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# Medusa

## The CEA Irfu team

February 23<sup>rd</sup>, 2009

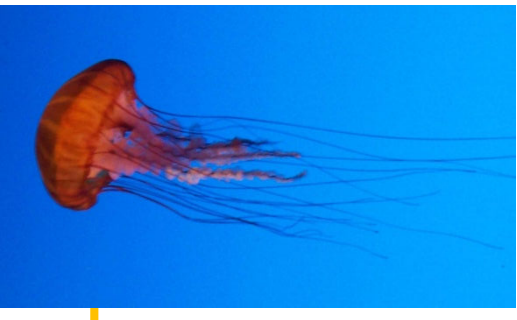
*S. Anvar, J. Ballet, F. Château, E. Delagnes, F. Druillole, A. Druilhe, G. Decock, D. Durand, R. Durand, V. Gautard, J. Giraud, F. Guilloux, M. Karolak, P. Lamare, H. Le Provost, S. Loucatos, F. Louis, P. Magnier, E. Monmarthe, L. Moscoso, Ch. Naumann, Ch. Rabouille\*, Th. Stolarczyk, B. Vallage, G. Vannoni, P. Vernin, E. Zonca*

\* CEA/DSM/LCSE



# What is Medusa ?

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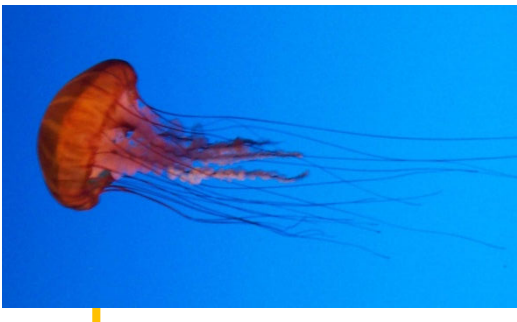
- Medusa is not a Jelly Fish !
  - *Méduse* in french, *medusa* in italian



# What is Medusa ?

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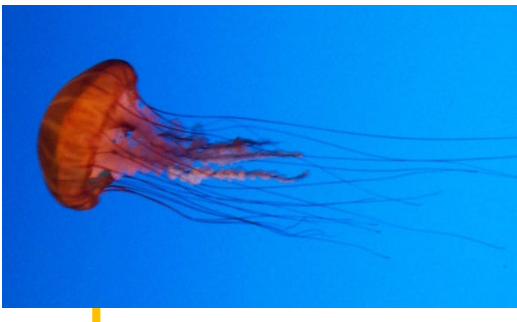
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- In Greek mythology, Medusa is a gorgon



# What is Medusa ?

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- Medusa is not a Jelly Fish !
  - *Méduse* in french, *medusa* in italian
- In Greek mythology, Medusa is a gorgon
- Medusa is a symbol of Sicily



# What is Medusa ?

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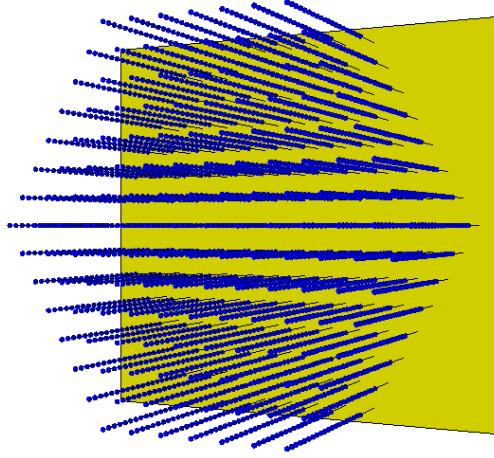
An acronym for our (CEA) idea of a km<sup>3</sup> detector

