

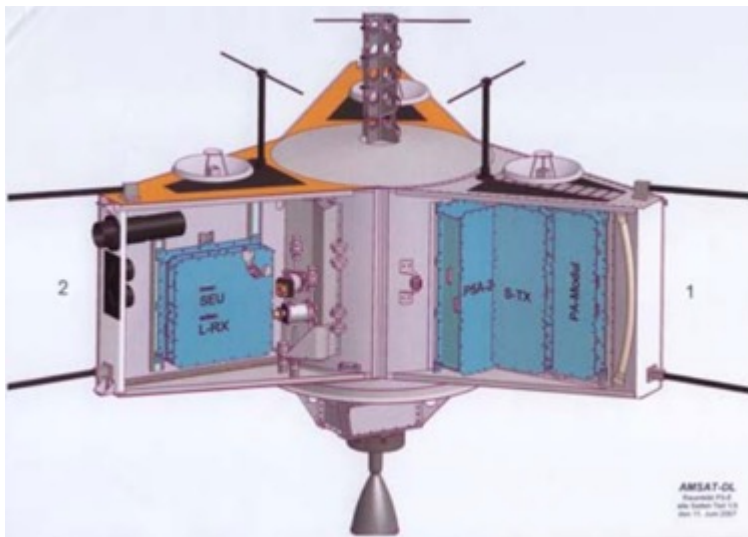
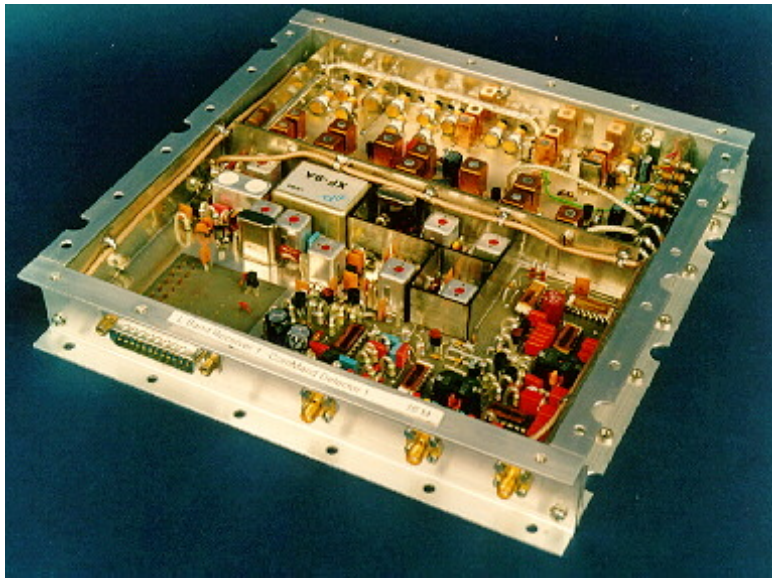
RESEARCH IN THE FIELD OF COMMUNICATIONS

Tomáš GOTTHANS, Zbyněk RAIDA

- Head of the DREL: prof. [Zbyněk Raida](#)
- **45** R&D + technical employees, **20** Ph.D. students

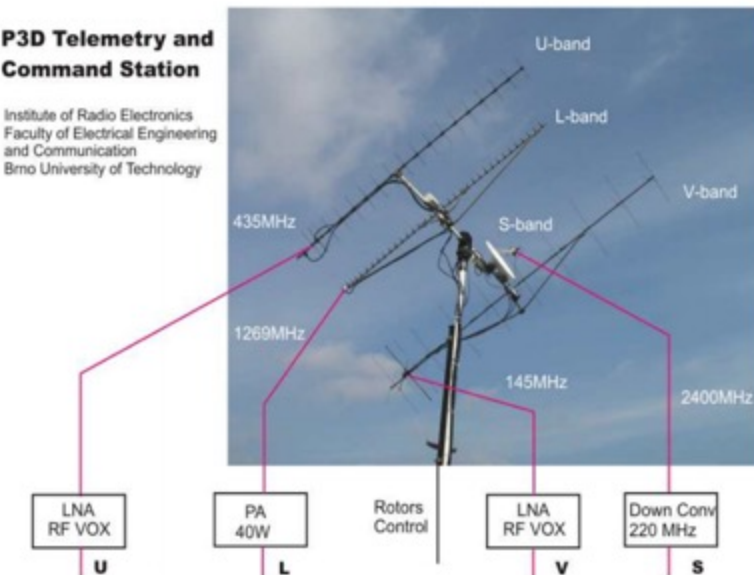


AMSAT (Kasal)

