



SPACE RELATED PRODUCTS

GROUND & SPACE SEGMENT

BHE BONN HUNGARY ELECTRONICS LTD.

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SPACE RELATED PRODUCTS

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SPACEBORNE



RADAR
SUBSYSTEMS



GROUND
SEGMENT

OVERVIEW

BHE Bonn Hungary Electronics Ltd. is the leading space technology company in Hungary. BHE employs engineers having space technology heritage of more than 30 years. Under different flags, we have been participating in numerous satellite projects and missions.

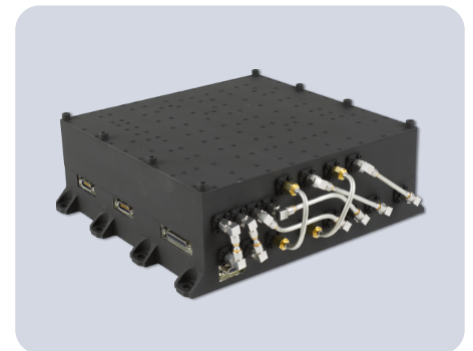
BHE has significant heritage in developing and manufacturing onboard and ground based space communications subsystems and equipment. BHE is ready for cooperation with other companies in this field and is open for joint development or manufacturing including technology transfer.

MAIN REFERENCES

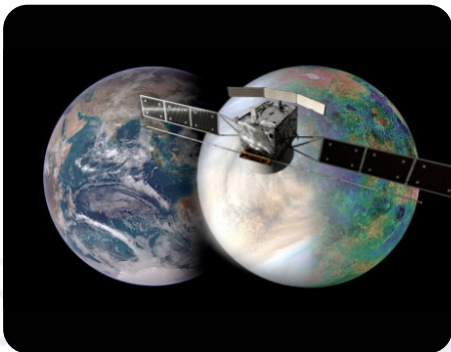
DEEP SPACE TRANSPONDER AND AMPLIFIER

Seeing the future need for communication solutions for the cislunar area, BHE decided to improve its transponder and High-Power Amplifier TRL for this matter by developing an X-band Moon-Earth communication system. This system consists of 2 separate boxes. One is the HPA, which amplifies the received signal to be sent to Earth.

The second is the transponder which collects and conditions the received data from the cislunar space and converts it to X-band. With this development BHE reached TRL8 and ready to supply for future projects.



BHE'S PARTICIPATION IN THE ENVISION SPACE PROBE



ESA selected a mission to analyse Venus, named Envision one of the scientific payloads is the Radio Science Experiment. BHE developing the Master Reference Oscillator (MRO), which is part of RSE's radio-occultation experiment. To the RSE to achieve the scientific objectives, a hardware is needed on the S/C, which generates a very accurate and stable signal for the Deep Space Transponder. This equipment is the MRO, which will be designed and manufactured by BHE Ltd. The objective of the RSE is to study the gravitational field and the atmosphere and ionosphere of planet Venus better than ever before. BHE was selected to analyse the feasibility to develop an MRO for the EnVision program.

INDIA'S SATELLITE ENTERED THE ORBIT OF THE MARS

Several news portals announced the launch of India's 1st Mars satellite (MOM) in November 2013, and its orbit insertion around the Red Planet in 24th of September 2014, followed by sending images and other data back to Earth. BHE - as a long time player in space ground segment - supplied the S- and Ku-band specific phase coherent 3-channel down converters to receive telemetry and Doppler signals from the Indian Mars Orbiter. These devices are used both on Indian tracking stations and tracking ships.



LUXSPACE

BUMT14 is installed onboard of VesselSat 1&2, launched in 2011 and 2012. Accumulated flight heritage is over 13 years. Redundant hardware configuration with full SDR technology, high PAE SSPA, with different modulations and coding schemes.

BHE IS ON-BOARD OF INTERNATIONAL SPACE STATION



BHE was requested to develop an important module for the antenna system of the ISS communication system. The purpose of this antenna system is to provide reliable digital TM/TC and data communication through GEO related satellites. The heart of the antenna system, - the BPBS28 S-band Solid State Power Amplifier -, has been developed and manufactured by BHE.

A NOVEL S-BAND ON-BOARD TRANSMITTER FOR SMALL SATELLITES

BHE finished the development of an on-board spectral and power efficient S-band telemetry and data transmitter. The small, lightweight ITAR-free and fully ESA compliant device was designed with small satellites constraints in mind, - but gives flexibility to users comparable with heavy/professional satellite devices. In order to achieve this goal, our company developed a satellite-board software defined radio (SDR) with advanced modulations and coding used by professional scientific and remote sensing satellites, but also provide standard modulations, coding and data rates used by less complicated (simpler) small satellite ground stations.

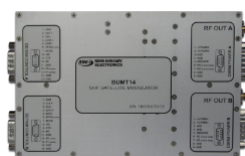
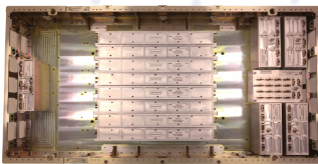


DLR GSOC PROJECT, WEILHEIM

Participation in the upgrade of two 17m tracking satcom antennas at the Weilheim facility of GSOC (German Space Operations Center) by providing S-band 2kW smart SSPA systems. GSOC is the mission control center of the German Aerospace Center DLR (Deutsches Zentrum für Luft- und Raumfahrt) in Oberpfaffenhofen near Munich. Both upgraded antennas are now capable of transmitting up to 2KW clean RF power each.