**MEDiterranean**

**Unders**ea

**String**

**Architecture**



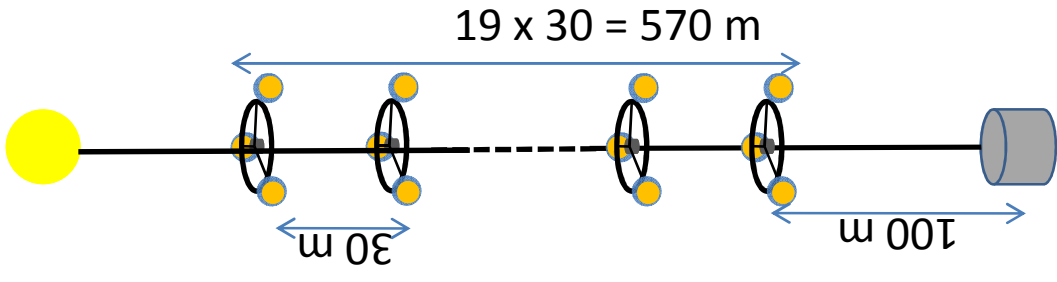
# Medusa philosophy

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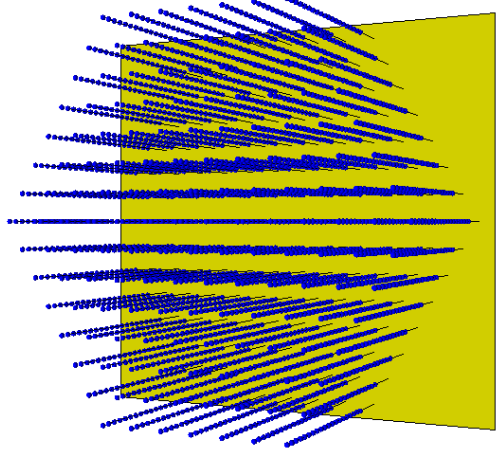
- Based on Antares
- Keep concepts that were successful
  - Architecture
    - Strings : Easy to transport and deploy
    - Electro-mechanical cable with fiber optics for data transmission
  - Make some parts evolve from our return of experience
    - 6 REX achieved : OM, Readout, Front-end, Electro-optical cables, Interconnection links, Line integration.
- **(Obviously) keep in mind cost reduction**
  - Material cost (Investment)
  - Time of development and construction (Manpower)
  - Time for deployment

# Medusa global view

To be optimised (WP2)



- Layout
  - Hexagonal
  - 154 strings
  - Spaced 95 m
- String
  - First storey : 100 m
  - 20 storeys
    - Betw. Storeys : 30m
    - Total height : 670 m\*
  - Each storey
    - 3 Optical Modules (OM)
    - 40 cm from the string axis



\*Too high ?

# Medusa strings

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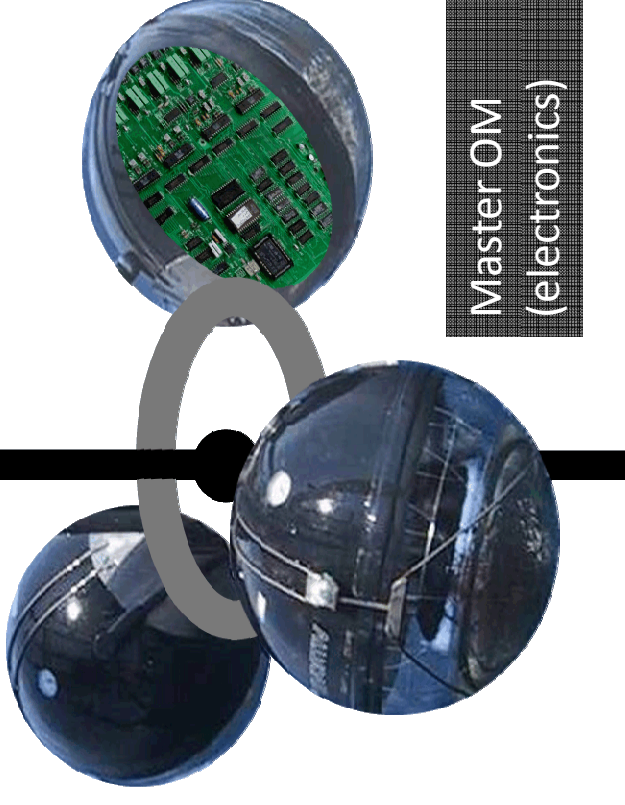
Many aspects still to be optimised or studied

- **Deployment**
  - From sea bed
  - (or keep Antares method?)
- **Mechanics**
  - Buoy : syntactic foam
  - Passive anchor
    - concrete, transportation frame?
  - Storey mechanical frame
    - Titanium or aluminium ?
  - Electro-mechanical cable
  - 4 segments of 5 storeys
- **Data transmission**
  - DWDM optical all along the chain
  - 10 fibres at maximum in backbone
    - Ethernet protocol
    - Clock on data fibre
  - Connectics
    - Connectors on segments
    - Connectors and splices for storeys
- **Calibration devices**
  - Depends on further studies, Antares data taking return of experience