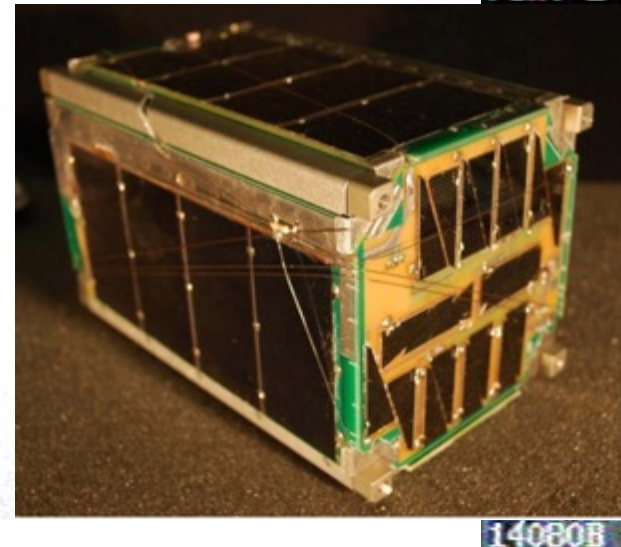
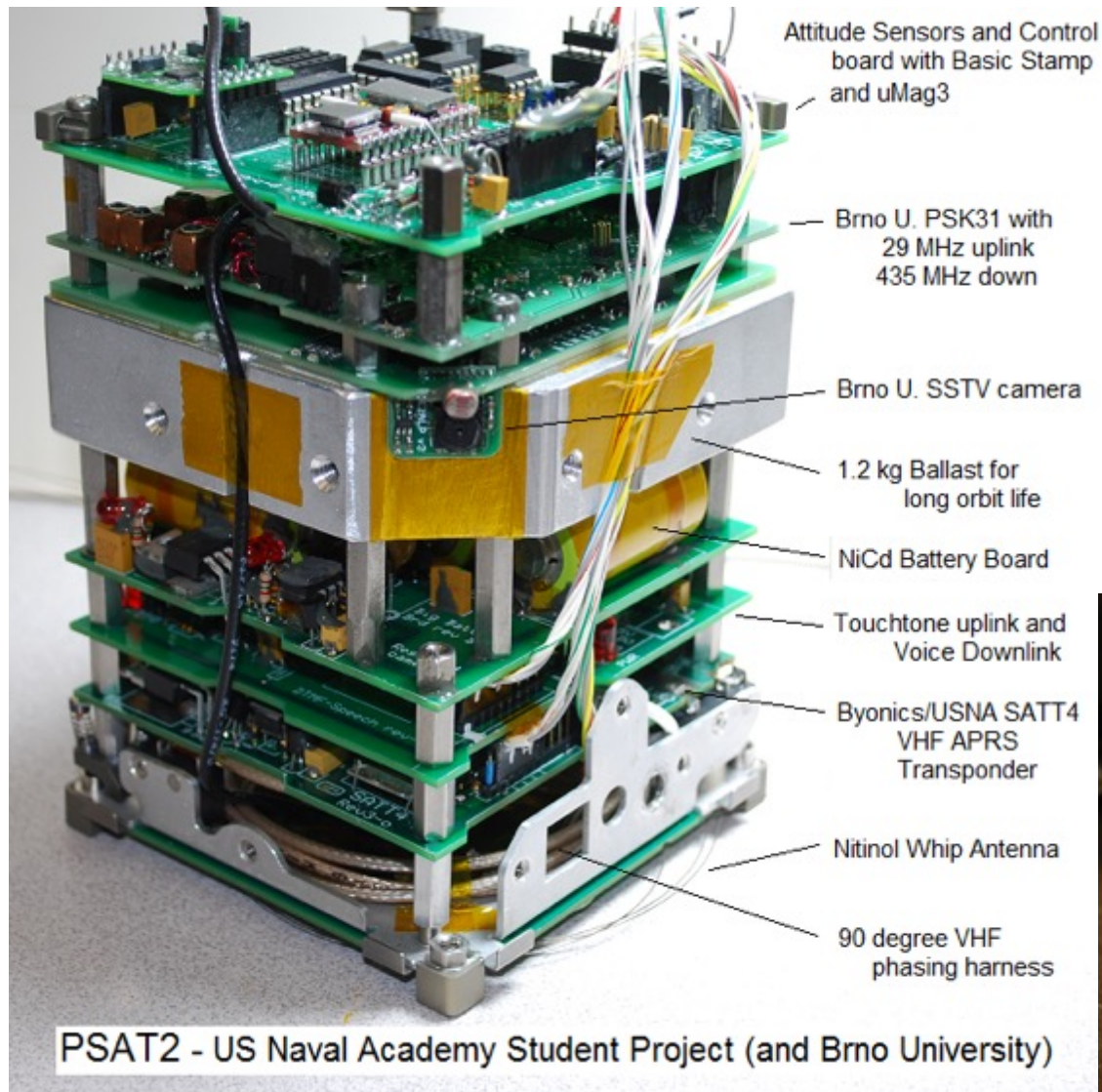


