

WOS000 Toulon 25-09-19

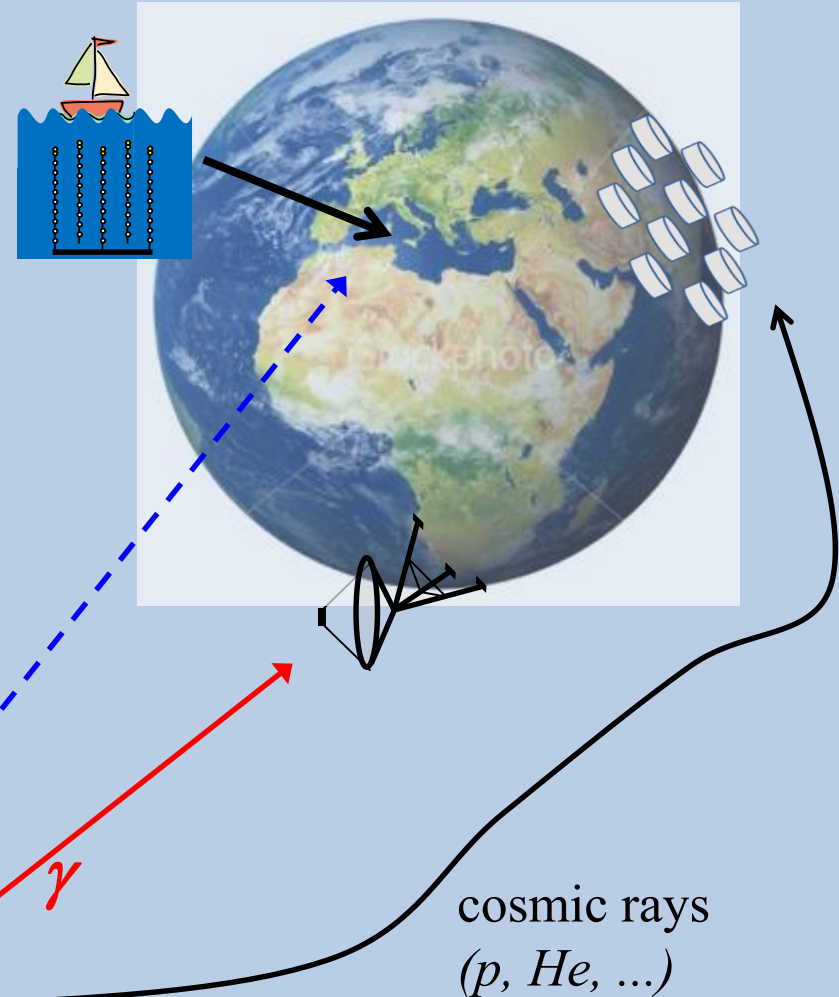
Risk Management in Marine and Subsea Operations

Example KM3NET Marine Operations Italy

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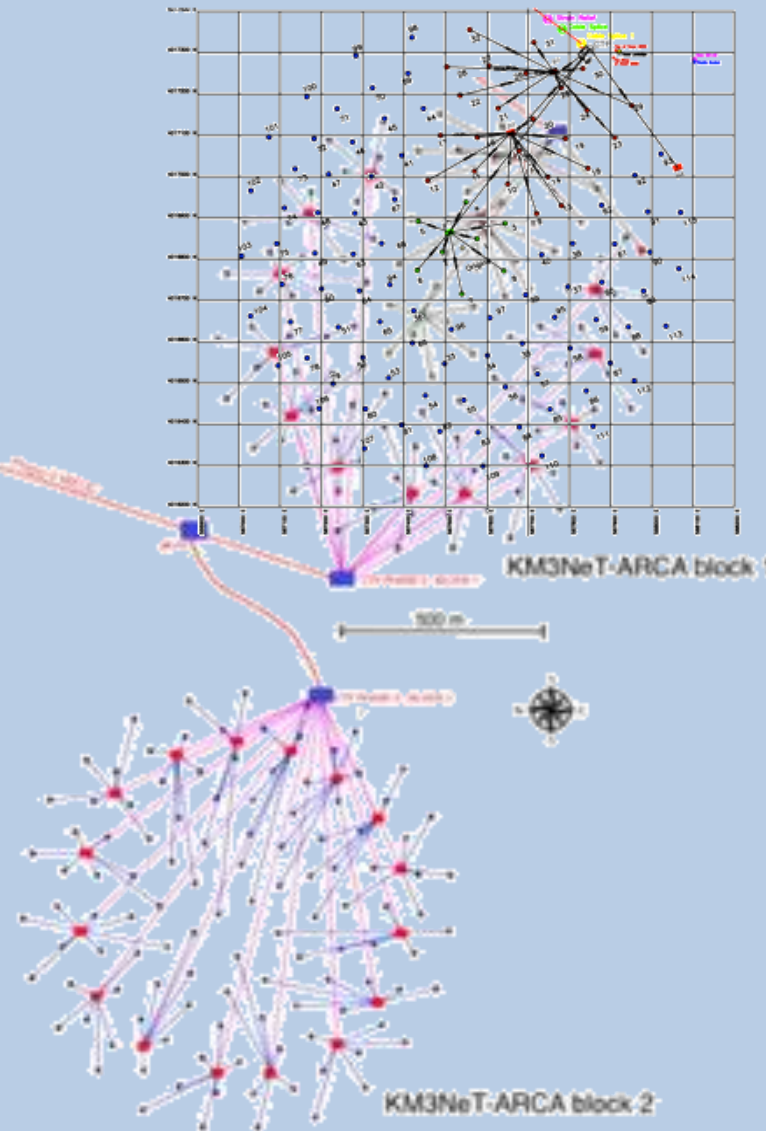
Neutrino telescope for high-energy astrophysics

