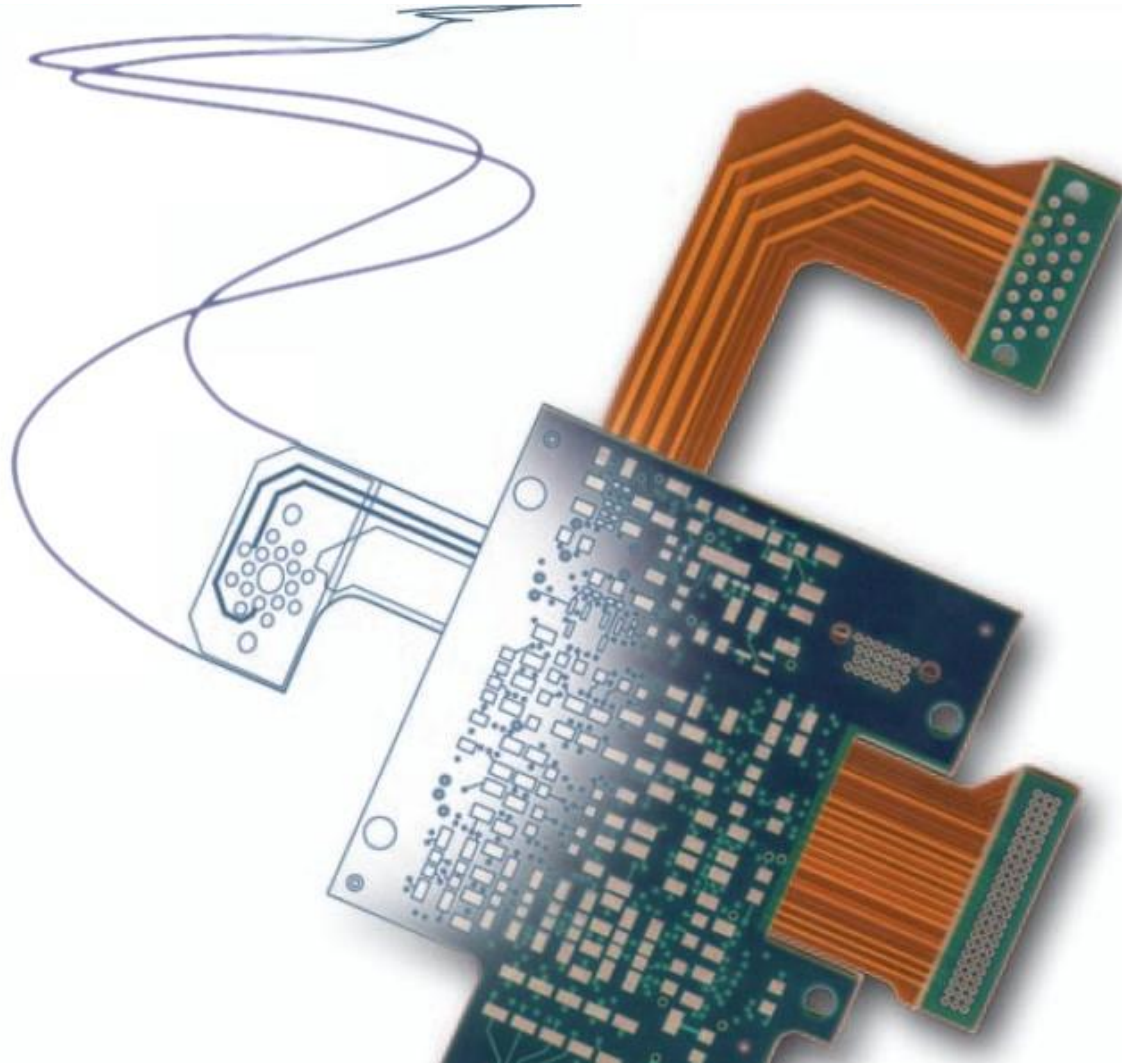


## Ultra-Long FPCs from Berlin



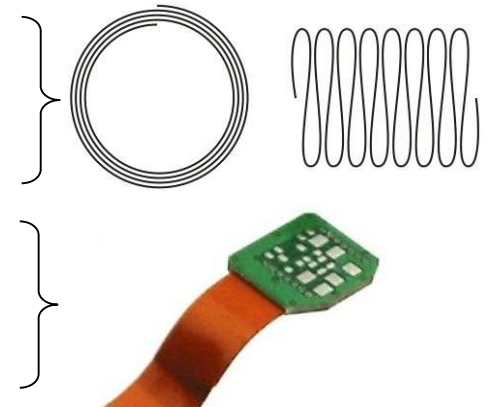
# What does “Ultra-Long FPC” mean?

## Surview

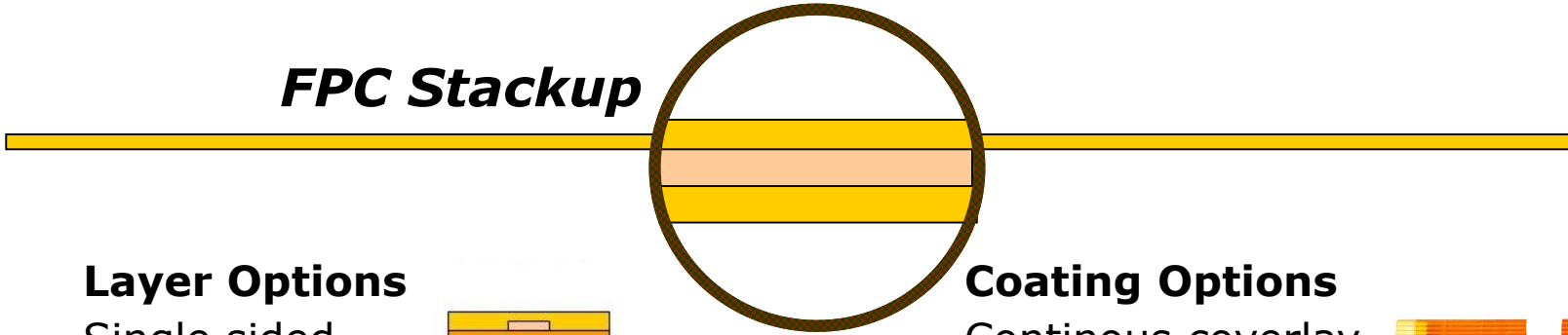
- Manufacturing of one piece up to 5 meters length without division into shares or folding
- Up to 4 electrical layers
- Temperature stability up to 150°C
- High realibility for complex applications of aerospace and research & development



- Electrical connection and function of a PCB in one
- Ultra flat shape for space-saving applications of restricted mounting situations
- Conductors and outline can be adapted individually
- Defined stiffness for defined mounting situations
- Reduction of connection interfaces. higher reliability
- High transmission rates due to impedance control
- High reliability up to 150°C operation temperature