P3D Telemetry and Command Station

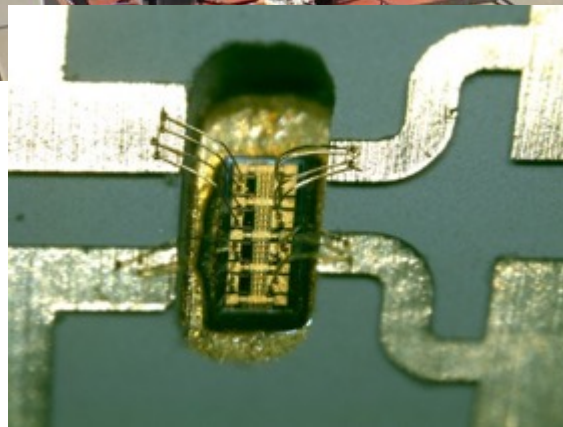
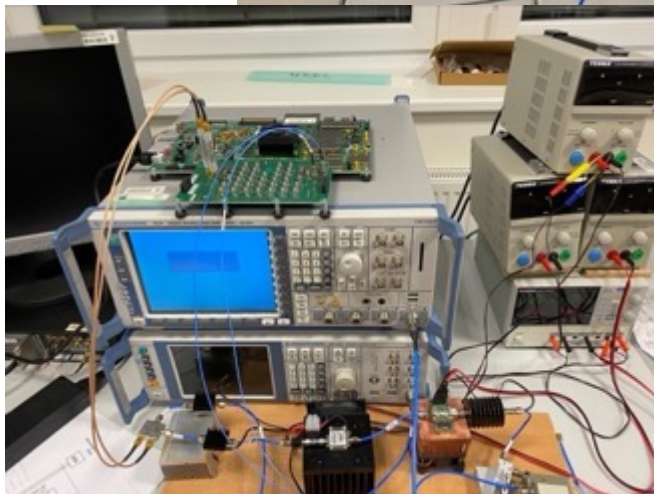
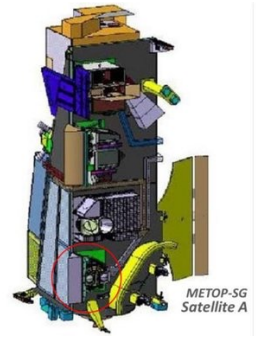
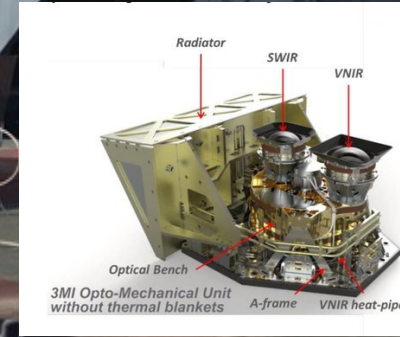
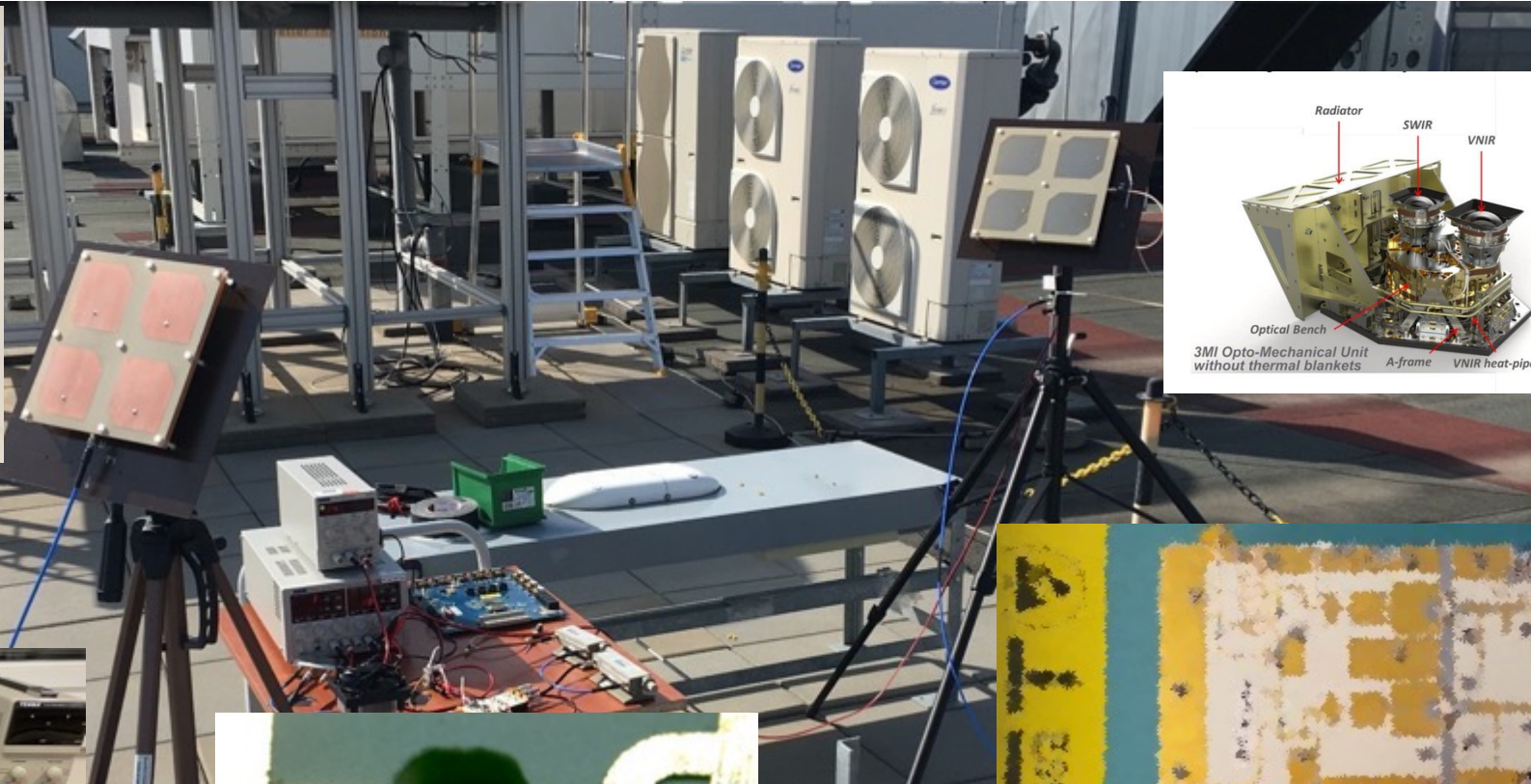
Institute of Radio Electronics
Faculty of Electrical Engineering
and Communication
Brno University of Technology



PSat-2 (Povalač, Urbanec)



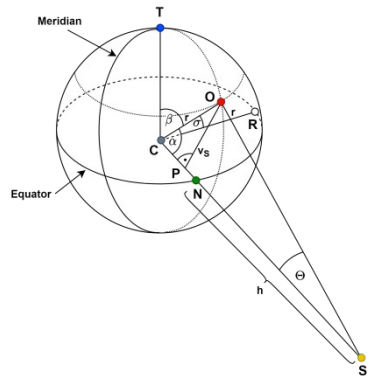
ESA (Gotthans)



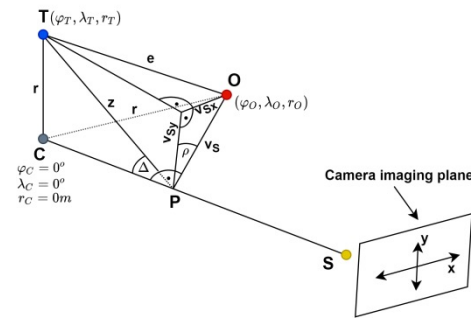
Honeywell (Gotthans)



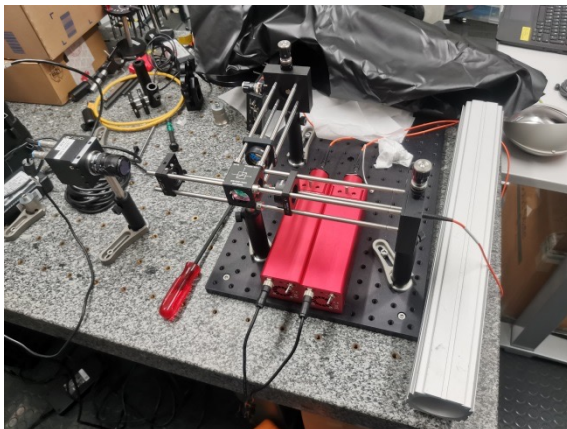
Multi-spot tracking system for free-space optical communication



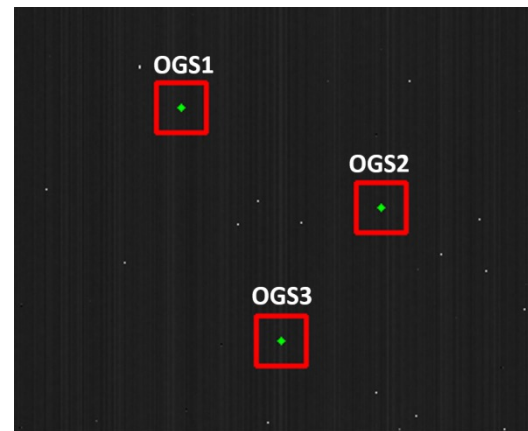
Geometric layout of Earth-satellite system



