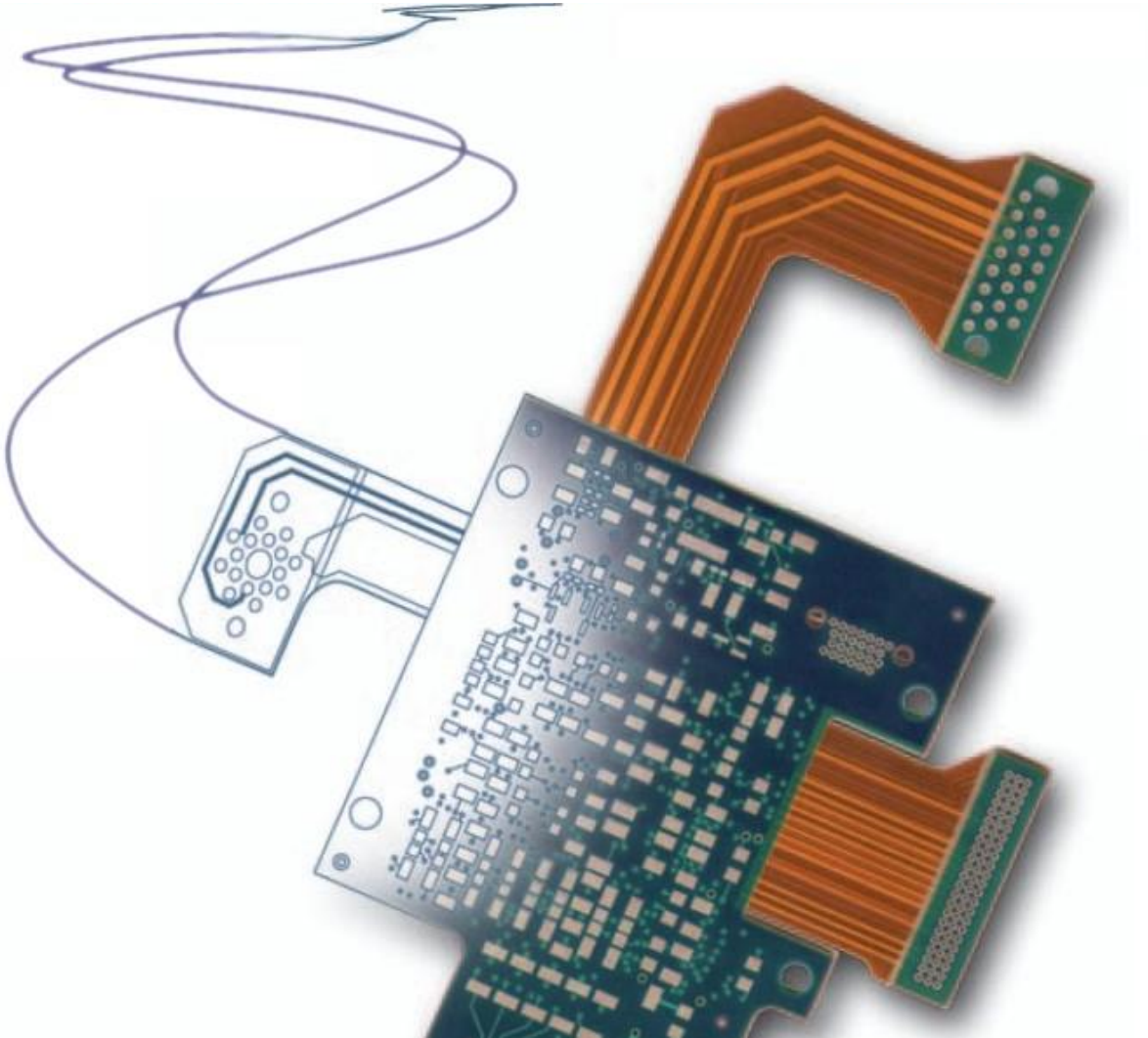
Ultra-Long FPCs from Berlin



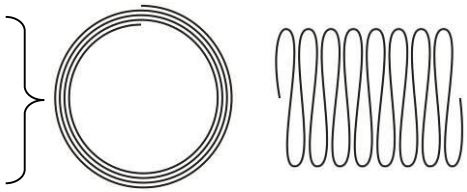
What does “Ultra-Long FPC” mean?

