FirstTo6G assembles European SMEs and leading universities to develop the globally first 6G TRx technology, i.e., data converters and corresponding sub-THz frontends, which fulfils the extreme requirements for making 6G a widespread reality. These requirements include extremely wide modulation bandwidth at high signal quality, high energy efficiency, and low cost.

Using a novel breakthrough microchip architecture, we will develop data converters with up to 16 GHz of modulation bandwidth, with extremely low power consumption, which are implemented in a commercial, low-cost 22 nm semiconductor technology.

We will also develop state-of-the-art frontend technology and integrate both parts to two full TRx solutions with unprecedented capabilities.

The TRx for the frequencies <100 GHz will deliver 8 GHz of modulation bandwidth and will be realised in a monolithically integrated chip. The TRx for the frequency range of 130-175 GHz will deliver 16 GHz of modulation bandwidth and will integrate on PCB the data converters and the SiGe frontends using advanced packaging technologies. The D-band frontend will be designed based on a fully automated design flow.

Key exploitable FirstTo6G results include designs for new technical concepts for data converters and the frontend, integration of high-performance TRx components in a single chip and automation algorithms for the design of frontends.

We will use these results to develop and directly commercialise high performance mm-wave / early 6G products, as a basis for further research, or to spin-off new businesses.

By making the widespread realisation of 6G possible, we will enable the highly positive contribution to prosperity of society which 6G will ultimately have.

Critical technical knowledge will be developed and exploited in Europe by strongly growing SMEs, which will grow the communication microelectronics provider landscape, bolster the European microelectronics ecosystem and strengthen European technological sovereignty.