

SKA-AAVP



Aperture Array Verification Programme

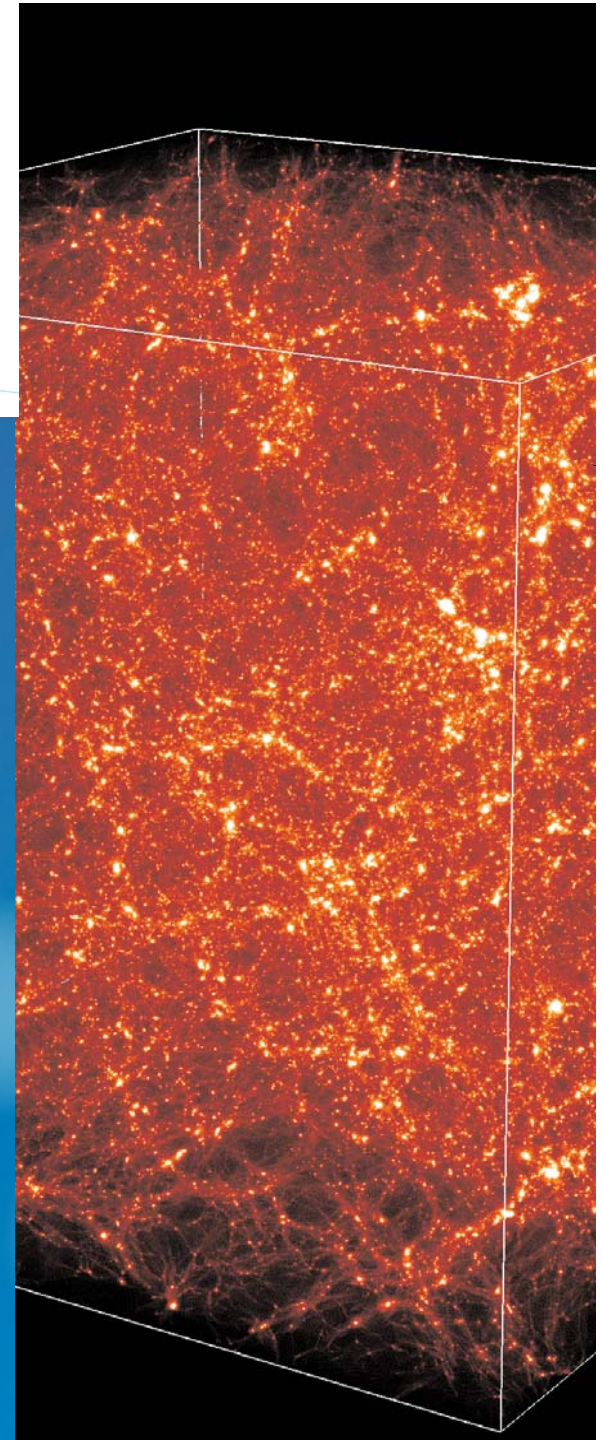
Pre-industrial phase  
**VIVALDI Antenna**



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- COSPAL Composites Srl -  
*VIVALDI Antenna*  
23th October 2012

*Large antennas &  
Radio Telescopes*



*Aluminum  
composite  
panel*



*Surface treatments of  
Aluminum for Aeronautic  
Industry*



*Manufacturing & Machining  
of Aluminum Structures*



*BUSINESS FIELD*





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*VIVALDI Antenna*  
23th October 2012

## *Large antennas & Radio Telescopes*

- Recent project -

COSPAL Composites supplied  
Main reflector panels, subreflector  
& BWG mirrors for