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

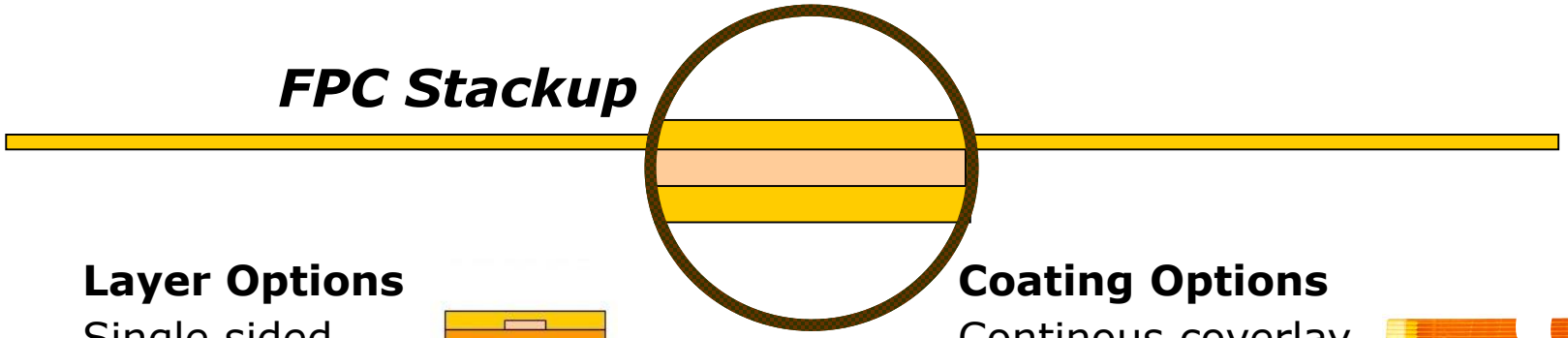
Advantages at a Glance

- 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



Stack up Options

FPC Stackup



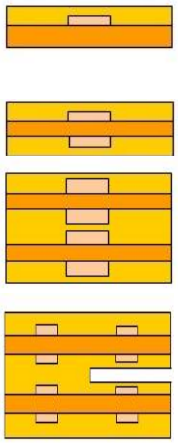
Layer Options

Single sided

Double sided

4 layers

Split layers

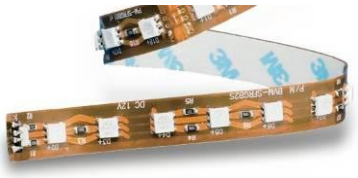


Coating Options

Continous coverlay

Coverlay openings

Adhesive-backed

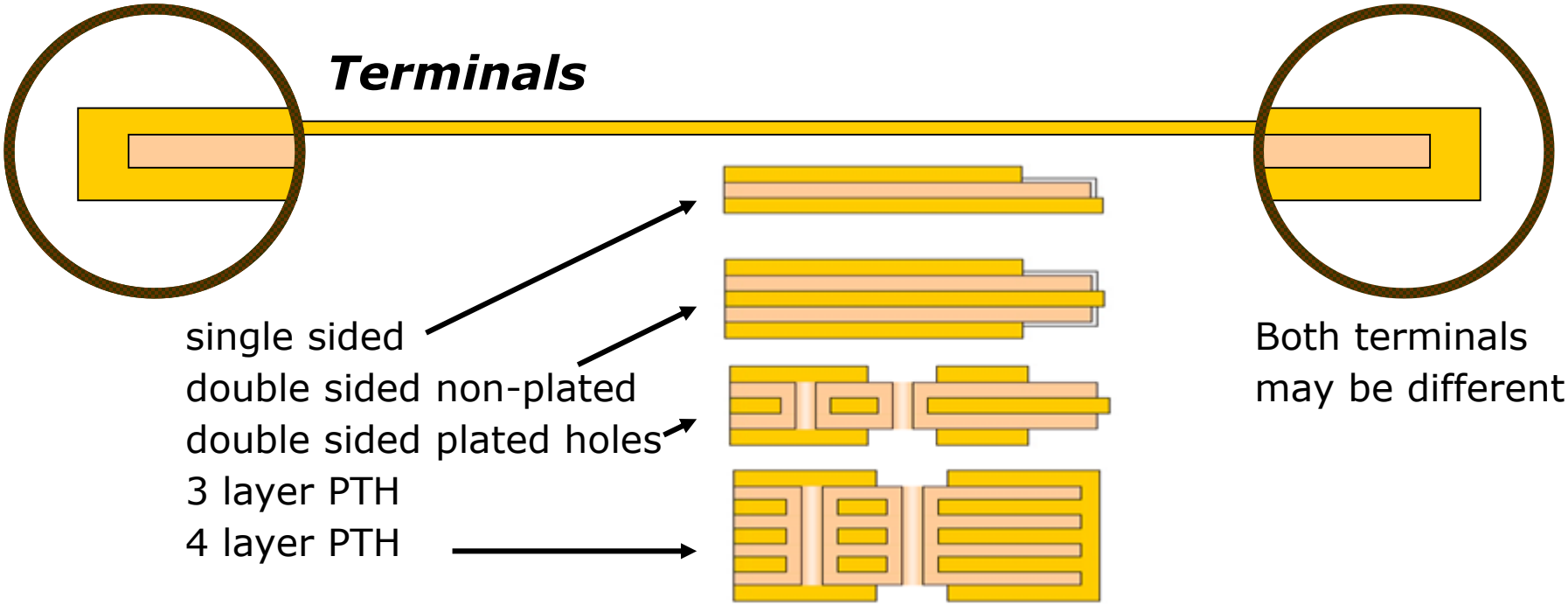


Layout Options

Continously

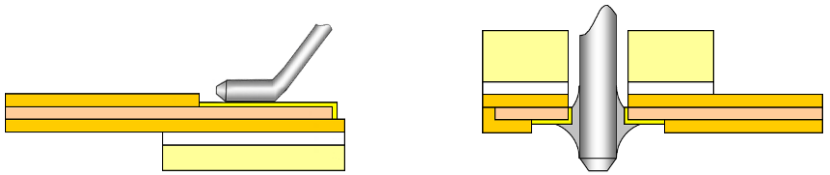
Individual

Stack up Options



Rigid flex: 2+ layer ... ...

Mechanical stiffener
(SMT and THT)



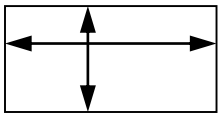
Material

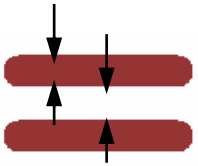
Base Material Polyimide substrate **AKAFLEX® KCL HT**
high temperature epoxy adhesive system
for maximum operation temperature up to 150°C
(Standard material, other material on request)

