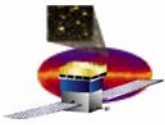




# Status of LAT TKR Flexible Circuits

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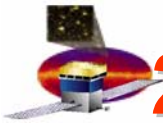
- Problem with production and assembly of flight flex circuits at Parlex
- We have had much experience with prototype flex circuits since the start of the project
  - (produced by a variety of vendors (“Tyco”, Cirrex))
  - 1999 BTEM / BFEM tower
  - Mini-tower (2x)
  - Burn-in cables, DAQ test cables
- All of these have been done on regular size (24”) panels
- In addition, full-size long cables were built by Parlex for the EM Mechanical Tower and stacked tower tests.
- None of them had coupons tested by GLAST



# Plan of Risk Mitigation

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- 3 avenues of correcting the problem:
  1. Improve Q/A at Parlex (see David Nelson's presentation)
  2. Procure flex circuits of identical design with a different vendor
  3. Re-layout of flex circuits to allow fabrication on regular size panels
  
- Plan for “new” cables (2. & 3.) is in place
  - Prototyping under way
  - SOW completed, drawings being updated
  - RFQ's drawn up
  - P.O. being signed
  - Parts being ordered
  - Testing and inspection documents being drawn up



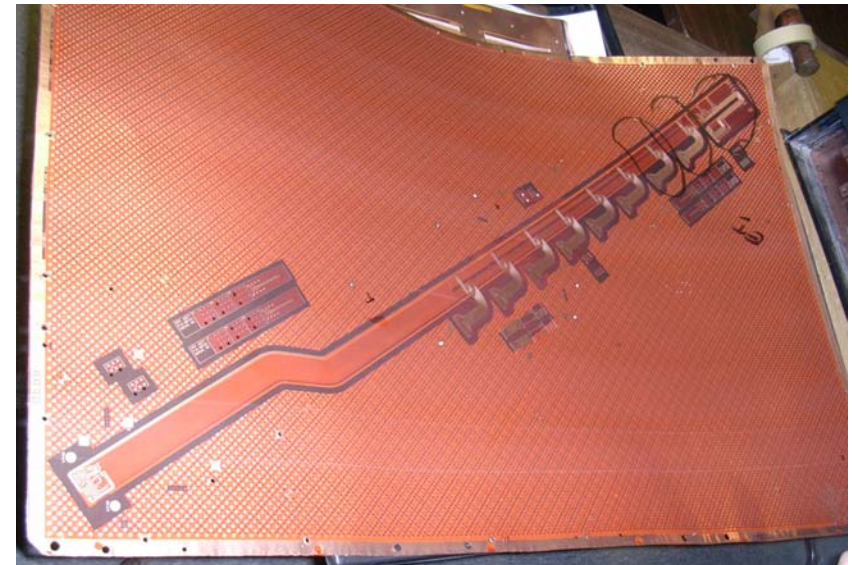
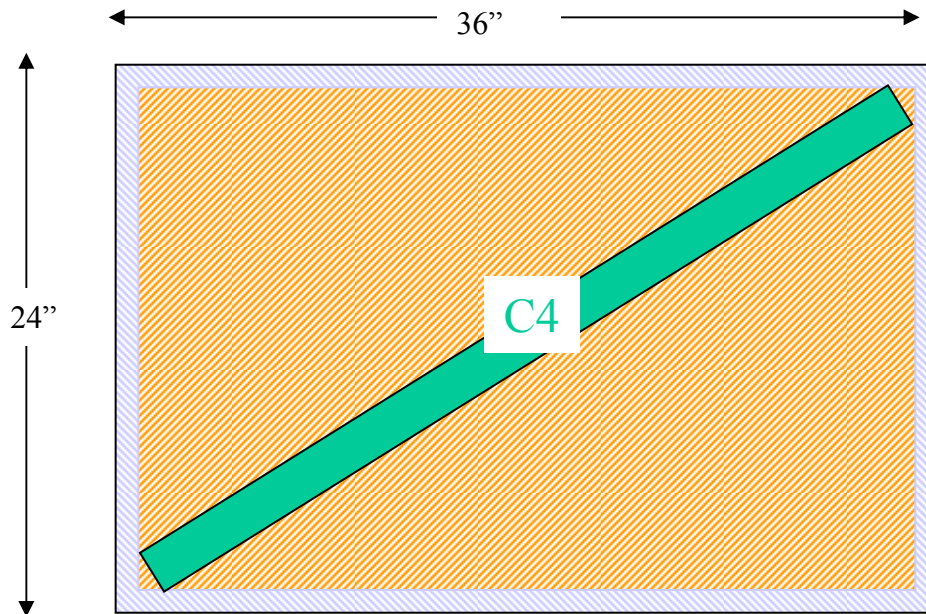
## 2. Alternative Supplier of Full-size Cables

