SAM is a suite of three instruments, a Quadrupole Mass Spectrometer (QMS), a Gas Chromatograph (GC), and a Tunable Laser Spectrometer (TLS).

* The QMS and the GC can operate together in a GCMS mode for separation (GC) and definitive identification (QMS) of organic compounds.
* The TLS obtains precise isotope ratios for C and O in carbon dioxide and measures trace levels of methane and its carbon isotope.

Three questions about the ability of Mars to support past, present, or future life are addressed by SAM's five science goals as stated in the table below.