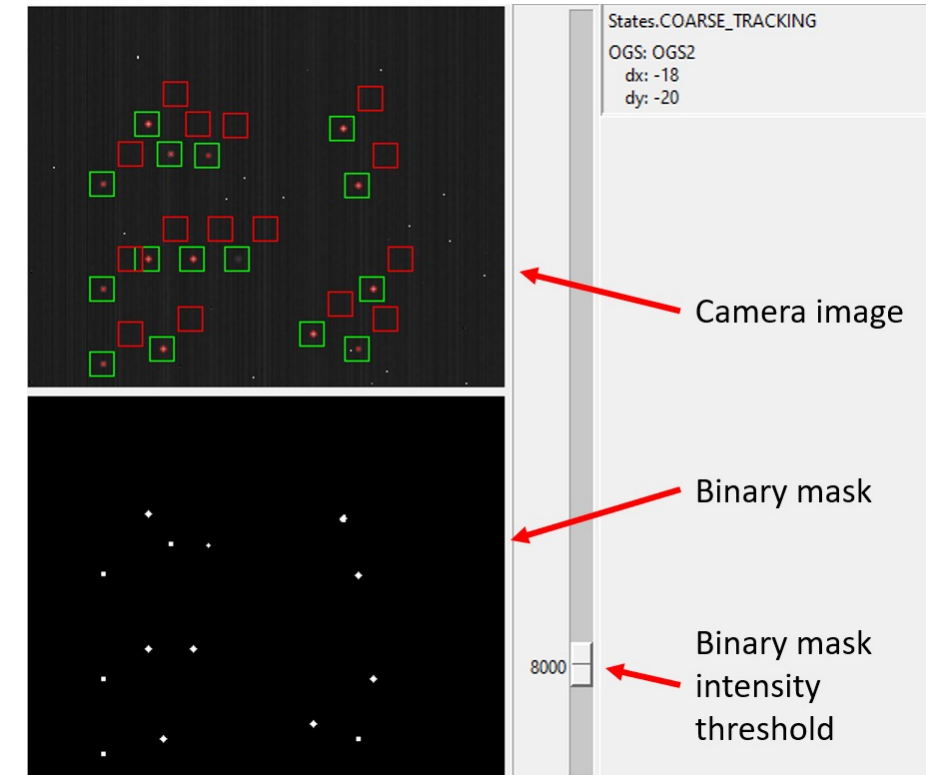
Geometry of Earth-satellite system for projection of optical terminal into camera image calculation



Detection of spot from camera image

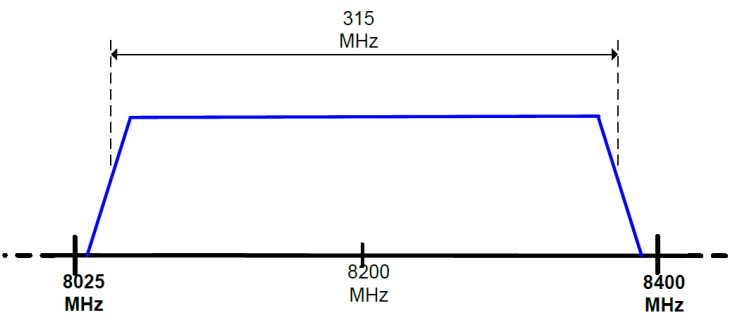
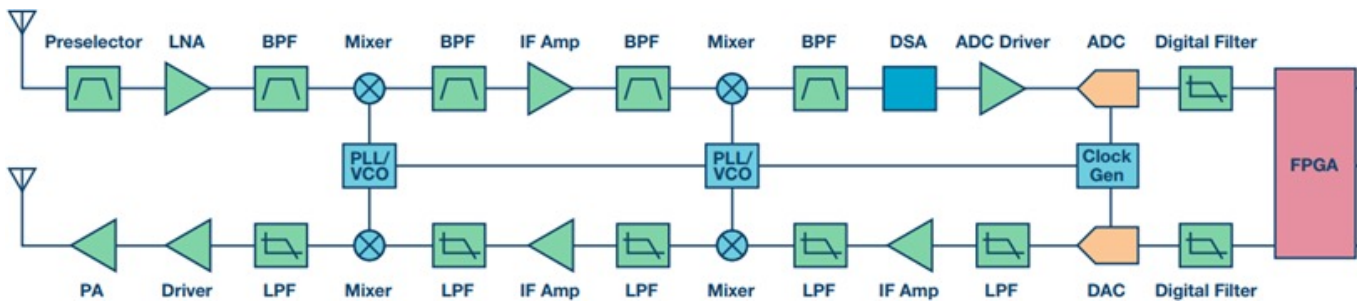