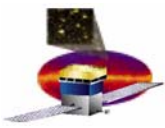
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- Identify potential alternative suppliers of full length cables
  - Titan ( -> Flex Circuit Technology):
    - Prototype order of 5 parts of C4, delivery Dec. 6, 2004
  - Under discussion: Tyco (could do assembly as well), Pioneer
- Separation of cable fabrication and assembly for maximum flexibility
  - SLAC and Zentek will assemble prototypes
  - Prepare RFQ for flight part assembly
- Q/A and acceptance testing in preparation
  - Visual, mechanical, electrical at SLAC
  - Coupon testing both at GSFC and local testing house
- Work towards submitting P.O. for full-size cable production on Dec 17 2004
  - SOW finished, drawings updated and signed-off
  - RFQ in the pipeline
  - P.O. started

# “Long” Full-size Cable Design

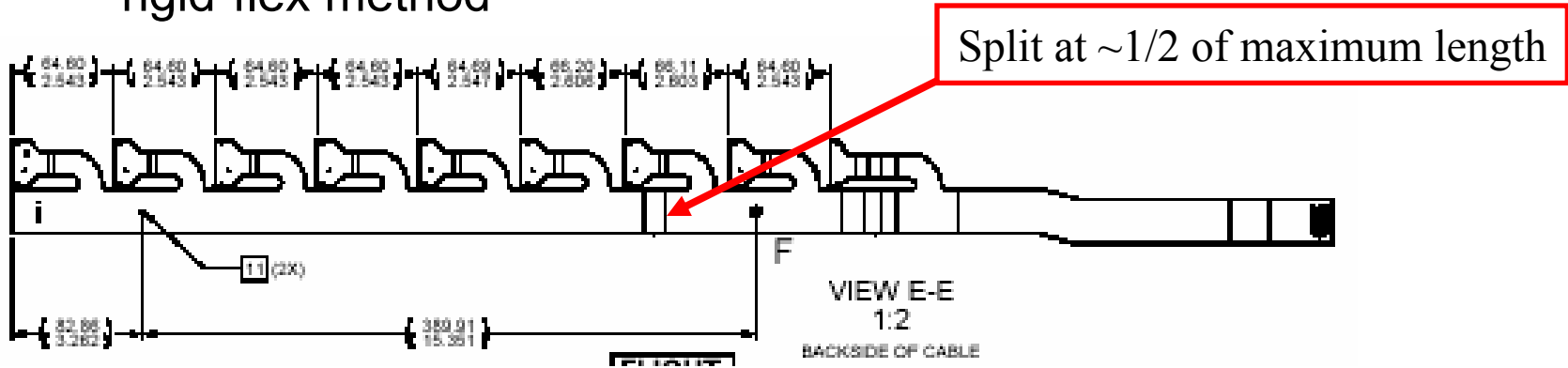
- The flight flex circuits in production at Parlex are “long”:
- The longest is 38.608”, panel is 36” x 24” (~ 34” x 22” useable)
- The number of suppliers is limited



