WP2 status

Paris, 15/10/2008

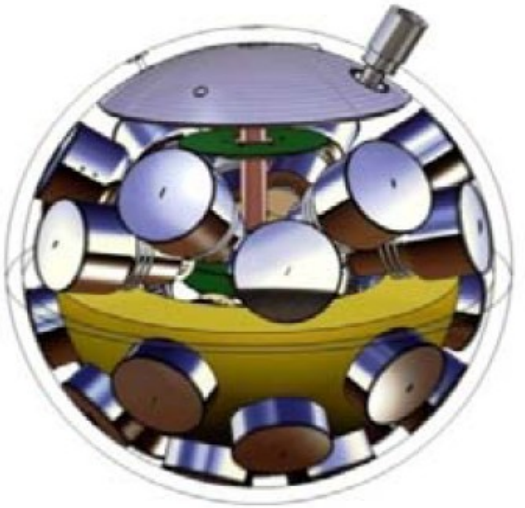
JP Ernenwein

Available inputs :

"String" Designs

Summary for simulation

Detection Unit (DU)	Parameter in simulation	Improved Antares String Design (default values)	Cabled Design (default values)
Total length DU	yes	600 m	600 m
Height lowest storey	yes	100 m	100 m
Distance between DUs	yes	95 m	95 m
Distance between storeys	yes	25 m	25 m
# OM per storey		3	1
Outer diameter glass vessel	yes	432 mm	432 mm
Inner diameter glass vessel	yes	404 mm	404 mm
Breaking index glass		1.472	1.472
Breaking index optical interface		-	-
Thickness optical interface		-	~ 2 mm
# PMTs per OM		1	31
Diameter PMT		10"	3"
Q.E. PMT (nominal) See wavelength dependence in figures below	yes	32%	42%
L0 definition		Threshold of 0.3 spe	Threshold of 0.3 spe
L1-a definition		L0 in two OMs at the same storey within 20 ns	L0 in two adjacent PMTs in the same OM within 10 ns
L1-a Purity		100%	100%
L1-a Efficiency		100%	100%
L1-b definition		Threshold of 3 spe in one OM	-
L1-b Purity		95%	-
L1-b Efficiency		~25%	-



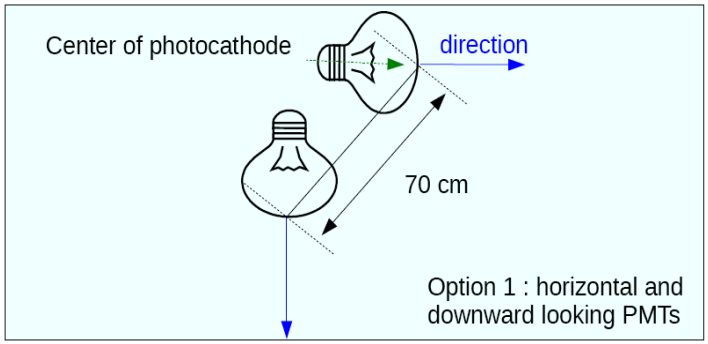
Els et al talks

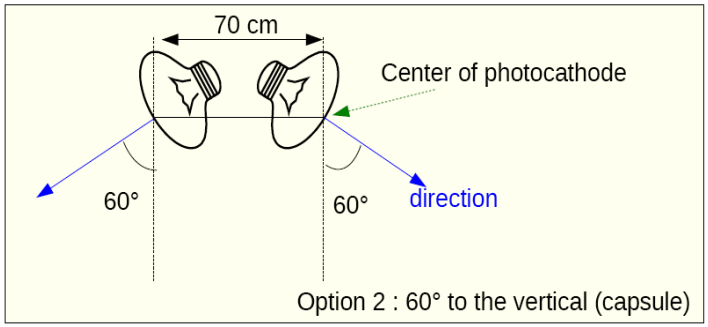
Preliminary, V3.4 14/10/2008

Available inputs :