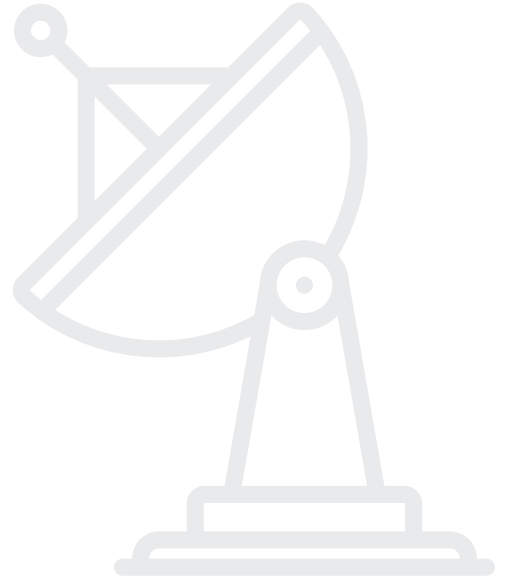
SPACEBORNE

- High efficiency Solid State Power Amplifiers
- Telemetry Transmitters based on Software Defined Radio technology
- Digital Telecommand Receivers based on SDR technology
- High data rate Digital Transmitters for data downlinks
- Spectrally efficient Digital Modulators with different data rates and coding
- Low phase noise RF & Microwave Synthesizers and Oscillators
- Microwave Front-Ends & T/R Modules
- RF & microwave subsystems for Synthetic Aperture Radar
- Up & Down Converters



GROUND SEGMENT

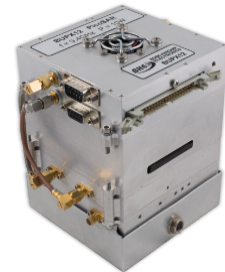
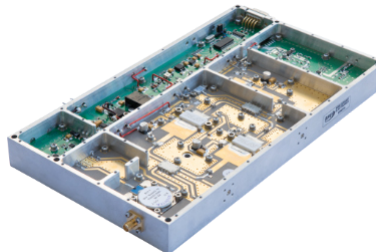
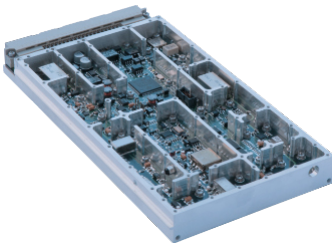
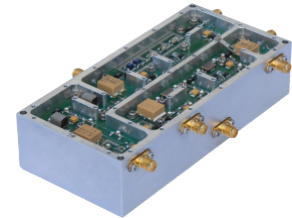
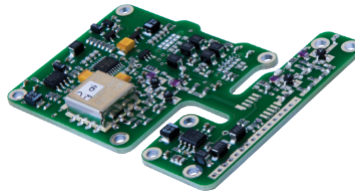
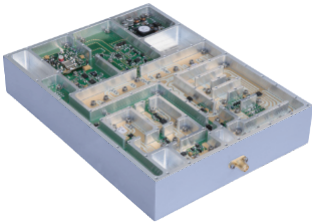
- Microwave LNAs, LNBs
- Low Noise Up & Down Converters
- Digital Demodulators
- Low phase noise, high resolution Frequency Synthesizers
- Digital Satellite Modulators & Transmitters
- High power Solid State Smart Amplifiers
- Digital Telemetry Receivers
- Test Loop Translators for satellite link simulation



RADAR SUBSYSTEMS



- RF and microwave subsystems for advanced Radars
- Digital signal processors and modulators for different Radars
- Special RF Subsystems for Radar RCS
- Solid state power amplifiers for radars
- RF & Microwave Front-Ends for active Phased Array Radars
- Special test instruments for Phased Array Radars
- Custom specified radar subsystems



HIGH RESOLUTION SAR PICTURES



FACILITIES

BHE's main facility is well equipped with manufacturing, assembling and testing capabilities adjusted for high-tech industrial and space-grade products. This chapter presents BHE's infrastructure with the available tools, instrumentation and test equipment which can be used by the running and future projects.



TEST LABORATORY



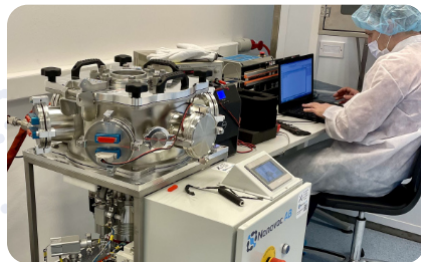
CLIMATE CHAMBERS



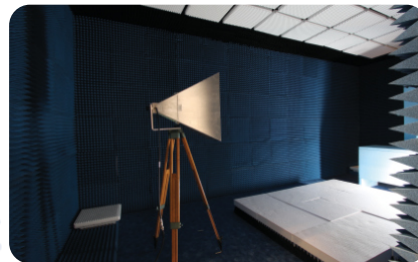
RF&MW TEST LAB



ISO6 CLEANROOM



TVAC CHAMBER



ANECHOIC & EMC TEST CHAMBER



Facility Security Clearance since 2020

These certificates refer to BHE's quality management systems. All our products are manufactured according to ISO 9001. Other, sector-specific management systems are only used in case of the customer's explicit request.

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