This paper will describe some advance in high precision GNSS and the work from the working groups within IAG SC4.5 “High Precision GNSS”. The focus will be placed on differential RTK including network RTK and long baseline RTK, precise point positioning (PPP) particularly bias treatment and integer ambiguity resolution, multi-constellation (GPS, GLONASS, Galileo and COMPASS) based precise positioning. The progress in real-time availability of global corrections on orbit, clock and atmospheric effects and their potential impacts on future high precision GNSS technology development will also be discussed. The challenges will focus on the critical issues and problems that should be addressed related to high precision GNSS. Integration of different high precision GNSS techniques for complementary benefits will be discussed. As the on-going miniaturization of GNSS receiver hardware such as chipsets and OEM boards and the further reduction of equipment cost for high precision GNSS, low-cost but precise solutions become more and more obtainable. Some latest progress in high precision receiver products will also be included which link to the trend of future high precision GNSS product development.