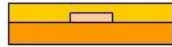


## FPC Stackup

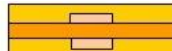


### Layer Options

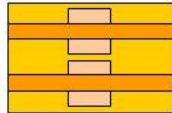
Single sided



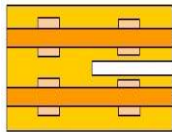
Double sided



4 layers



Split layers



### Coating Options

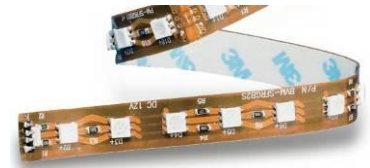
Continuous coverlay



Coverlay openings



Adhesive-backed



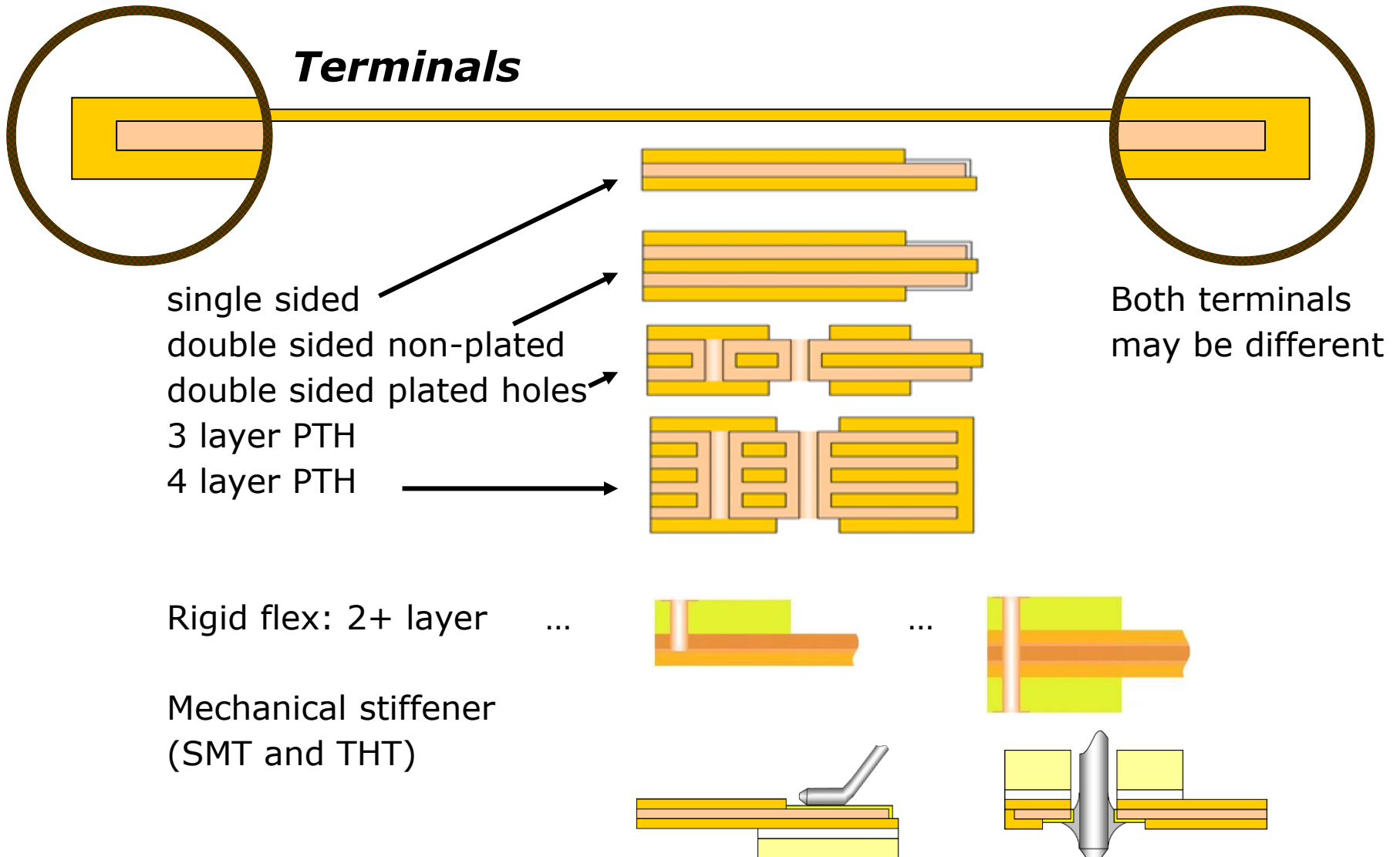
### Layout Options

Continuously



Individual





**Base Material** Polyimide substrate **AKAFLEX® KCL HT**  
high temperature epoxy adhesive system  
for maximum operation temperature up to 150°C  
(Standard material, other material on request)



**Coverlay** Polyimide **LF Series**  
high temperature acrylic adhesive  
for operation temperature up to 130°C



**Adhesive back** Self-adhesive foils  
suitable for soldering processes  
high peeling forces



## Ultra long FPCs and rigid flexible PCBs

Maximum length: 5 m  
Maximale width: 225 mm

Minimale conductor: 200  $\mu\text{m}$   
Minimaler clearance: 200  $\mu\text{m}$

