



TILBA R

SPECIFICATIONS

More reliable laser communications and remote sensing

Features

- › **3x to 10x Spatial mode** demultiplexer
- › **Higher numerical aperture** at the receiver
- › Standard telecom **single-mode fiber outputs**
- › **Low insertion loss**
- › **Passive optical system**
- › **Airborne packaging** available

Applications

- › Long-range **free space optical communication:**
Aircraft-aircraft & ground-aircraft links
Ground-Satellite links
- › **LiDAR sensors**
- › Remote sensing & active imaging

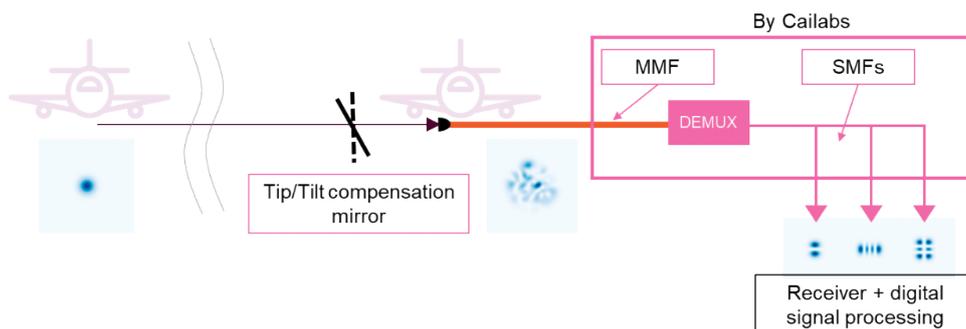
Description

Intended for free space optical communications and LiDAR applications, **TILBA-R** is a passive optical component designed to **increase the quantity of light** collected in the presence of **atmospheric turbulence**.

Based on the **Multi-Plane Light Conversion technology***

(MPLC) by Cailabs, spatial mode diversity and an enlarged numerical aperture, **TILBA-R** decomposes the spatial modes of the incoming beam to **improve the reliability of the optical link** and **lower the power constraints**. **TILBA-R** is completely passive, compatible with standard telecommunications components and available as an onboard airborne version.

Use cases



› Direct detection

Adding up **6 spatial modes** in **direct detection** has been shown to increase the 5% worst coupling efficiency signals by **7 dB** in turbulence transmission.¹

› Coherent detection

In **coherent detection**, using **3 spatial modes** decreases the required transmitted power in LEO-to-ground transmission by **9 dB** with constant FEC compared to a single mode aperture.²

Demonstrated by NEC corporation in ¹Arikawa & al, Sum. Top. (2016) & ²Arikawa & al, ECOC (2017)

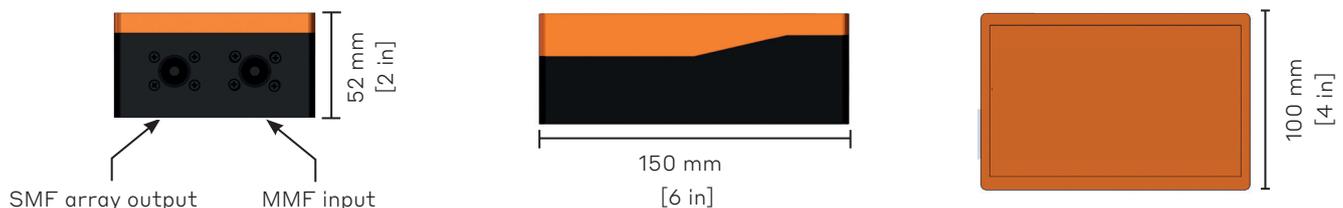
* U.S. Pat No 9.250.454 - Japanese patent n° 5990544

General specifications

OPTICAL PARAMETERS		
Parameter	Typical value at 20°C	Comments
Number of spatial mode diversity	3, 6 or 10	Up to 45 modes
N.A. increase compared to SMF	MMF input : +20% to +70%	Other value possible depending on fiber
	Free Space input: Arbitrary size	
Wavelength of operation	C-band	Other wavelengths available
Insertion loss	< 3 dB	-
Signal output fiber type	SMF-28e+ array	
Signal input	Multi-mode fiber or free space	Collimated free space & large range of fiber available

Ground station physical characteristics

PARAMETER	VALUE
Package dimensions	150 x 100 x 52 mm ³
Weight	950 g
Operating temperature	-5°C to +45°C (EN 300 019-1-3 Class 3.2)



Airborne physical characteristics

PARAMETER	VALUE	
Package dimensions	90 x 60 x 21 mm ³	
Weight	120 g	
Conditions tested	Min	Max
Operating temperature	- 40°C	+ 70°C
Relative humidity	-	95% ¹

¹Tested at 50°C – Standard humidity environment test D0160

