



# **Draft HSSG Tutorial Outline & Discussion Points**

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# Presentation Motivation

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- The study group needs to hold a tutorial for the 802 community at large
  - To review the PAR(s), 5 Criteria and Objectives
  - To provide supporting material covering market applications, the range of technical approaches & feasibility of such, and related material which supports and expands on the 5 Criteria & Objectives
- Have proposed here a general outline for review & discussion
  - For each of the sections – prepared some talking points and a general approach
  - Before volunteers begin to assemble the detailed tutorial draft slides, wanted to solicit SG input on the approach and content

# Presentation Assumption

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- This draft assumes the PAR A Project Documentation from the website (<http://www.ieee802.org/3/hssg/PAR-A/index.html>)
  - IEEE 802.3 HSSG PAR A Objectives
  - IEEE 802.3 HSSG PAR A Project Authorization Request (Working Draft)
  - IEEE 802.3 HSSG PAR A 5 Criteria (Working Draft)
  - Note: material here also includes the Fiber Optic Ad-hoc SMF Technical Feasibility chart which lists the 40km distance objective (for discussion purposes here)
- We can adjust & incorporate the inclusion of new PHYs (i.e. 40km &/or copper) and any new rates (i.e. 40Gb/s) as may be included in the PAR(s)

# Draft Tutorial Outline

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- Overview
- Market Applications
- MAC & PHY
- PMDs
- Summary / Q&A

# Overview

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- Objectives
- Title
- Scope
- Purpose
- Critters
- Schedule
- Study Group Participation
- Summary

# Market Applications Review

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- Ethernet Eco-System
- Discussion of Market Potential/size?
  - Higher Speed Core to support 10G Feeds
  - Historical perspective on relationship of speeds
- Reach objectives related data
- Review Broad Market Potential for the following applications from presented data
  - Carriers
  - IXs
  - Horizontal Server Aggregation
  - Access?
  - Video (Unicast)
  - Financial (Multicast)
  - Other types of Content
  - HPC
  - Data Center
  - Blade Servers
- Summary

# MAC & PHY Review

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- Overview – 100G MAC & PHY
  - Consistent with previous Ethernet rates, extension to 100,000 Mb/s data rate
    - Touch on any of the standard objectives applicable to the MAC and all PHYs
    - Layer diagram – really needed?
  - Should we comment on “possible” interfaces (logical and physical) which have been discussed?
    - Can we do this with applicability to both PCS approaches?
- MAC
  - Proposing no changes to the MAC operation
  - Specify required MAC management / control parameters
  - Several presentations made reviewing technical feasibility; suggest we summarize a few of the salient points?
- PCS
  - General objectives & considerations the group has discussed for the PCS
  - Two proposals reviewed – multiple solutions possible
    - APL - Aggregation at the Physical Layer
      - Review 802.3ah PME concept for leveraging 10GBASE PHYs or technology
    - Virtual Lanes / CTBI
      - Review 100G PCS concept which maps CTBI to n lane PMD(s)

# SMF PMD Technical Review

SMF	10km 1310nm	40km 1310nm	10km 1550nm	40km 1550nm
10x10G DML	yes + CL	yes + CL + OA	yes	maybe + OA
10x10G ML	yes + CL	yes + CL + OA	yes	yes + OA
5x20G / 4x25G DML	yes	maybe + OA	maybe	maybe + DC
5x20G / 4x25G ML	yes	yes + OA	yes	yes + DC
2x50G DQPSK I/Q ML	yes + CL	yes + CL + OA + DC	yes + CL + DC	yes + CL + OA + DC
1x100G TDM ML	yes + CL + OA	yes + CL + OA + DC	yes + CL + OA + DC	yes + CL + OA + DC

CL = Cooling (or semi-cooling,) OA = Optical Amplification, DC = Dispersion Compensation

Green shading designates alternatives under detailed study by Fiber Optic Ad Hoc contributors



# SMF PMD Technical Review

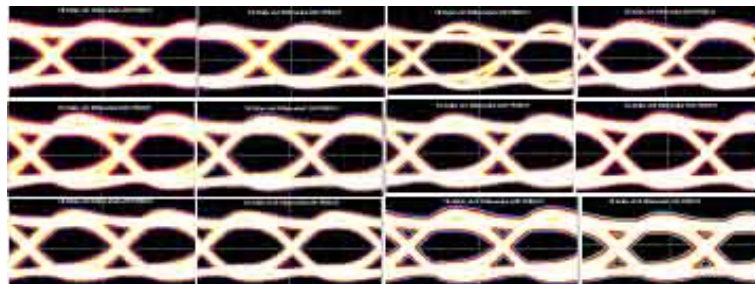
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- The Fiber Optic Ad-hoc has reviewed numerous proposals and technically feasible approaches for the SMF PHYs
- Several proposals are under active study for the 10km reach
  - 10 x 10G
  - 4 x 25G
- These proposals and several others are under active study for the 40km reach
  - 2 x 50G
  - 1 x 100G
- A variety of approaches for each proposal are technically viable
  - Lasers
  - Modulators
  - Wavelengths and bandwidths
  - Receivers
  - Optical Amplifiers
  - Dispersion compensators

# MMF PMD Review

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- Objective: At least 100m on OM3 MMF
- Platform: Parallel fibers; ~10Gbps/ch; 850nm VCSEL arrays
  - Combines existing 10GbE serial and 12x2.7G parallel product technologies
  - Considering 10x10.3Gbaud (64/66), 12x10Gbaud (8B/10B), and others
  - Considering WDM (e.g. 2  $\lambda$ 's) to reduce fiber count/cost
- Early Demo: 12x10GbE over 300m by IBM/Picolight at OFC 2003



# Summary / Q&A

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- Tutorial wrap-up / Q&A session
- Discussion topics:
  - Key items or topics which should be added to the tutorial?
  - Are there areas which we have too much planned detail? Areas that we touch on too lightly?
  - Other input from the study group on the tutorial direction?
  - Next steps – prepare draft slides for review in the May interim meeting
    - Call for volunteers to assist in slide preparation & for presenters...