Copper heights: 18  $\mu\text{m}$ . 35  $\mu\text{m}$ . 70  $\mu\text{m}$

PTHs:  $\geq 0.3$  mm. only at start and end part  
( $\leq 500$  mm from each end)

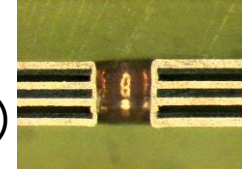
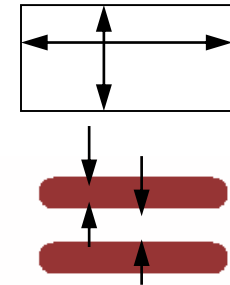
Annular ring PTHs:  $\geq 0.30$  mm

Distance track to outline:  $\geq 0.5$  mm (standard) /  $\geq 0.2$  mm (laser cut)

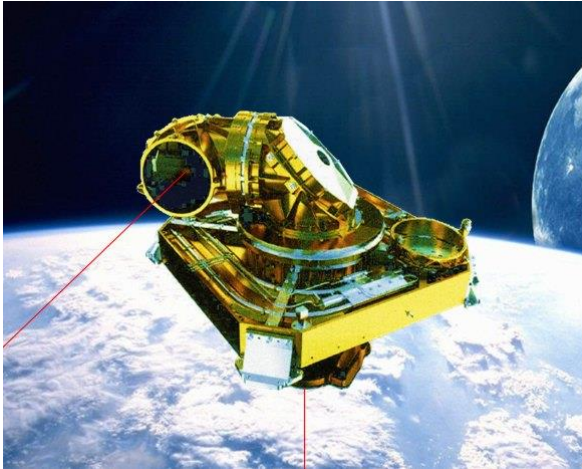
Length of rigid area:  $\leq 75$  mm, depending on thickness

GND areas: use grids to provide flexibility, if any  
Recommended grid: Pitch 1.5 mm / track 0.5 mm

Finishes: immersion tin, HAL SnPb, Silver, Copper,  
ENIG (up to 300 mm from each end)



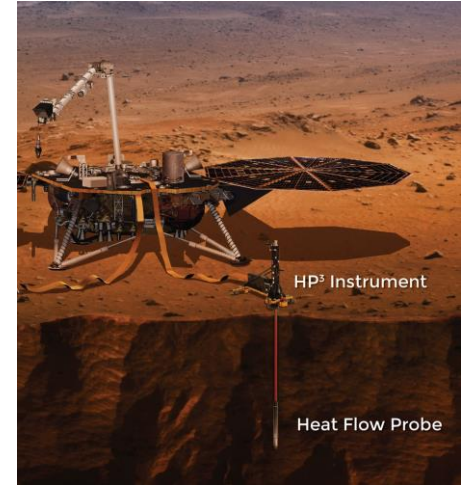




Sattelite communication (DLR)



Sensor data in wings



Mars drill (DLR)



Synchrotron control (USA)



Catheter; imaging techniques

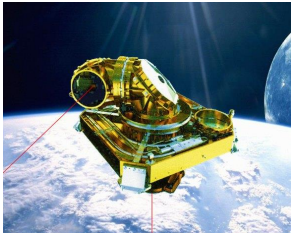


Your application ?