### *Sardinia Radio Telescope 64m*





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23th October 2012

# *Large antennas & Radio Telescopes*

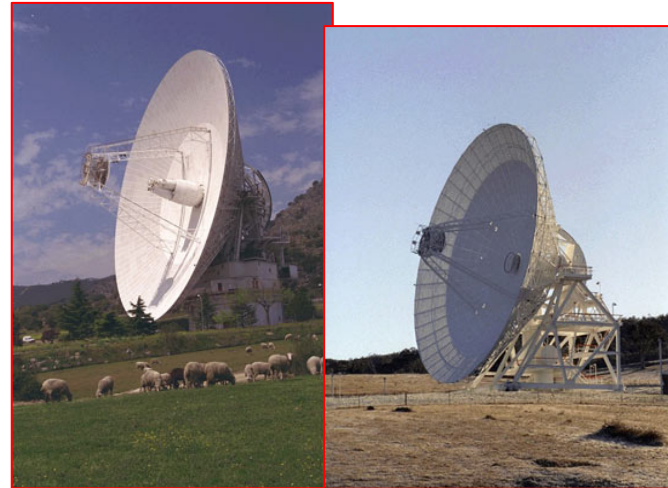
- Recent project -

COSPAL Composites is the supplier of  
Main reflector panels & BWG mirrors for

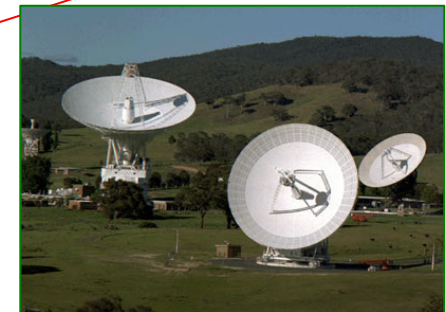
## *NASA Deep Space Network*



70m & 34m antennas  
Goldstone (USA)



70m & 34m antennas - Madrid (Spain)



70m & 34m antennas  
Camberra - Australia





# *Large antennas & Radio Telescopes*

- Recent project -

**40m antenna IGN (Spain)**



**18,3 antennas (White Sand - USA)**

**Polar Bear Telescope (USA)**



**KVN 21m antennas (Korea)**

**13m reflector (USA)**



**4,5m transportable (Spain)**



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## *Aluminum composite panels*

- Production capabilities -



Approx 50.000 Mq. per year (one shift)

- Thickness range from 6 mm up to 120mm
- Max panel dimensions (single piece) 1500x7000mm
- Max panel dimensions (with junction) 2500x7000mm
- Different type of cores (foams or aluminum honeycomb)
- Different type of skins (Aluminium and stainless steel)
- Different type of aluminium (skin thickness)
- Different type of finishing (pre-painted alu skins)



## *Aluminum composite panels*

- Main applications -

- Floors for high speed trains (customized product)
- Floors & roofs for bus (up to 2.4 x 12m single piece)
- Access platforms for special applications
- Composite Structures for Machines and Instruments
- Floors and walls for clean rooms, vehicles, buildings, ...



