The stealth dish

An update...

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ARI Perugia
The stealth dish ... one year later
Why a stealth dish... : Challenges and advantages

CHALLENGES

✓ Accuracy and repeatability of positioning.
✓ Complex mechanism.
✓ Much higher overall weight.
✓ Stability.

ADVANTAGES

✓ Very easy access to the feeder and to the rotators.
✓ Fast feeder exchange.
✓ Lower overall profile when in «resting» position that minimize lightening risk.
✓ «One man» operation.
✓ Fast Az El movements that allows fast object tracking.
✓ «curiosity» minimization...
✓ .... Good sleep during thunderstorms ......
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*Why a stealth dish .... : a bit of history*

...... *From Braunau am Inn to Assisi*
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Mechanical design: tower design

- 5m dish.
- 0.5 f/D.
- Tilting mechanism based on standard (Bonfiglioli) motor gearbox.
- Manual movement easily upgradable to motorized.
- SPID BIG – RAS/HR Az El rotator.
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Mechanical design: tower design

- Counterbalancing weights with wheels to allow easy maintenance and safe resting position.
- Removable tower top that allows tower extension.
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Mechanical design: tower design
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*Mechanical design: tower design*

Very easy access to the focus point that allows easy maintenance and fast feeder exchange.
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Mechanical design: the plinth

<table>
<thead>
<tr>
<th>PLINTH CALCULATIONS</th>
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<tbody>
<tr>
<td><strong>Plinth</strong></td>
</tr>
<tr>
<td>Width</td>
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<tr>
<td>Lenght</td>
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<tr>
<td>Height</td>
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<tr>
<td>Specific weight of CLS</td>
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<td>Weight of plinth (stabilizing moment)</td>
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<table>
<thead>
<tr>
<th><strong>Antenna</strong></th>
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<tbody>
<tr>
<td>Dish diameter</td>
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<tr>
<td>Tower height</td>
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<tr>
<td>Tower weight</td>
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<tr>
<td>Rotatotor weight</td>
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<tr>
<td>Dish weight</td>
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<tr>
<td>Counterbalance weight</td>
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<tr>
<td>Extra weight due to snow</td>
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<tr>
<td>Dish area</td>
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<tr>
<td>Total weight</td>
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<table>
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<tr>
<th><strong>Wind</strong></th>
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<tr>
<td>Max wind velocity</td>
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<td>Cx</td>
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<tr>
<td>Wind load per m^2</td>
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<tr>
<td>Total force of wind</td>
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<th><strong>Safety factor</strong></th>
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<tbody>
<tr>
<td>Safety factor</td>
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<td>Tilting moment</td>
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System is stable
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Technical characteristics: the station

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Technical characteristics: the results

Calculations done with «Murmur» program to predict Pulsar detectability

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Technical characteristics: the results

PowerSDR
PstRotator
I0NAA PA Server
I1NDP doppler correction
WSJT10
Murmur

Echo with 250W.

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Mechanical stability of the dish holder block must be improved and a dampen mechanism to the rotator elevation should be added to avoid oscillation @ start-stop.
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Space for improvement: Automatic pointing

Pointing repeatability must be improved as incremental encoders (and moving tower) require at the beginning of each session a re-alignment of Az/El using sun noise. Square Spiral Search Pattern program is in development, but most likely absolute encoders will be the final fix.

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Some caveat ..... 

BIG DISHES ARE VERY INTERESTING TOOLS AND CAN GENERATE A LOT OF STIMULATING IDEAS .... BUT BE CAREFUL .. CAN ALSO BE VERY DANGEROUS .....
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Some caveat .....
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Thank you!