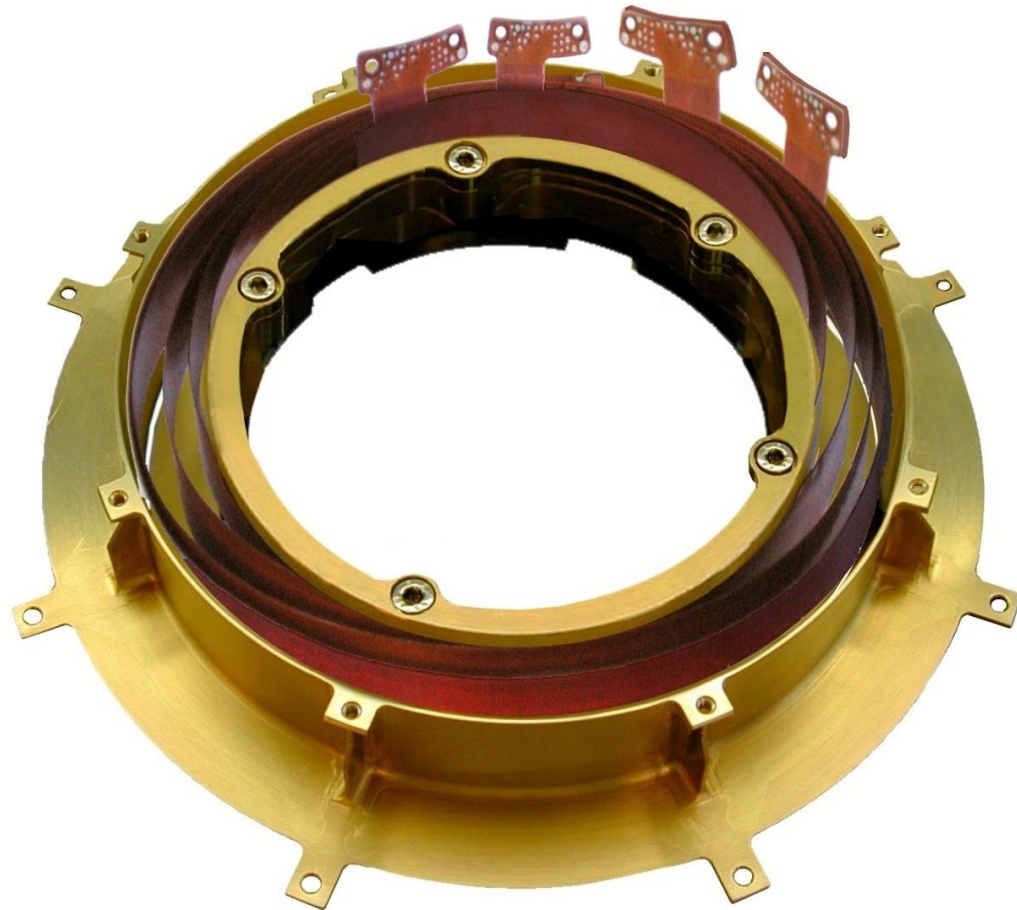
Clock Spring  
Principle



Zero-force Laser  
Pointing Systems



Laser Beam  
Target Screen

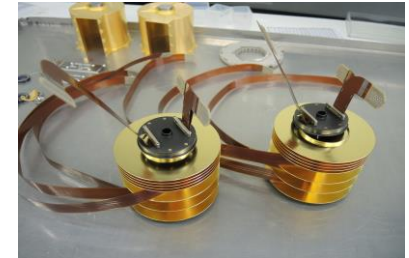


## Spacial Projects using ultra-long FPCs

ALPHASAT 2013/EUTELSAT 2016 (ESA et al, *launched*)  
Twist Capsule for Laser Pointing System



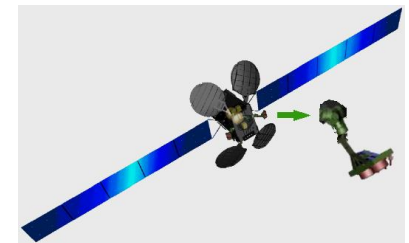
ExoMars (ESA)2016: *launched*  
Twist Capsules for Camera on Orbiter



Mars InSight, HP3 (ESA-NASA, *launch 05.05.18 13:05 CEST*)  
Tether (5m into Mars soil); Deck Harnesses



Small Geo, ELECTRA (ESA), *launch 2022*)  
Twist Capsule as Thruster Orientation Rudder Boom



MetOP-SG KBA	T.C. for Solar Generator Panel (EM)
Mars 2016(ESA-NASA)	T.C. for CaSSIS Camera Swivel
ISS / FOAM (ESA-NASA)	Rotating Foam Detection Module



## **Project Manager**

Dr. Christoph Lehnberger  
c.lehnberger@andus.de  
+49 30 610006-81



## **Product Sales**

Christoph Zander  
c.zander@andus.de  
+49 30 610006-56