- Use neutrinos to unambiguously identify sites of hadronic acceleration in the Cosmos
- Build a very large Cherenkov detector in a deep transparent medium (water or ice)
 - The Mediterranean Sea has been chosen to look at the Galactic Plane and the Galactic Centre (based on very good angular resolution)
 - Ionina Sea has been chosen for the huge plain area at 3500 m water-depth, no 'life', low current, only 100km off the coast





KM3NeT Detector/Telescope





Risk Management in Marine and Subsea Operations

- Consider RM as a **positive influence** rather than a restrictive constraint on progress.
- Assess risk already at **conceptual design stages**.
- Marine operations and objects should be designed with consideration to resisting **characteristic loads** and conditions as well as be **practicable and safe**.
- The planning process should address **redundancy and backup philosophies**.



Risk Management in Marine and Subsea Operations

- RM and reduction in practise means that all personnel participating in preparations and execution of marine operations should actively seek to minimize risk **as far as practicable** through **preventive operational planning, selecting safe solutions, robust designs** etc.
- Principles of risk management are considered a **mind-set**.
- Risk reducing actions should be based on subjective **cost-benefit assessments**.
- **Key personnel** involved in operations planning, defining criteria, assessing risk and categorizing of operations **must be familiar** with the practical and theoretical aspects of the intended operations



RM Marine and Subsea Operations - Example

Two line policy

A ROV is deployed or in the water and at the same time a structure is lowered to or lifted from the sea floor. This deployment strategy is sometimes refused by the vessel operator (mainly scientific operators) based on the increased risk of entanglement of the lines and resulting downtime and or loss of equipment.

Advantages

- Eyes on the ground and the equipment +++
- Directly influence the deployment +++
- Position structures with highest precision ++
- Soft to equipment +
- Time saving potential +++



RM Marine and Subsea Operations - Example

Risk mitigation two line policy

- Planning of the operations according to recognised standards

Preparation of a Marine Operations Manual as per DNV RP-H101

- Use of recognised technical standards and adequate marine verification

Upfront analysis of all components involved. Ship system (especially survey capacity), ROV (LARS, Umbilical, TMS), HLL (rigging, type), Back deck and Equipment (weight, dimensions, lifting behaviour)

- Coordination and communication

The key to success is a well organised and coordinated crew that is working to a 'primus inter pares' principle and recognises the other parties skills and capabilities.


- Execution by and presence of qualified personnel during the operations



Risk Matrix

Risk Rating = Likelihood x Severity

Severity		Likelihood				
		1	2	3	4	5
S e v e r i t y	Catastrophic	5	10	15	20	25
	Significant	4	8	12	16	20
	Moderate	3	6	9	12	15
	Low	2	4	6	8	10
	Negligible	1	2	3	4	5
		1	2	3	4	5
		Improbable	Remote	Occasional	Probable	Frequent

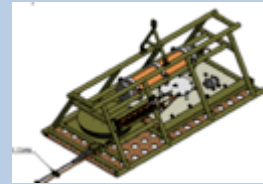
- Catastrophic  STOP
- Unacceptable  URGENT ACTION
- Undesirable  ACTION
- Acceptable  MONITOR
- Desirable  NO ACTION



Backup



Tools and Equipment



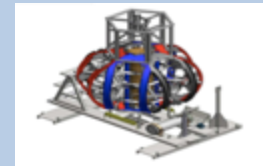
Cable Termination Frame - CTF



Junction Box - JB



Interlink Cables - IL
IL dry (CTF – JB) up to 600 m
IL oil (JB – DU) up to 300 m



String - S 1000x



Cable Tray - CT

- Multi Service Vessel
- 30 t hydraulic A-Frame or Crane
4500m lift line
- Heavy work class ROV rated up
to 4500 mwd
- DP2
- Two line policy

Deployment of a DU