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

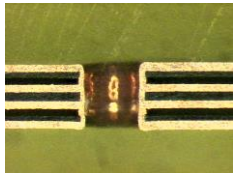
Adhesive back Self-adhesive foils
suitable for soldering processes
high peeling forces

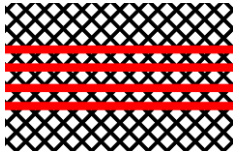
Ultra long FPCs and rigid flexible PCBs



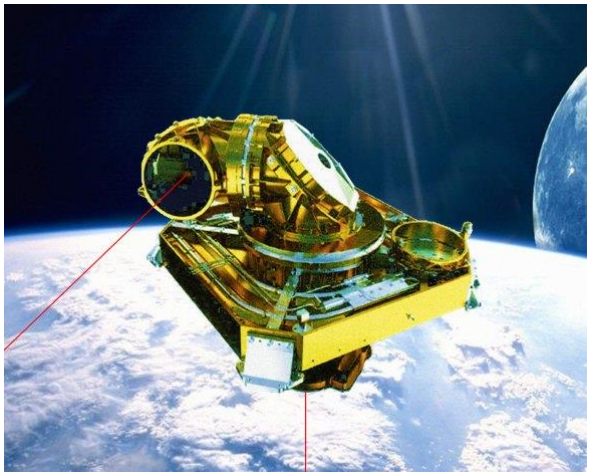


Maximum length:	5 m
Maximale width:	225 mm
Minimale conductor:	200 µm
Minimaler clearance:	200 µm
Copper hights:	18 µm. 35 µm. 70 µm
PTHs:	≥ 0.3 mm. only at start and end part (≤500 mm from each end)
Annular ring PTHs:	≥ 0.30 mm
Distance track to outline:	≥ 0.5 mm (standard) / ≥ 0.2 mm (laser cut)
Length of rigid area:	≤ 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)



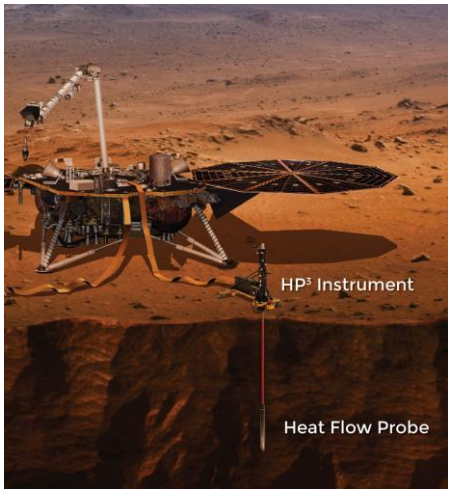


Applications



Sattelite communication (DLR)

Sensor data in wings



Mars drill (DLR)

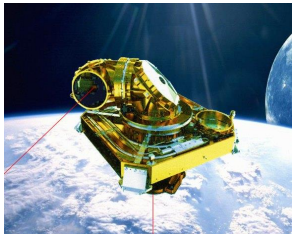
Synchrotron control (USA)

Catheter; imaging techniques

Your application ?