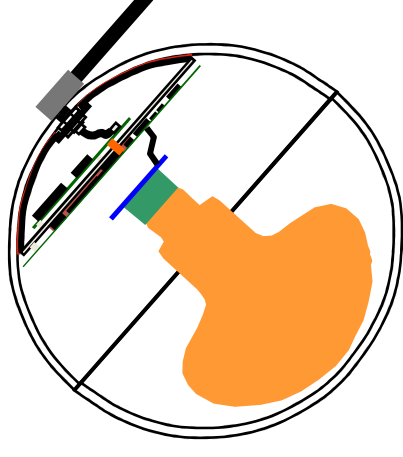


# Medusa Storey

- 2+1 Optical modules
  - 17'' glass spheres
    - No valve
  - 10'' PMs
    - 45° downward looking
- Master OM : Electronics
  - Front-end electronics
  - Readout / slow control
  - Power dissipation
    - up to 12 W permitted
  - Instrumentation

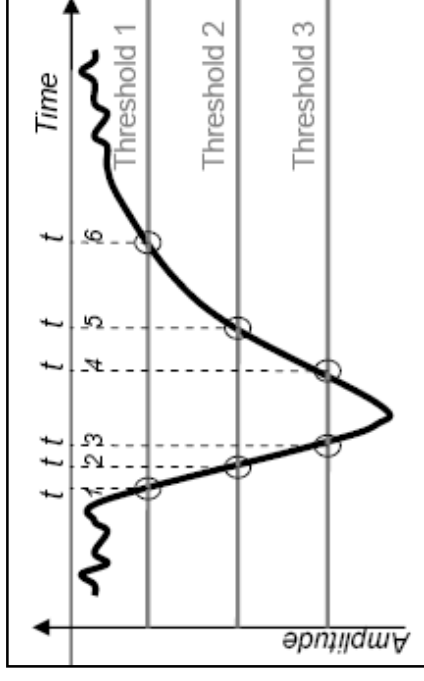
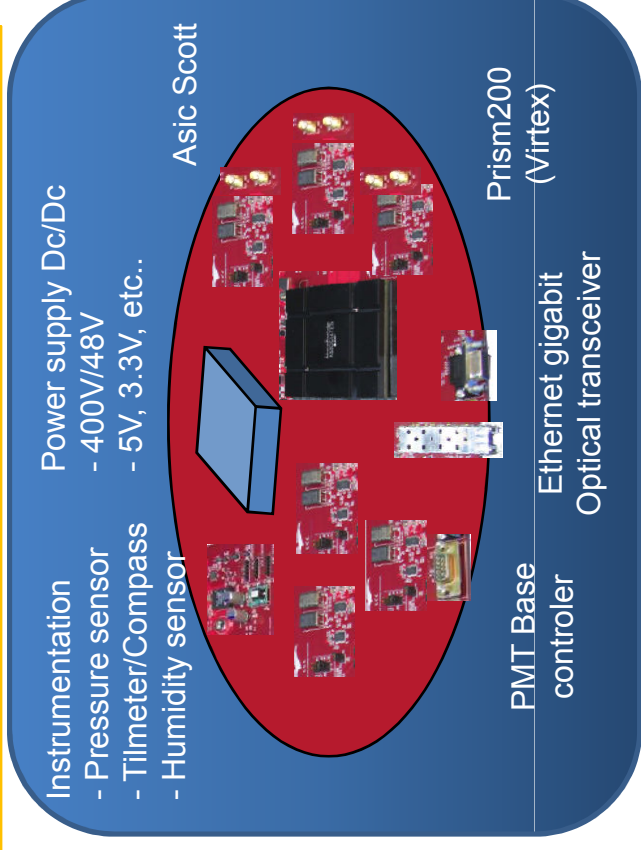


Master OM  
(electronics)



# Medusa Master OM

- A single electronic board
  - Annular board (KOALA)
- Front-end
  - ASIC : Scott - See Fabrice's presentation
- Readout / slow control
  - System on chip
  - OS : VxWorks (or Linux?)



# Medusa

## MEDiterranean Undersea String Architecture

- Discussions needed for some aspects
  - Improvement of existing
  - Alternative solutions ?
- Cost estimate still to be done
  - Already cheaper than Antares
- Information and more details in
  - **Medusa** PBS
  - Various presentations
  - Document in preparation