# *VIVALDI antenna*

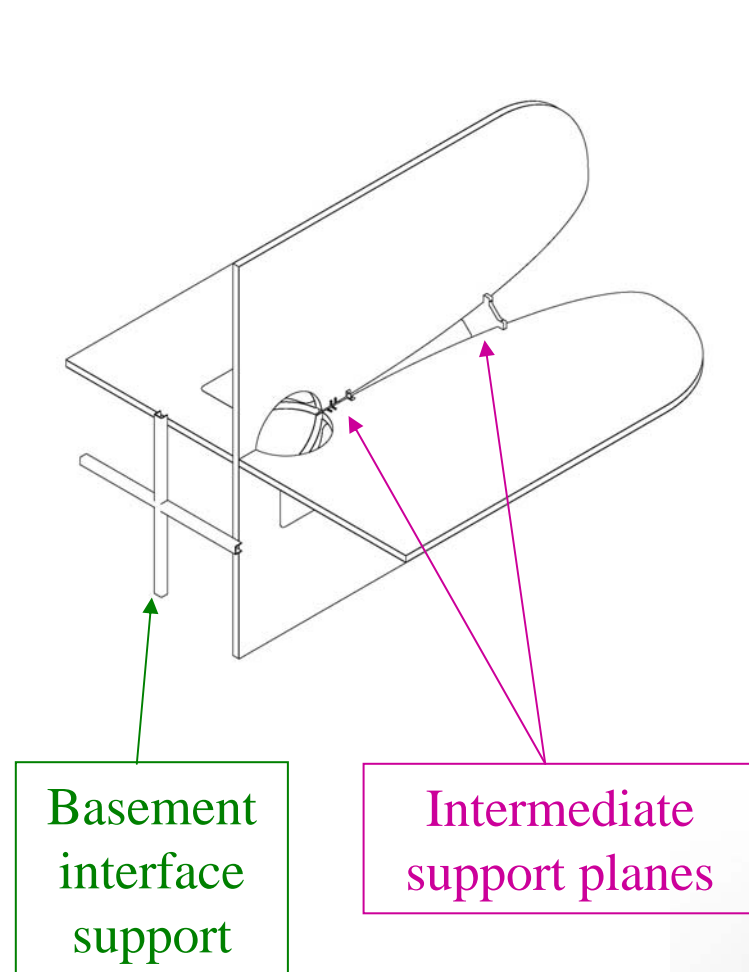


## **R E Q U I R E M E N T S**

- 1) Target price < 200€per piece
- 2) Series production > 10.000 antennas (AAVS1 target)
- 3) Low non-recurring costs
- 4) Resistance to desert environmental conditions (dust & temperature -  $20^{\circ}\text{C} < T < 60^{\circ}\text{C}$ ) & UV radiation
- 5) Installation operations: easy & fast deploy & alignment < 10min per element
- 6) Shipping operations: easy storage - large quantities transportable
- 7) High wind resistance - Strong stability of antenna installed >60Km/h (operating) > 150Km/h (survival)
- 8) Shielded pocket for RF circuitry protection

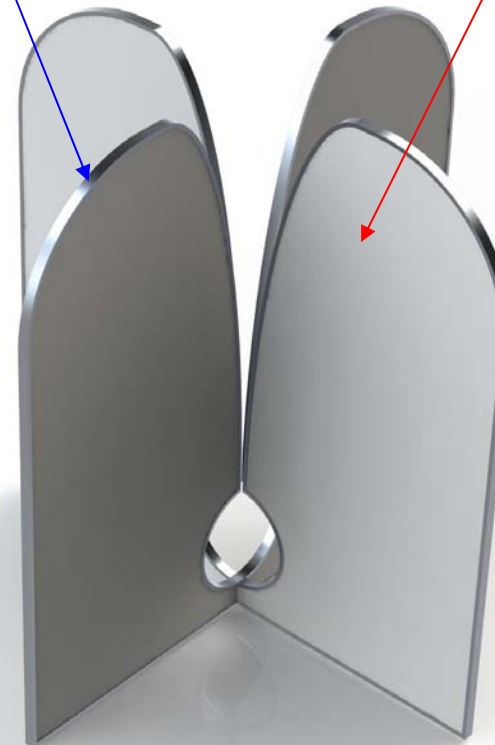


# *VIVALDI antenna*



Aluminum Frame  
Border Profiles

Aluminum  
composite  
panels



# *VIVALDI antenna*



## Aluminum composite panels

- Bonded & Machined
- Low cost foam core with closed cells
- Glue for desert environmental conditions

## Preformed frame Border profiles





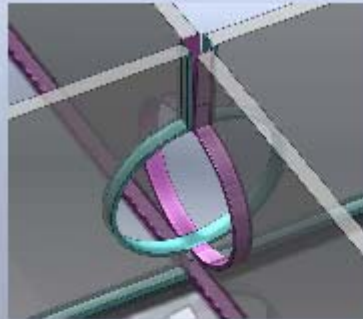
- COSPAL Composites Srl -  
*VIVALDI Antenna*  
23th October 2012



