- ✓ Home station build - 1st steps
 - ✓ Contest temporary
 - ✓ DXing
 - ✓ Field Day
 - ✓ POTA / SOTA
 - ✓ Experiment with something new
 - ✓ Special events
 - ✓ ECOM
 - ✓ Summer / Vacation QTH
 - ✓ DXpeditions
- ... and on & on ...

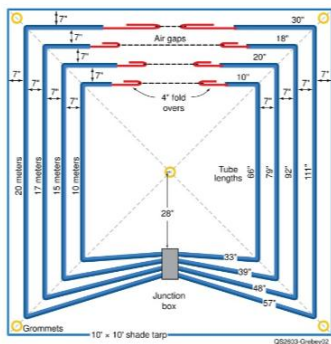


Figure 2 — The HF glove's layout.



Is this you....? These techniques can help

- ✓ *New Ham just getting going*
- ✓ *New QTH just starting your station*
- ✓ *HOA stealth limits*
- ✓ *Have a fully loaded tower*
- ✓ *Downsizing to a smaller footprint*

So maybe give it a try & put one (or more) up...

Key points:

- ✓ Under individual trees
- ✓ In between multiple trees
- ✓ Reduced WX exposure
- ✓ “Right angles”
- ✓ “Comfortable tension”
- ✓ “Above the boom”
- ✓ Fast & Easy
- ✓ Single handed
- ✓ Feet flat on the ground

Check List:

- ✓ Suitable spot
Viable limbs, height, clearance
- ✓ Cylinder
- ✓ Pulley line(s) Routing
- ✓ Connect & suspend
Single pulley / Two pulleys
- ✓ Lift line (mech advantage?)
- ✓ Tag line
- ✓ Feed line

Take a fresh look around your own backyard
and maybe see some new possibilities

Effective Antennas Without towers

Wires, Quads & Yagi antennas
in the trees

John Vogel, N1PGA

May 15, 2026