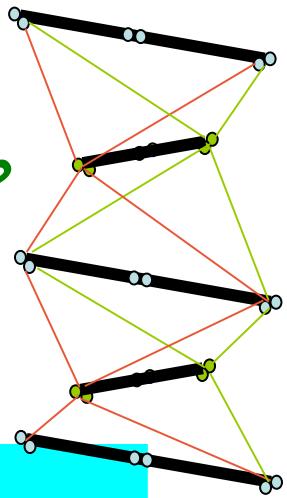
"Tower" Design

Parameter	Value
Number of towers	91
Distance between towers	130 m ; 150 m
Layout	Uniform hexagon (figure 3, table 2)
Height of the lowest storey	100 m
$(N_{storeys}, D_{between\ storeys}, L_{arm})_{instrumented\ height}$ (m)	$(20,30,8)_{570}$; $(16,40,10)_{600}$; $(20,30,6)_{570}$: Perpendicular arms
Number of PMTs per storey	4 ; 6 ; 8
Arrangement of PMTs in a storey	Pairs regularly positioned along the arm
Orientation of PMTS	A pair = 1 horizontal+ 1 downwards looking PMT A pair = 60° looking downward for each PMT (figure 4)
Size of PMTs	8" or 10"
Angular acceptance of PMTs	ANTARES one (Genova measurements)
Electronics resolution (mainly PMT TTS)	1.5 ns
2 hits time separation	25 ns
Dynamic range	100 pe/25 ns; tests of higher values for muons and showers.
QE of PMTs	35% (eg Photonis XP1804 or Hamamatsu R7081)
L0 definition	Amplitude > 1/3 pe
L1 definition	Coincidence within 20 ns ($\Delta t<20$ ns) or Q > 3pe
T3 definition	2L1 on one storey within 50-100 ns
Reconstruction strategy	Two independent reconstruction strategies
Angular resolution and Effective area	Computed under the condition that the atmospheric muon background is less than 10% of the atmospheric neutrino signal
Physics criterion	E^{-2} point source fluxes sensitivity Dark matter sensitivity
Physics criterion	E^{-2} diffuse flux sensitivity, for muon neutrinos and for electron neutrinos





PMTs orientations and typical distances



Paolo et al talks

Preliminary, 14/10/2008

Comparison between designs : tools and criteria

L0 definition	Amplitude > 1/3 pe
L1 definition	Coincidence within 20 ns ($\Delta t<20$ ns) or Q > 3pe
T3 definition	2L1 on one storey within 50-100 ns
Reconstruction strategy	Two independent reconstruction strategies **At least**
Angular resolution and Effective area	Computed under the condition that the atmospheric muon background is less than 10% of the atmospheric neutrino signal
Physics criterion	E^{-2} point source fluxes sensitivity Dark matter sensitivity
Physics criterion	E^{-2} diffuse flux sensitivity, for muon neutrinos and for electron neutrinos

Comparison between designs : softwares

String Design

Tower Design

Optimization with 1 software comparison with at least 2

The final optimization will include atmospheric muons background, at 3 depths.

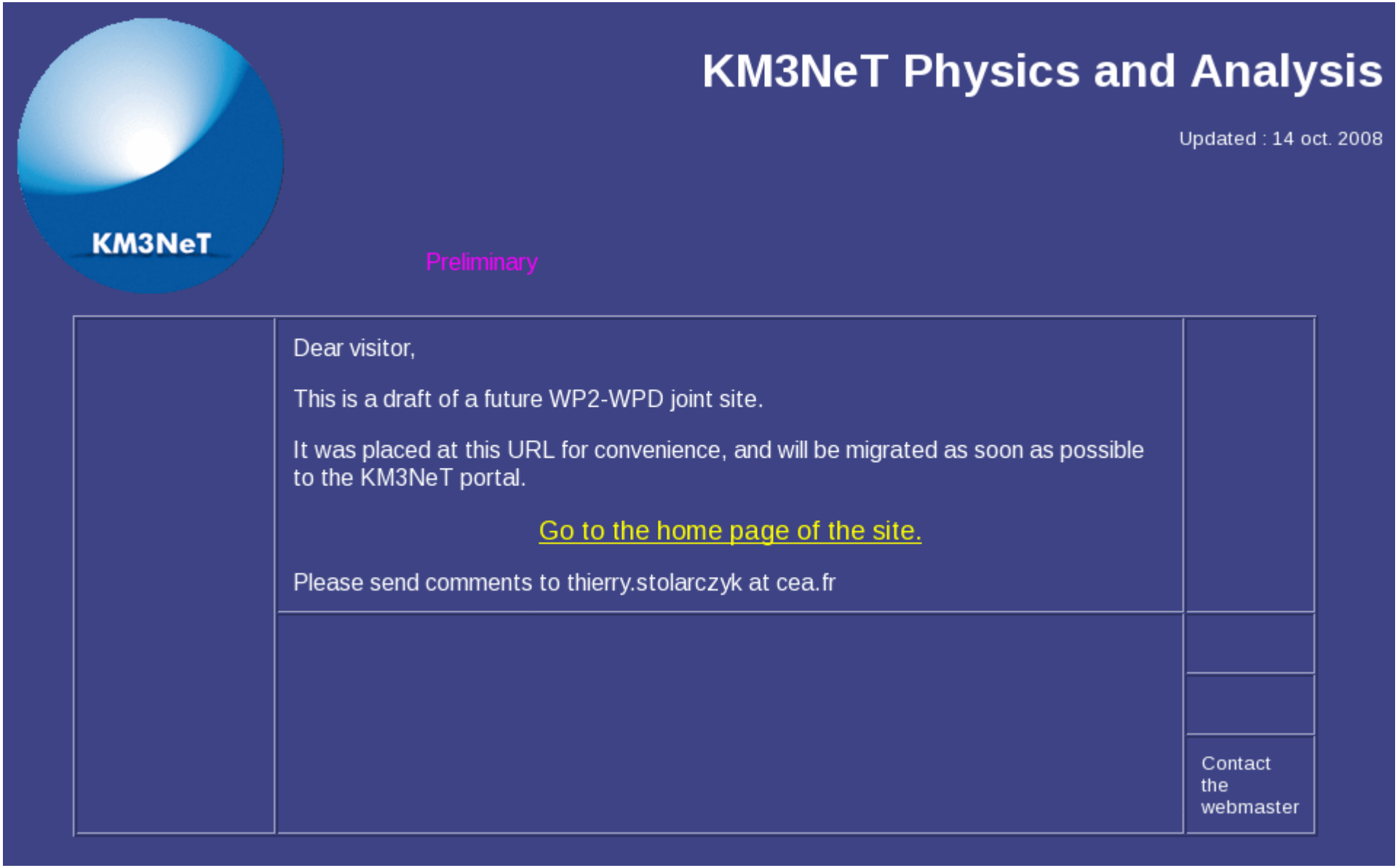
ANTARES/NEMO
KM3TRAY (ANIS, Sirene ...)
HOU software
Mathematica
Other in developpement (Demokritos)

