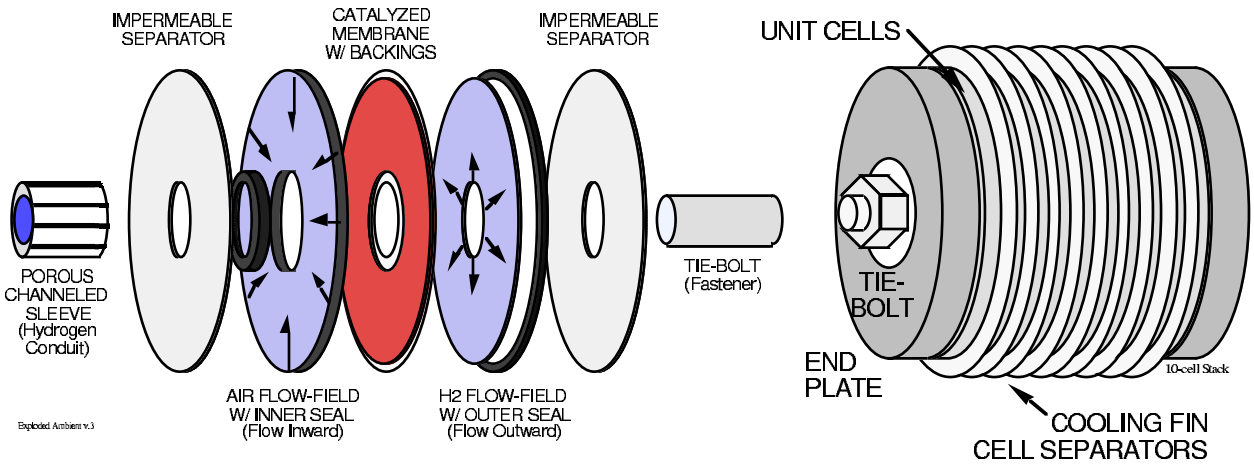

Figure 1 - Configuration and key components of a unit cell in an air-breather stack.

When the cells are stacked, not only do the structures heat up more but water accumulation in the annular region actually becomes a problem. Since the hydrogen supply is dead-ended, condensate can collect undisturbed and block the hydrogen from accessing the cells furthest from the hydrogen supply. The accumulation can be alleviated by introducing a wicking material in the annular region that draws the condensate away from the downstream cells (Wilson and Neutzler 1997).

Not surprisingly, cell performance is substantially affected by the thickness of the cathode flow-field because oxygen must diffuse in from the periphery through this structure. While the thicker flow-fields provide high powers at low temperatures, too much water is lost as the stack heats up to higher temperatures, especially at the relatively high altitude of LANL (2,250m or 7,300'). The optimum flow-fiel