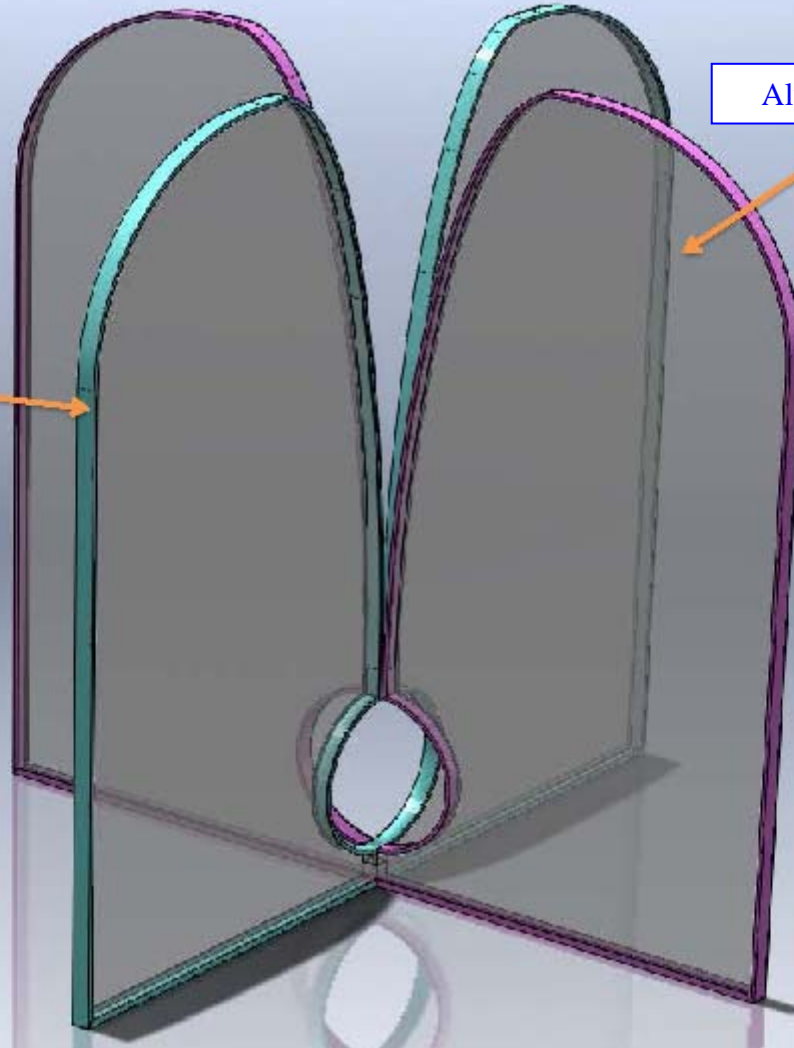
# *VIVALDI antenna*



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Preformed frame  
Border profiles  
obtained using "C"  
profiles deformed as  
per drawing on CNC  
machine



Aluminum composite panels



# *VIVALDI antenna*



## ***COST***

### ***BREAK-DOWN***

Foam core solution

1) Panels	87€
2) Curved profiles	25€
3) Panels machining	18€
4) Profiles fixation	28€
5) Packaging	5€
6) Miscellaneous	16€