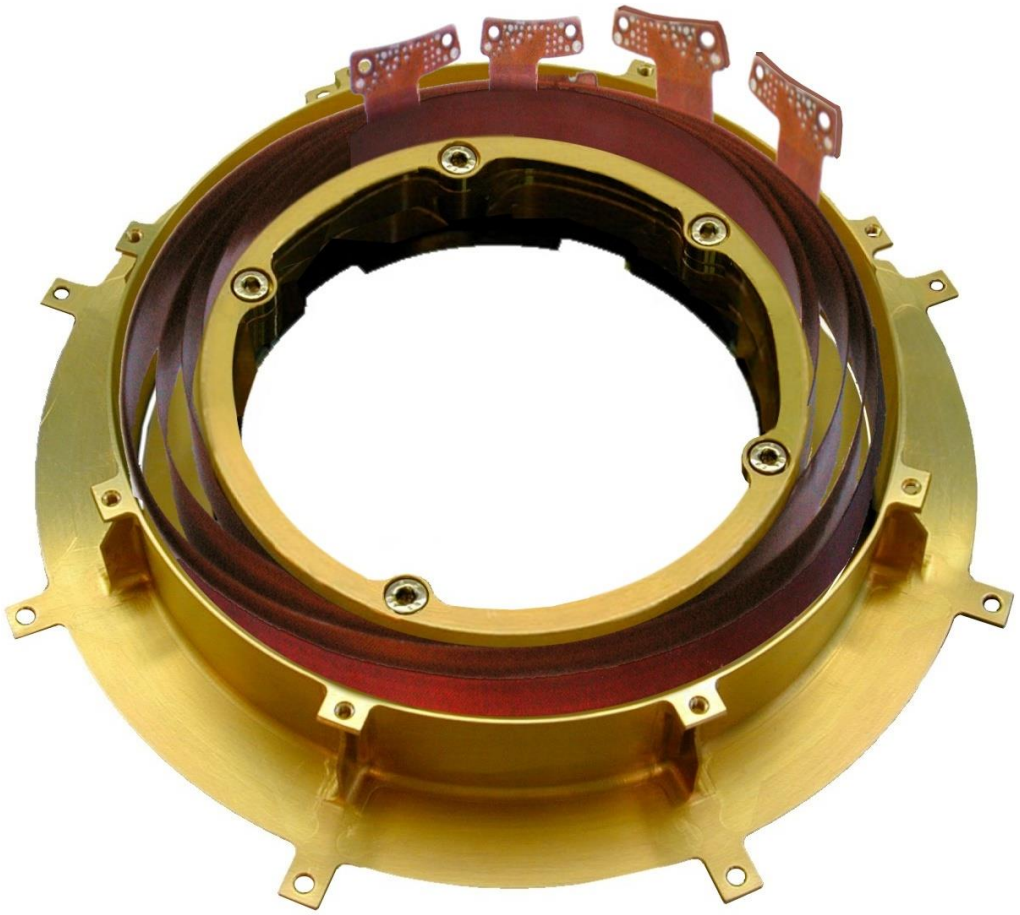
Twist Capsule

Clock Spring
Principle



Zero-force Laser
Pointing Systems

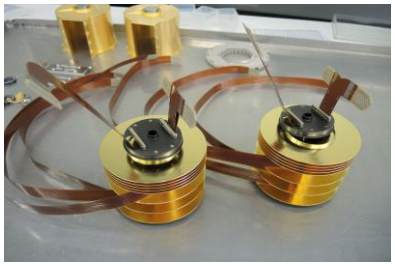
Laser Beam
Target Screen



Public Space Flight Heritage

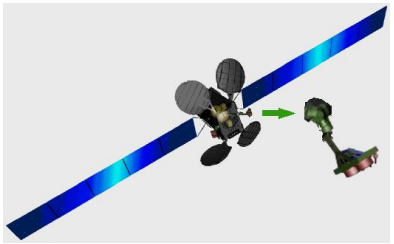
Spacial Projects using ultra-long FPCs

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