ABSTRACT: The mission design for Cassini-Huygens calls for a four-year orbital survey of the Saturnian system and the descent into Titan's atmosphere and eventual soft-landing of the Huygens probe. The Cassini orbiter tour consists of 76 orbits around Saturn with 44 close Titan flybys and 8 targeted icy satellite flybys. The Cassini orbiter spacecraft carries twelve scientific instruments that will perform a wide range of observations on a multitude of designated targets. The science opportunities, frequency of encounters, the length of the Tour, and the use of distributed operations pose significant challenges for developing the science plan for the orbiter mission. The Cassini Science Planning Process is the process used to develop and integrate the science and engineering plan that incorporates an acceptable level of science required to meet the primary mission objectives for the orbiter. The bulk of the integrated science and engineering plan will be developed prior to Saturn Orbit Insertion (SOI). The Science Planning Process consists of three elements: 1) the creation of the Tour Atlas, which identifies the science opportunities in the tour, 2) the development of the Science Operations Plan (SOP), which is the conflict-free timeline of all science observations and engineering activities, a constraint-checked spacecraft pointing profile, and data volume allocations to the science instruments, and 3) an Aftermarket and SOP Update process, which is used to update the SOP while in tour with the latest information on spacecraft performance, science opportunities, and ephemerides. This paper will discuss the various elements of the Science Planning Process used on the Cassini Mission to integrate, implement, and adapt the science and engineering activities plans for Tour.