Status of Alternative Optical Package R&D

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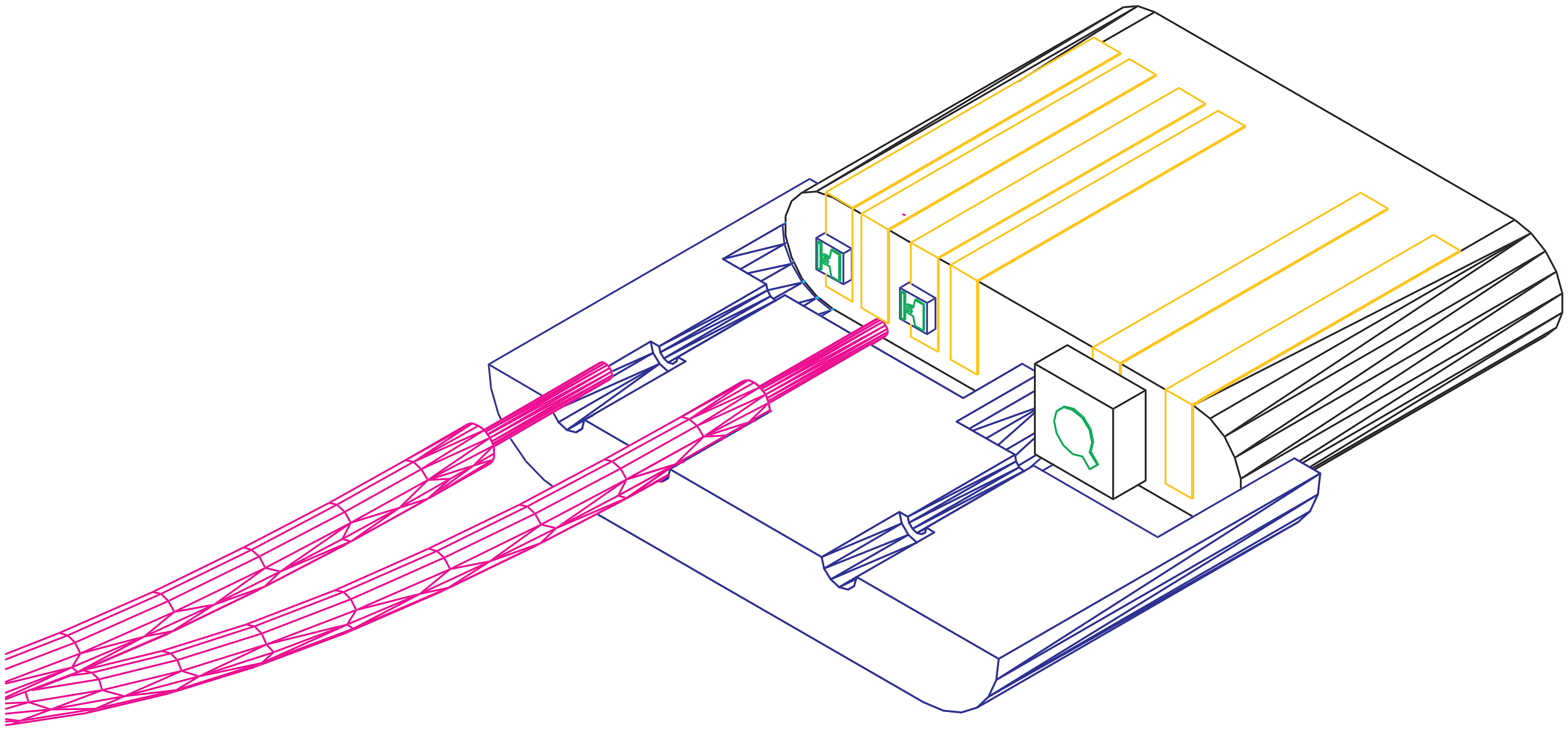
Outline of Talk

- Introduction
- Status
- Plans

Introduction

- **connector concept design**
  - ◇ fabricated using macor (machinable ceramic)
  - ◇ simple two-piece design
  - ◇ precisely machined cap and base for alignment
- **cap**
  - ◇ 3 holes for fibres
- **base**
  - ◇ deposit gold traces for wire bonding, VCSEL and PIN placement

Cap and Base



Status

- **have all fabrication jigs constructed**
- **solved problem in handling VCSEL (250 μm x 250 μm x 80 μm)**
- **fibre cleaver modified to cut short bare fibre**
  - ◇ 6 mm $\rightarrow$ 1.2 mm

Status

- **poor gold trace adhesion to macor base**
  - → inconsistent wire bonding pull strength
  - → Hybrid Tek to screen on gold traces (10 μm) using macor strips machined by OSU
  - → micro-cracks produced by stress in machining long (10 cm) and thin (4 mm) strips
  - → use outside vendor to machine strips
  - → Hybrid Tek has delivered strips with gold traces
    - ◇ excellent gold trace adhesion
    - ◇ excellent wire bonding strength ($>$ 10 gmf)
  - → fabricated several new caps and bases
  - → surface is not flat enough for good VCSEL adhesion to base using surface mount technique
    - ◇ 3 VCSELs do not stick
    - ◇ 3 VCSELs have poor adhesion

Plan

- **use Hybrid Tek to fabricate bases with alumina and deposit thin gold traces**
  - ◇ VCSEL has good adhesion to BeO with thin gold deposited by Hybrid Tek
  - ◇ Marconi use alumina as VCSEL/PIN carrier
  - ◇ use alumina instead of BeO for economy
  - ◇ widen VCSEL gold traces from 250 to 300 μm to stay clear of roll-over region from gold to alumina to maximize contact area
  - ◇ expect new packages in January