Time Scale :

31 / 01 / 2009

a full document describing each optimized design is requested by the PCC

People & activities : WP2 + WPD web page (draft) soon on the portal.



Webmaster : Thierry Stolarczyk

People & activities : WP2 + WPD web page (draft) soon on the portal.

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KM3NeT Physics and Analysis

Updated : 13 oct. 2008

Who's doing what

Members and tasks

Preliminary

Home | Meetings | **Members and tasks** | Physics and analysis | Tools | Milestones

This page collects the information related to the WP2 and WPD task sharing in the consortium.

The list needs to be updated ? Contact your coordinators.

Get the correspond
Excel file.

Mailing lists

Name	First name	Institute	in	out	Main activity
Auer	Ralf	Univ-Erlangen/ECAP			Shower studies, KM3Tray framework
Baret	Bruny	CNRS/APC			Detector optimization
Bigongiari	Ciro	IFIC			Simulations of Optical Beacon calibration, water optical properties, light scattering modelling
Brunner	Juergen	CNRS/CPPM			ANTARES software, CC Lyon
Carminati	Giada	INFN/Bologna			Mupage, KM3Tray Framework

Attempt to gather WP2ers activities in a single location and synthetic way.

List incomplete and not exact, currently filled according to some email exchange : please give some feed-back

People & activities : WP2 + WPD web page (draft) soon on the portal.

Coniglione	Rosa	INFN/LNS			ANTARES/NEMO software : studies of tower design. Optimization.
Distefano	Carla	INFN/LNS			ANTARES/NEMO software : studies of tower design. Optimization
Dornic	Damien	CNRS/CPPM			MATHEMATICA software : detector optimization
dos Santos Assis Jesus	Ana Carolina	Nikhef			KM3Tray Framework, detector optimization (String Design)
Eberl	Thomas	Univ-Erlangen/ECAP			KM3Tray framework
Ernenwein	**Jean-Pierre**	**CNRS- CPPM**			**WP2 coordinator**
Kavatsyuk	Oksana	Gronignen/KVI			Detector optimization, KM3Tray Framework
Kooijman	Paul	Nikhef			Sirene
Kopper	Claudio	Univ-Erlangen/ECAP			KM3Tray Framework
Lenis	Dimitris	Demokritos			Depth studies (atm muon background), PMT orientation issue, G4 software and Sirene, reconstruction strategies
Markou	Christos	Demokritos			Depth studies (atm muon background), PMT orientation issue, G4 software and Sirene, reconstruction strategies
Naumann	Christopher	CEA Irfu			MATHEMATICA software : detector optimization
Presani	Eleonora	Nikhef			String design optimization, KM3Tray framework (Sirene)
Rapidis	**Petros**				**WPD coordinator**
Sapienza	Pierra	INFN/LNS			ANTARES/NEMO software : studies of tower design. Optimization.
Shanidze	Rezo	Univ-Erlangen/ECAP			ANTARES software : detector studies (string type with small or large PMTs), shower studies
Stavropoulos	Georgios	NESTOR			Depth studies (atm muon background), PMT orientation issue, G4 software and Sirene, reconstruction strategies
Stolarczyk	**Thierry**	**CEA Irfu**			**WPD coordinator**
Tsirigotis	Apostolos	Patras/HOU			Detector optimization, HOU software
Umberto	Emanuele	IFIC			Detector optimization, KM3Tray Framework, calibration
Vecchi	Manuela	INFN/Roma			KM3Tray Framework, detector optimization

Also in construction : a task table

People & activities : WP2 + WPD web page (draft) soon on the portal.

Software links and reference files

WP2 Presentations during this meeting :

Univ-Erlangen (ECAP, Rezo Shanidze) : ECAP in KM3NeT WP2

INFN/LNS : Rosa Coniglione & Piera Sapienza :
Tower Design Optimization Studies

CEA/IRFU : Christopher Nauman : Synthesis of detector studies