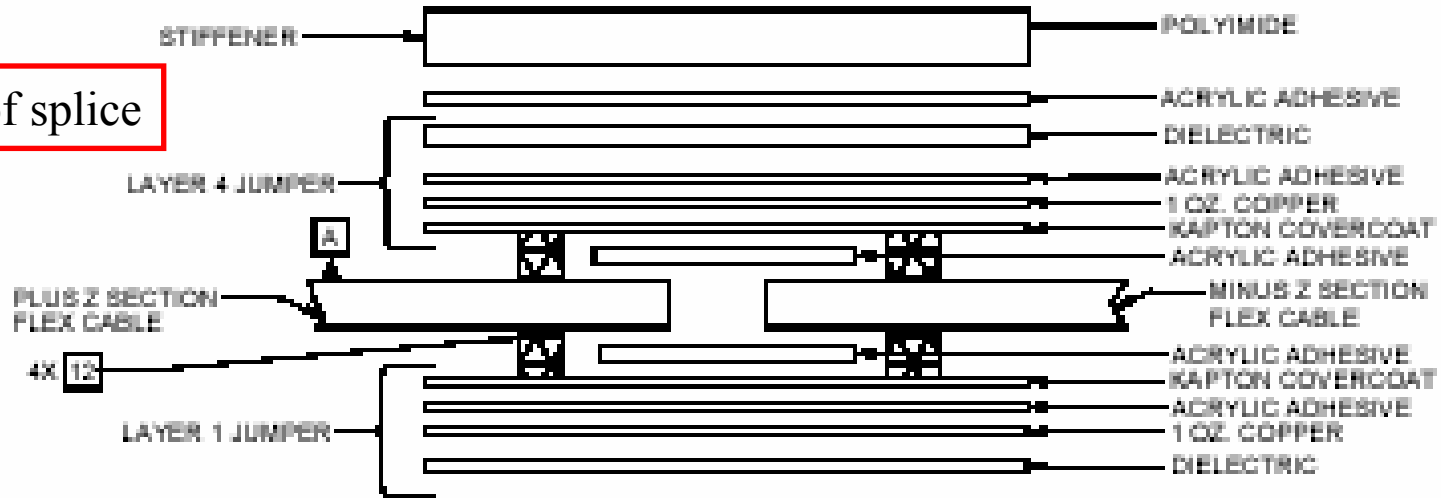


# 3. "Short" 2-piece Rigid-flex Design

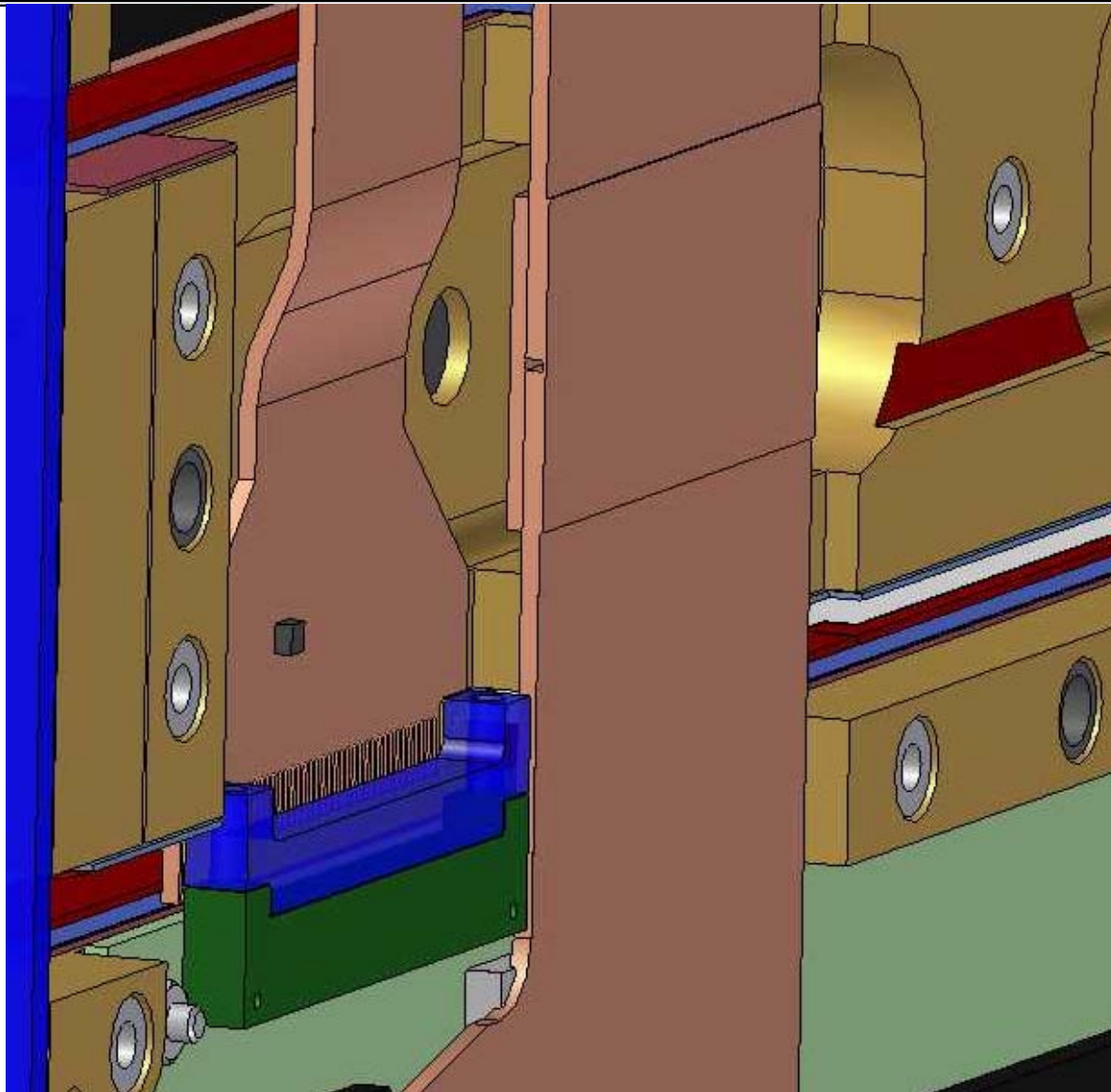
- The flight flex circuits are built in two pieces and joint by commercial rigid-flex method

