Hadron structure is not fully understood yet. While the spin-averaged Parton Distribution Functions (PDFs) and the helicity-dependent PDFs are well determined, little is known about the transverzity and some other transverse-momentum dependent PDFs (TMDs). The COMPASS experiment at CERN is preparing for studying the TMDs using a Drell–Yan process on transversely polarized target hit by pion beam in 2014–2015. An outline of the parton model of hadrons and of the TMDs is given. The COMPASS spectrometer is described, with emphasis on the modifications for the Drell–Yan program, and its capabilities to measure the TMDs is briefly discussed. A special attention is paid to the polarized target. The dilution refrigerator, the DNP system for polarizing the nuclei and the NMR for polarization measurement are described. The new monitoring system of the refrigerator is described, including the author's contribution to it. Issues of the new NMR coils design are discussed.