

Low SWaP High Performance RF-Photonics 94GHz Cloud Radar Receiver

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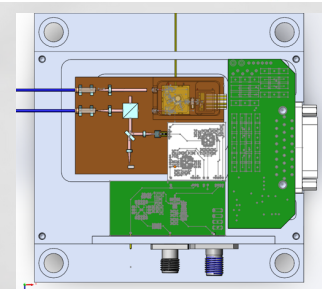
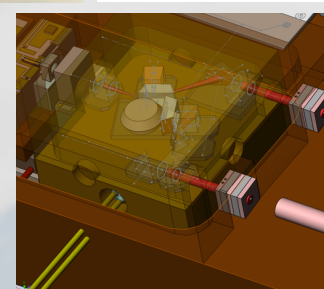
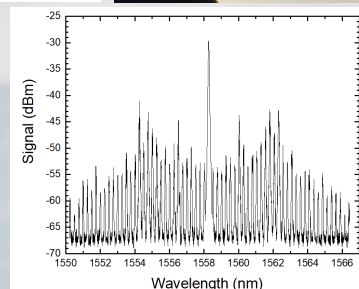
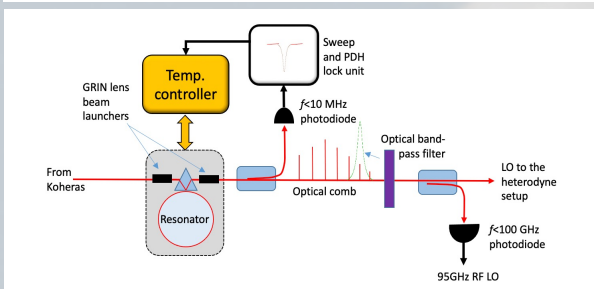
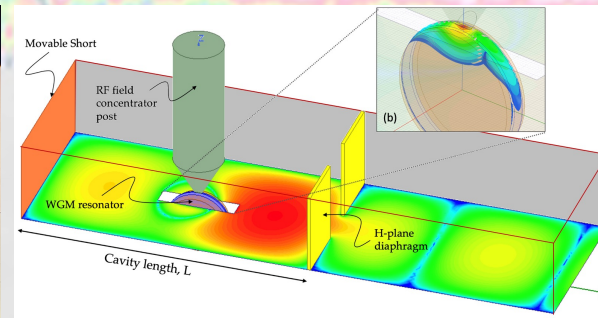
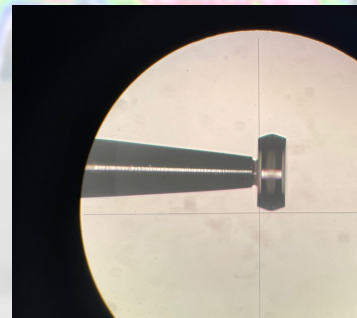
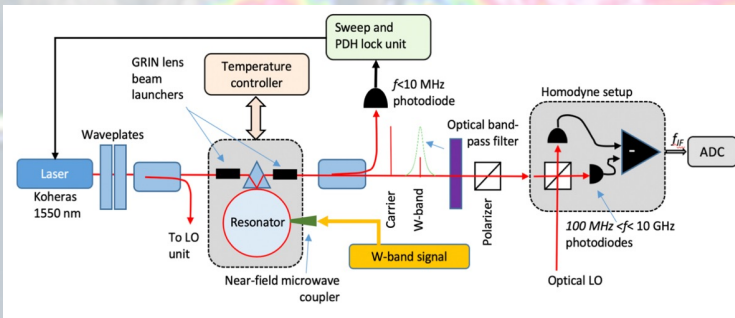
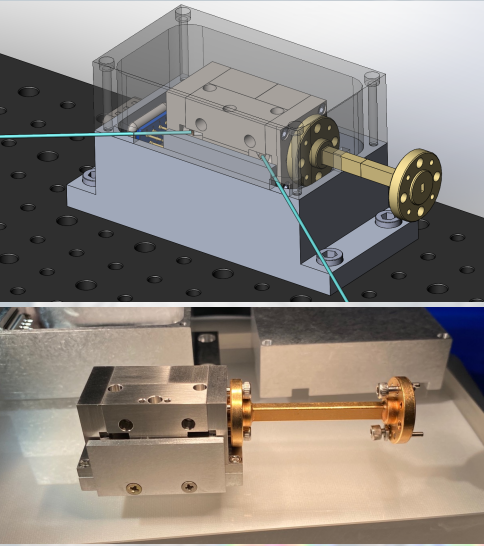
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TRMM, GPM, CloudSat have proven utility of spaceborne radars for measuring clouds and precipitation on Earth

- TRMM/GPM/CloudSat (Volume > 10m³, Weight > 100Kg, Power > 500W)
- RainCube (6U, 5.5Kg, 22W) demonstrated feasibility of compact, affordable radars

94GHz RF-photonics receiver reduces SWaP while improving performance

- Improved SNR due to ultra low system noise temp.
- Improved sensitivity due to low phase noise
- Reduction in overall instrument size due to RF-photonics arch.



Sensitivity	Science	Missions
+15dBZ	Moderate to light rain	TRMM, GPM, RainCube
0dBZ	Most light rain, snowfall	
-15dBZ	99% of all precipitation	
-25dBZ	Most clouds associated with precipitation	ACCP, CloudCube (IIP 19)
-30dBZ	Large fraction of non-precipitating clouds	CloudSat
-35dBZ	Majority of clouds impacting radiation budget	EarthCare

Parameters	RF-electronics	RF-photonics
Volume	>100cm ³	<10cm ³
System Temp	1200K	< 300 K (below ambient)
Max input power tolerance	10-13dBm	30dBm
Phase noise	-90dBc/Hz @ 10kHz	-110dBc/Hz @ 10kHz