Reference optical ground station image

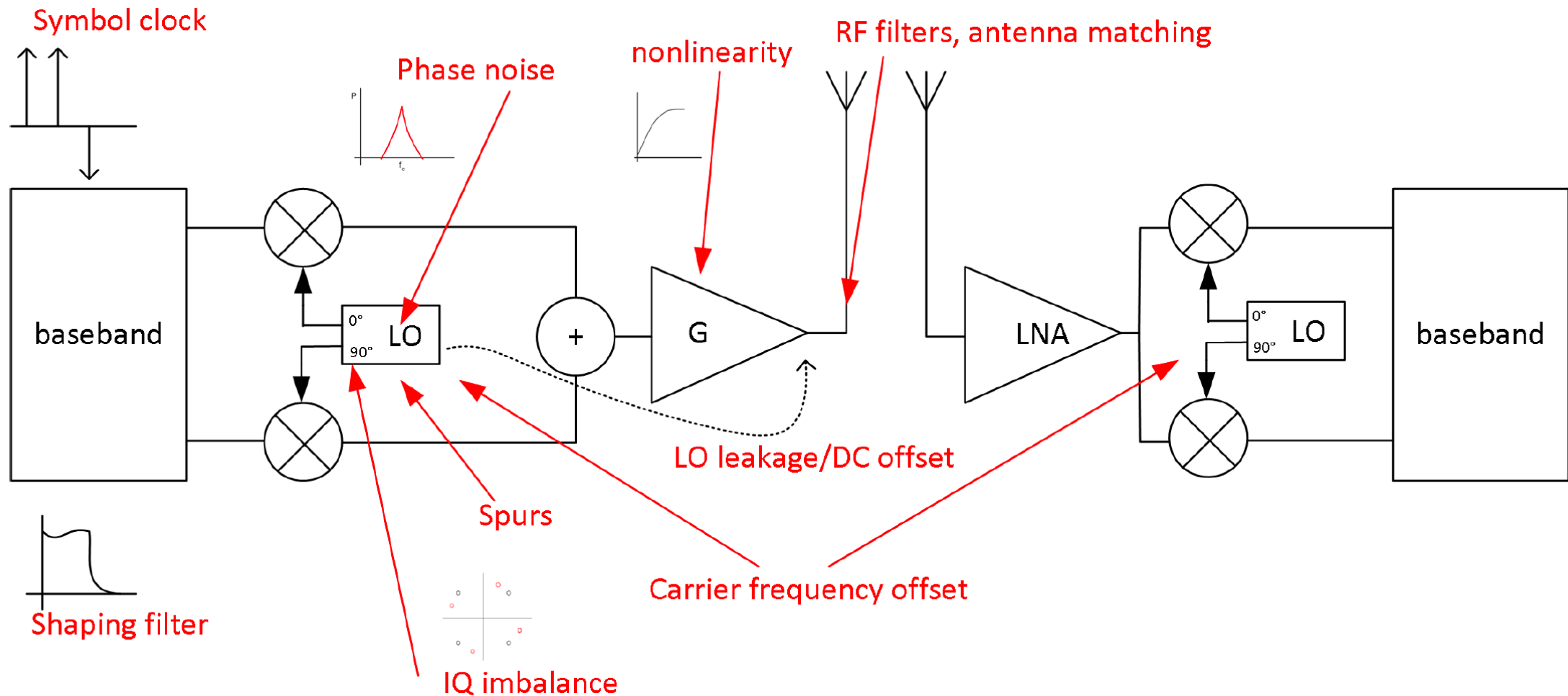


Tracking of 15 spots/optical ground stations

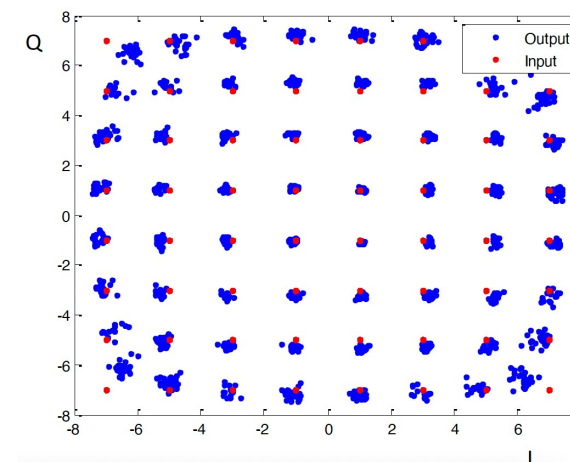
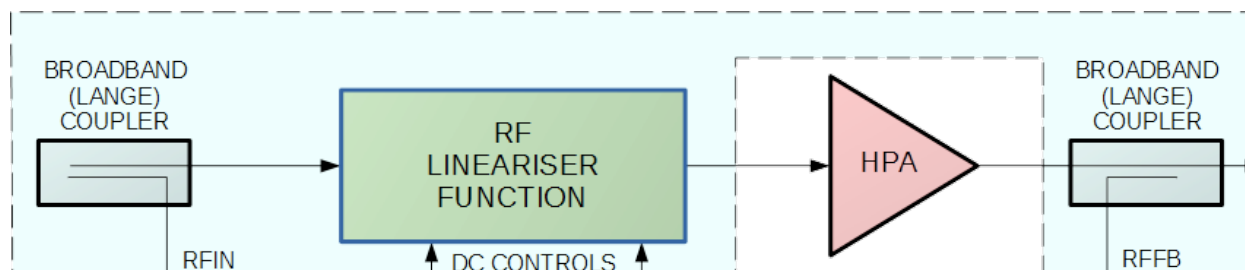
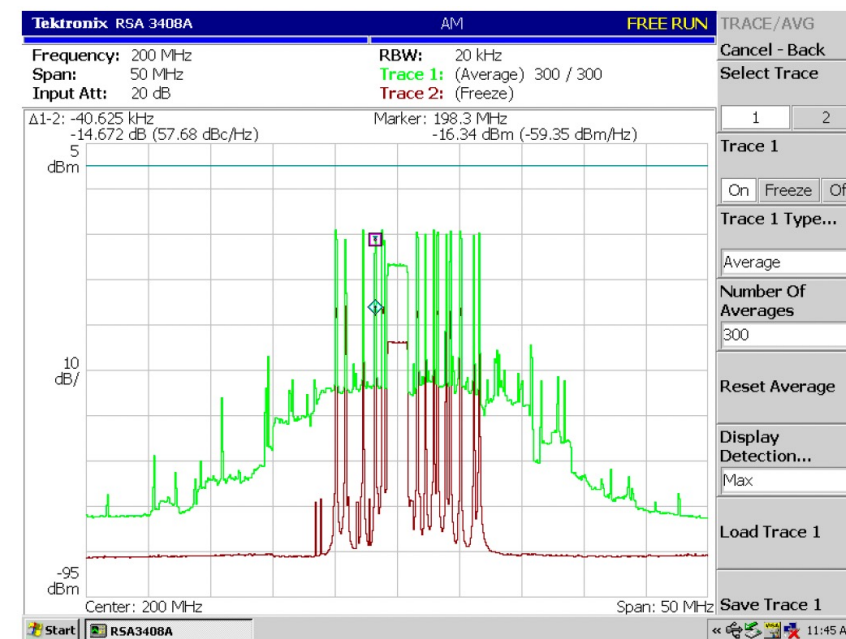
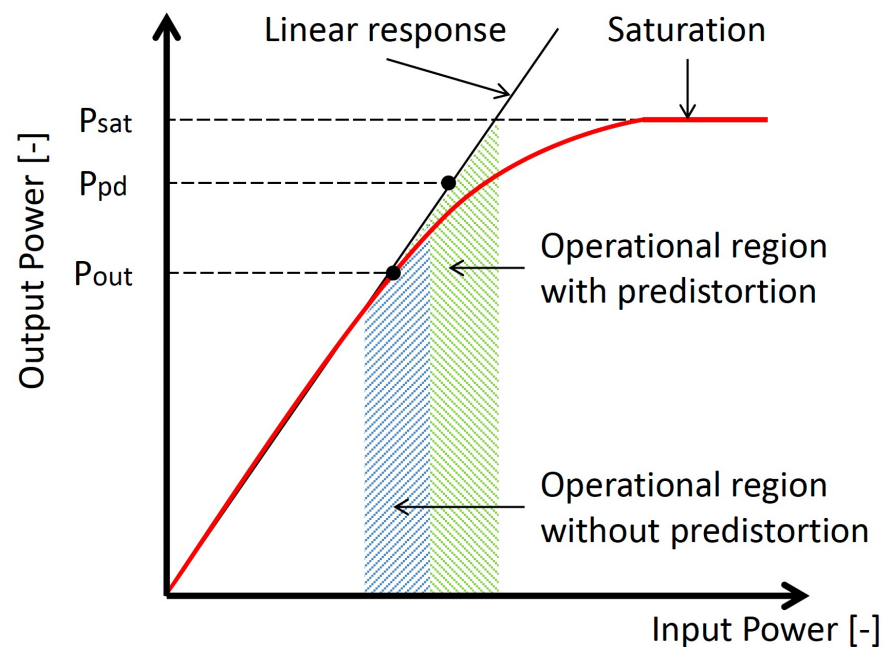
Modulation format	QPSK						8PSK						16APSK					32APSK					64APSK				
ACM Format	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Modulation Index	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6	6
Input Bit rate (Mb/s)	166.342	201.009	242.609	284.209	325.809	381.276	325.809	381.276	429.809	492.209	554.609	617.009	554.609	617.009	679.409	748.742	818.076	748.742	818.076	894.342	963.676	1039.94	963.676	1039.94	1116.21	1185.54	1261.81



