To accomplish SHARAD data processing, a specific software tool has been designed and implemented by Co.Ri.S.T.A. within the SHARAD Ground Data System (GDS) development activities funded by the Italian Space Agency. The SHARAD Ground Data System (GDS) is the element of the Internet-distributed architecture defined for controlling and monitoring the instrument, and for receiving and processing the down linked Science Data.

The Level 1B (L1B) Tool is the GDS software devoted to basically accomplish Range and Doppler processing in order to produce radargrams of Mars subsurface. It generates as output Level 1B data files formatted according to PDS formatting specifications.

Taking advantage of PGA phase estimation, a non linear least-squared fitting (Trust-region method) has been applied to SHARAD data showing clear improvements in range compression.

To make ionospheric distortions unavoidable, the level 1b  tool has to be applied. The PGA method has been often applied to SHARAD data showing clear improvements in range compression.

\[
\phi(f) = 2\pi f \tau_0 \sqrt{f^2 - f_p^2} - 2\pi \Delta f \tau - K
\]

By using this method, plasma frequency and ionospheric delay of Mars ionosphere have been evaluated.

The estimated values seem to be in accordance with measurements acquired by MARSIS on board MEX mission.