The MAVEN Mission to Mars: Results from the nominal mission

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The MAVEN (Mars Atmosphere and Volatile EvolutioN) spacecraft has been making measurements relevant to the loss of Martian atmospheric particles to space since September 2014. Now in its first extended mission, MAVEN observations are teaching us about the chain of events that lead to atmospheric escape - including the drivers of escape from the Sun and solar wind, the atmospheric particle reservoirs for escape, and the escape processes and rates. These measurements are made using nine science instruments on a spacecraft with an elliptical precessing orbit that dips below the Martian exobase every 4.5 hours. During certain 'Deep Dip' periods the spacecraft periapsis is lowered further to near the top of the homopause, and the main peak of the ionosphere.

Here we summarize the key results from MAVEN through the nominal mission and beyond. We emphasize new discoveries (e.g. diffuse aurora, a dusty upper atmosphere, metallic atmospheric ions) as well as coordinated measurements that allow us to evaluate atmospheric escape and climate evolution in unprecedented ways. We then highlight plans for continued observations of the Martian upper atmosphere and escape.