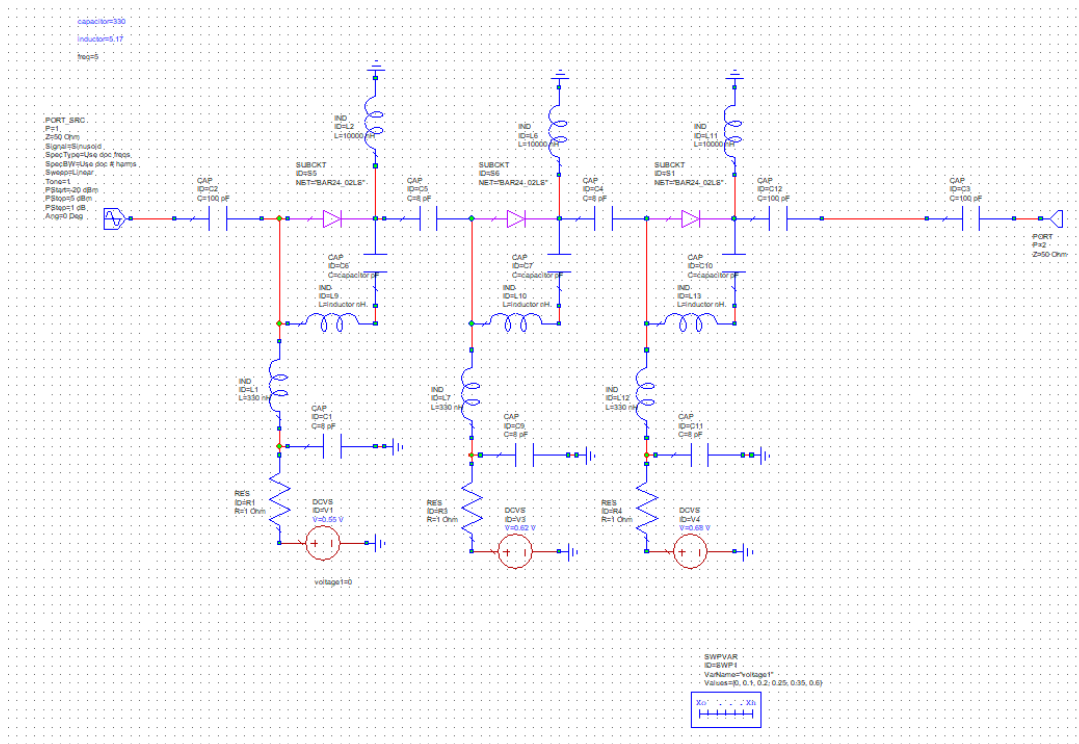
X-BAND DOWNLINK



X-BAND DOWNLINK

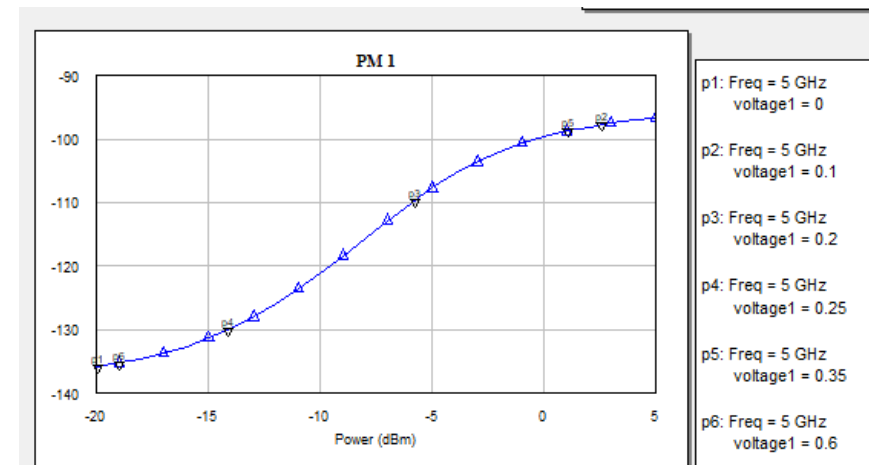
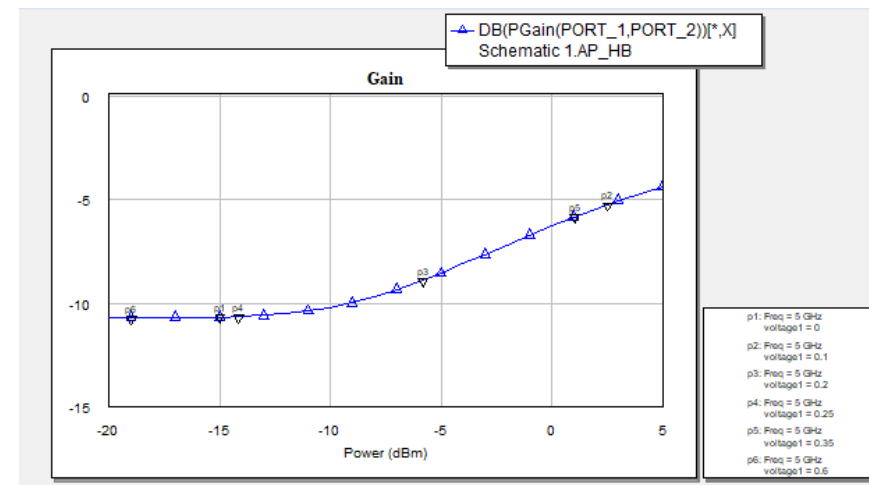