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Total 179€

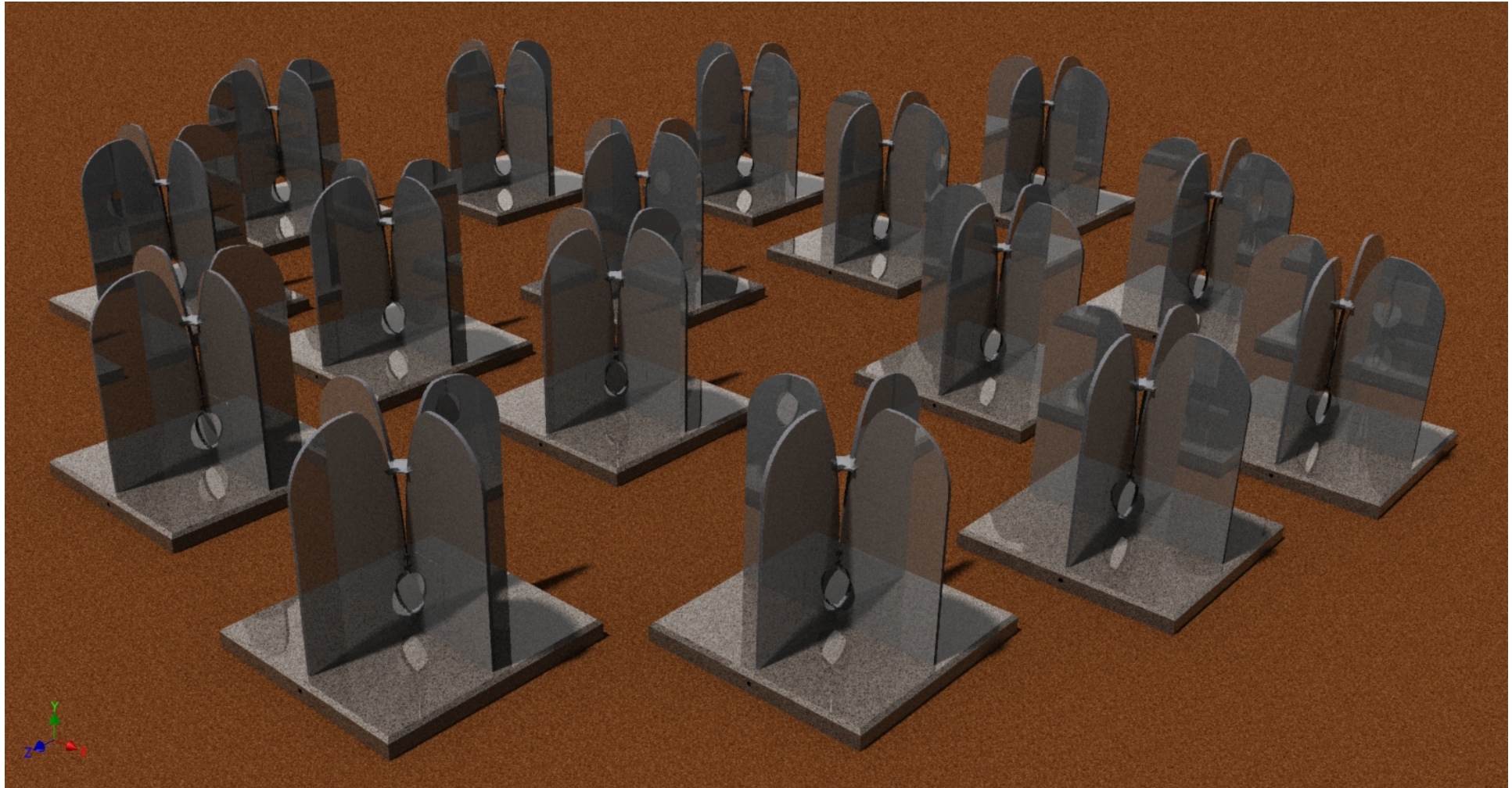
10% profit 17€

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Final cost 196€

# *VIVALDI antenna*



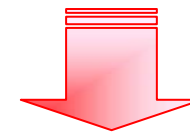


It could be provided a basement interface support with optical target in order to minimize the overall cost of deployment without worse the positional accuracy

# *VIVALDI antenna*



Solution with  
aluminum foam  
composite panels +  
aluminum frame  
border profiles



Ready for starting the  
production in a short  
time

# *VIVALDI antenna*



We are now working in order to achieve the next requirements for the full deployment phase

