`	Year	Status	Frequency	Wavelength	Aperture (m)	Instrument	Detectors	Science Aim	Type	Location	Notes	Links
STO-2	2016	**Flown**	1.4 1.9 4.7 (THz)	64 258 215 (μm)	0.8	**Spectrometer**	HEBM	Observations of **CII, NII, and OI** fine structure line in **Milky Way giant molecular clouds**.	LDB	Antarctica	2nd gen	https://iopscience.iop.org/article/10.1088/1757-899X/101/1/012131/meta
OLIMPO	2018	**Flown**	150 220 350 480 (GHz)	625 857 1499 1999 (μm)	2.6	**Differential spectrometer**	KID	Study **inverse Compton scattering** of **CMB** photons crossing **clusters of galaxies** (Sunyaev-Zeldovich effect).	LDB	Svalbard, Norway		https://www.sciencedirect.com/science/article/pii/S1387647306003253
BOBCAT	2019	**Flown**	-	-	3-4	**-**	-	**Develop new technology** for infrared ballooning (lighter dewars, larger telescopes, etc.).	Conventional	New Mexico, USA	No observing instrument, it was a cryogenic tech demo	https://ui.adsabs.harvard.edu/abs/2020AAS...23546004D/abstract
PIPER	2019	**Flown**	200 270 350 600 (GHz)	500 857 1110 1499 (um)	1	**Polarimeter**	TES (BUG)	Map **CMB polarization** at large angular scales.	Conventional	New Mexico, USA	Flew, but telescope lid did not open (no science yet)	https://www.spiedigitallibrary.org/conference-proceedings-of-spie/9914/99141J/The-Primordial-Inflation-Polarization-Explorer-PIPER/10.1117/12.2231109.short?SSO=1
BLAST-TNG	2020	**Flown**	1199 856 599 (GHz)	250 350 500 (μm)	2.5	**Polarimeter/ B-field mapper**	KID	Map **polarized dust emission** locally (galactic molecular clouds) and in select extragalactic sources.	LDB	Antarctica	Flew but came down in the first few hours due to an error	https://www.spiedigitallibrary.org/conference-proceedings-of-spie/11453/1145304/Characterization-deployment-and-in-flight-performance-of-the-BLAST-TNG/10.1117/12.2560854.short?SSO=1
GUSTO	2022	**Pending flight**	1897 4758 1462 (GHz)	63 158 205 (μm)	0.9	**Three wide-field heterodyne array receivers**	-	Map **CII, OI, and NII** in the **Milky Way**, the **LMC**, and select deep regions.	ULDB	Antarctica	Hard to find detailed documentation for	https://ui.adsabs.harvard.edu/abs/2018AAS...23123105K/abstract
EXCLAIM	2023	**Pending flight**	420 - 540 (GHz)	555 - 714 (μm)	0.9	**Six spectrometer-on-a-chip devices (R~512)**	KID	Perform **line intensity mapping** of **CO** and **CII** at **intermediate redshifts**. Map **Galactic CI** abundances.	Conventional	New Mexico, USA		https://www.spiedigitallibrary.org/journals/Journal-of-Astronomical-Telescopes-Instruments-and-Systems/volume-7/issue-4/044004/Experiment-for-cryogenic-large-aperture-intensity-mapping-instrument-design/10.1117/1.JATIS.7.4.044004.short?SSO=1
ASTHROS	2023	**Pending flight**	1.4 - 1.5 2.4 - 2.7 (THz)	200 - 214 111 – 125 (μm)	2.5	**Heterodyne array camera**	KID	Simultaneously observe the **NII** fine structure lines in **galactic** and **extragalactic** star forming regions.	LDB	Antarctica	Interesting and bold astro2020 white paper	https://www.jpl.nasa.gov/missions/asthros
TIM	2024	**Pending flight**	0.7 - 1.25 (THz)	240 - 420 (μm)	2	**Imaging (grating) spectrometer (R~230)**	KID	Perform **line intensity mapping** of FIR lines (**CII, OIII**, etc.) from **z~0.2 - 3.8**.	LDB	Antarctica		https://arxiv.org/abs/2009.14340
JUSTIINE	2025	**Proposed**	9-10 (GHz)	30-90 (mm)	-	**Polarizing Fourier Transform Spectrometer (R~100)**	-	Observe young stellar objects (**YSOs**), **evolved stars**, and a select **AGN**.	unknown	unknown		documentation thin
BEGINS	2026	**Proposed**	4.7 - 12 (THz)	25 - 64 (μm)	0.5	**Spectro-photometric imager**	KID	Create spectral energy distribution (**SED**) **maps** of **molecular cloud** environments.	LDB	TBD		https://ui.adsabs.harvard.edu/abs/2021AAS...23823201G/abstract
BLAST-Observatory	2027	**Proposed**	856 1199 1713 (GHz)	175 250 350 (μm)	1.8	**Polarized 3-band photometer**	KID	Map **polarized dust emission** in nearby **molecular clouds**, **LMC/SMC**, and the **diffuse ISM**.	ULDB	Antarctica or New Zealand	ULDB mid-latitude flight (Wanaka) 30% of time for external observers	https://arxiv.org/abs/2012.01376
Dust Buster	2027	**Proposed**	0.115 – 2.5 (THz)	120 – 2600 (μm)	1.9	**Polarizing Fourier Transform Spectrometer**	-	Map **polarized dust** and use spectra to determine dust composition and properties. Improve **dust foreground** removal.	unknown	unknown		documentation thin

Balloon Type	Zero Pressure (ZP)	ZP	Super Pressure (SP)
Mission Type	Conventional	LDB	ULDB
Duration	2 hours to 3 days	Typical 7-15 days Up to 55+ days	Up to 100 days
Science Payload Weight	Up to 2,721 kg (Up to 6,000 lbs)	Up to 2,721 kg (Up to 6,000 lbs)	18.8 MCF* – 907 kg (2000 lbs) 26 MCF – 454 kg (1000 lbs)
Typical Float Altitude	29.2 to 38.7 km (96 to 127 kft)	36.5 to 38.7 km (120 to 127 kft)	18.8 MCF – up to 34 km (˜110 kft) 26 MCF – up to 36 km (˜117 kft)
Support Package	Consolidated Instrumentation Package (CIP) ● Line of Sight (LOS) ● Up to 1 Mbps direct return	Support Instrumentation Package (SIP) ● Over The Horizon (OTH) ● 6 kbps TDRSS downlink ● 100 kbps option with TDRSS or Iridium	
	Micro Instrumentation Package (MIP) ● Stand alone package for small payload support ● LOS and OTH TM & Command (Iridium) 255 byte/min packets ● Up to 1 Mbps LOS option System without batteries ~20 lbs (9 kg) * MCF – Million Cubic Feet		