RF Analogue

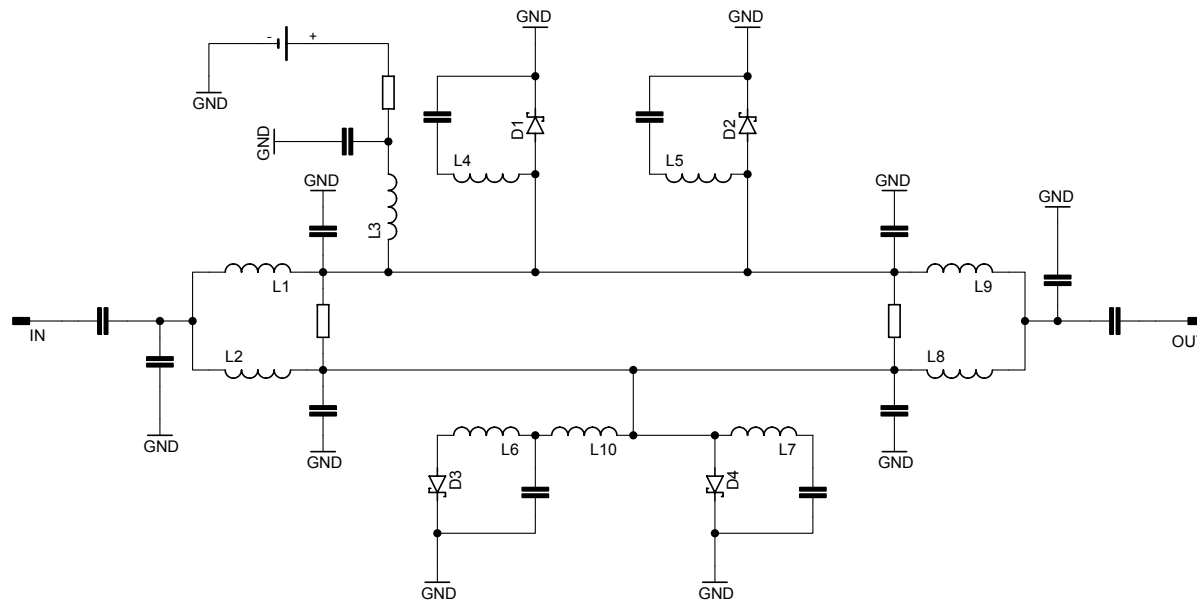


- Very good tunability of AM/AM
- Designed for TWTA (Poor AM/PM)