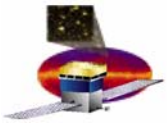


Stack-up of splice



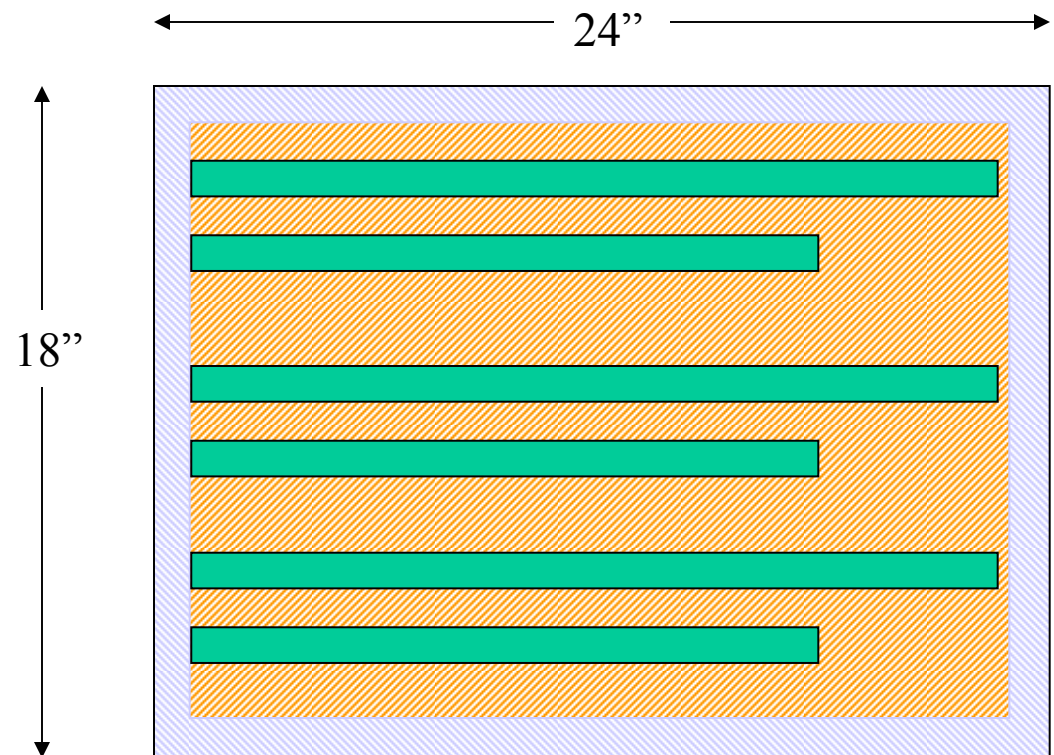
# Splice of 2-piece Circuit fits into Tray Cavity

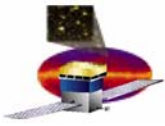




# 2-piece Rigid-flex Design

- The 2 pieces are “short”
- The longest piece is 21.8”, panel is 24” x 18” (~ 22” x 16” useable)
- Efficient use of panel: 3 cables per panel ?
- Standard commercial process
- Large number of suppliers

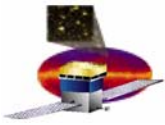




# Prototyping of 2-piece Cables

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- Prototype 2-piece cable Rigid-flex
  - Standard commercial process (used in FREE card)
  - Order 5 parts of C4 from Cirrex, delivery Dec. 14, 2004
- Assembly identical to alternative “full-size” cables
- Q/A and acceptance testing similar to alternative “full-size” cables
  - + Visual, mechanical, electrical test of joint at SLAC and GSFC
- Work towards submitting P.O. for 2-piece cable production on Jan. 3, 2005
  - SOW finished
  - Drawings completed by Dec 6, 2004
  - RFQ in the pipeline
  - P.O. started



# TKR Flex Circuits Outlook

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1. Need to improve yield and Q/A at Parlex.
  2. Prototype “long” full-size flex cables with alternative supplier.  
If cable and coupon test ok, P.O. out Dec 17, 2004
  3. Prototype 2-piece rigid-flex cable.  
If cable and coupon test ok, P.O. out Jan 03, 2005
- Separate the fabrication of bare cable and the assembly of circuits for these two alternatives.