-Production rate  $> 100.000$  pieces per year

- Target Price  $< 70$  Euro/each



# *VIVALDI antenna*

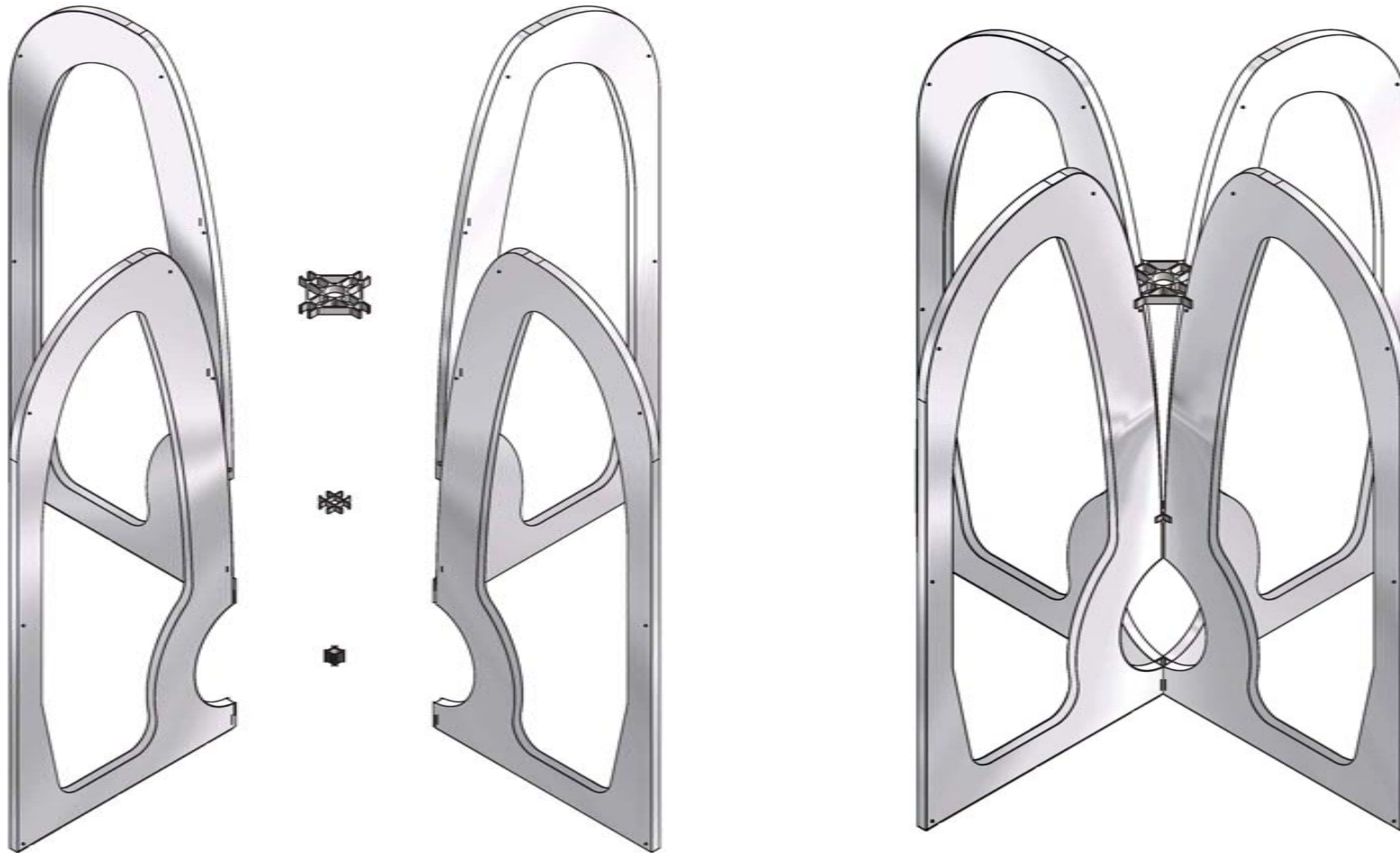


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Aluminum curved Profiles concept

# *VIVALDI antenna*



Stamped Aluminum sheets concept