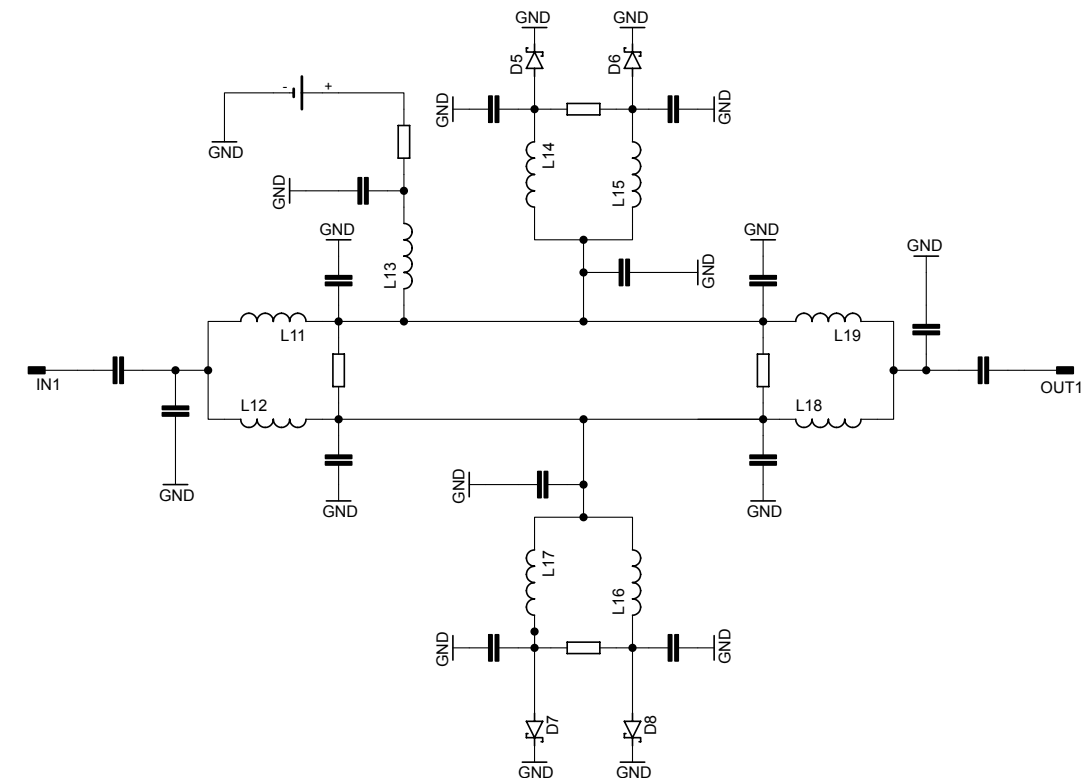
Patent No. US 6,346,853 B1



Lumped element schematics of the implemented lineariser AM/AM and AM/PM blocks

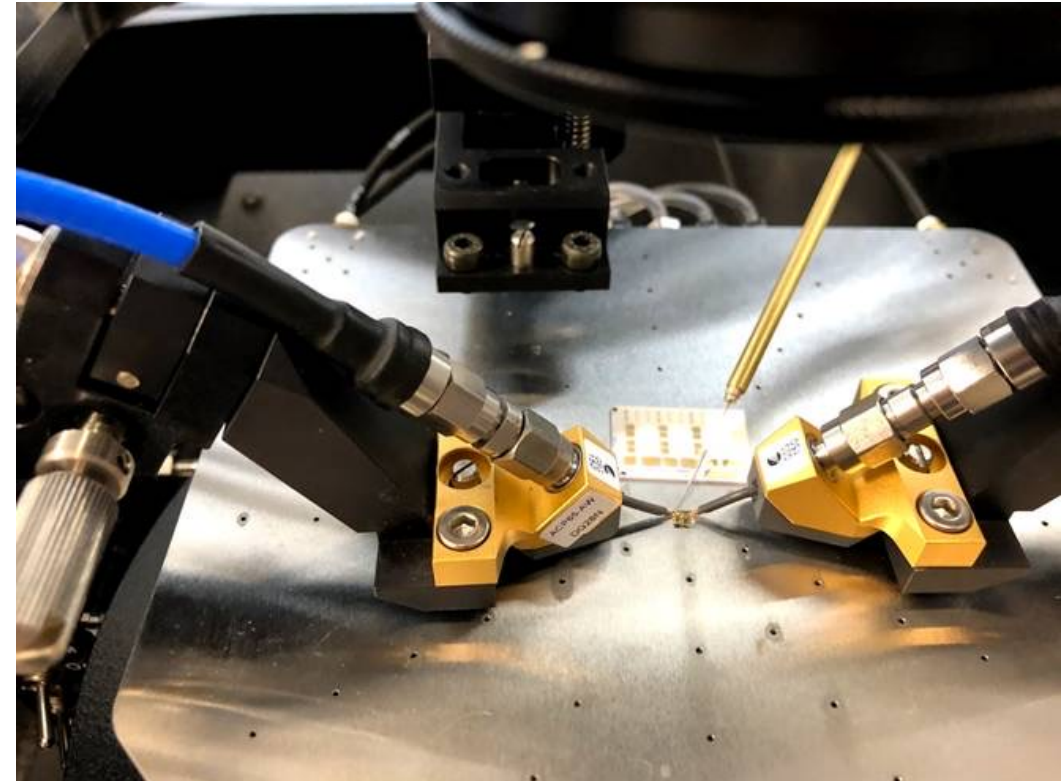
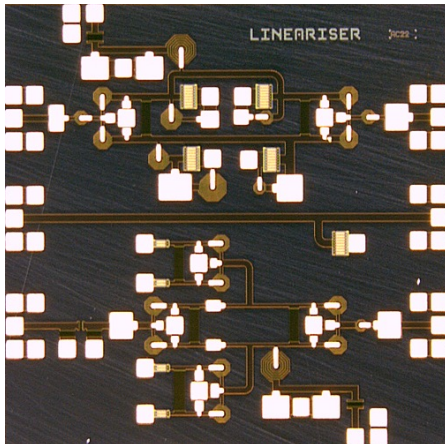


AM/AM Schematics

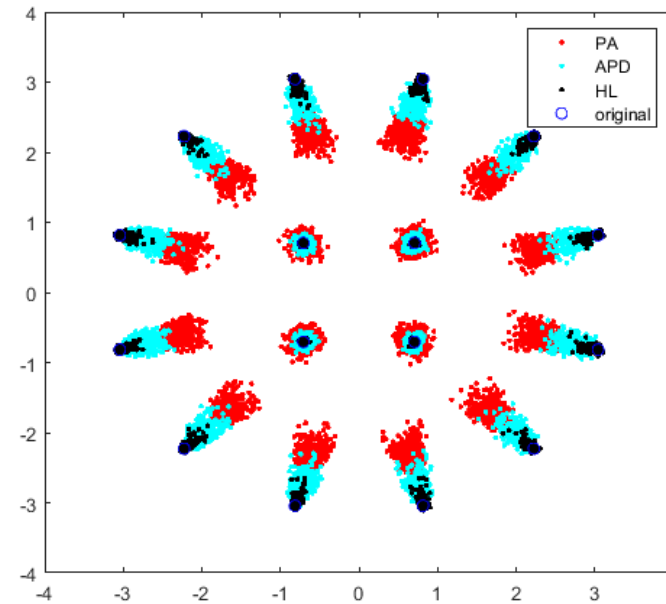
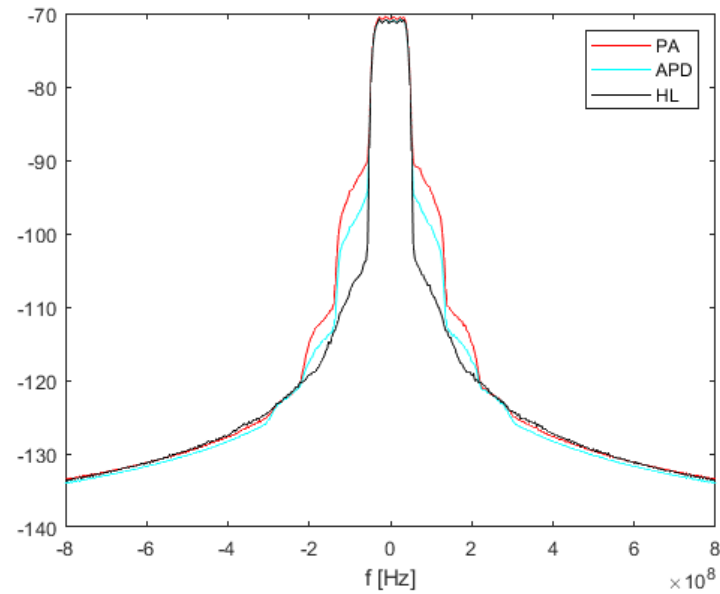


AM/PM Schematics

- GaN RF MMIC Chip
- Fabricated by UMS



Total estimated (max) power consumption: **810 mW**



PA only:	EVM=9.1	ACPR=-24.2 -24.0 -47.7 -47.6	Power=38.5
PA + APD:	EVM=5.4	ACPR=-28.6 -28.5 -49.9 -49.8	Power=38.4
Hard Lim:	EVM=2.1	ACPR=-37.6 -37.4 -52.3 -52.3	Power=38.5

THE END

