Scientific Background
The turbulent motion of liquids and gases is a ubiquitous phenomenon in nature and engineering. Such motion is fundamental to the formation of planets from interstellar clouds of particulates, to the dynamics of the earth’s atmosphere and oceans that determine weather systems, to the mixing of reactants in combustion, to the dispersion of pollutants from smokestacks and storm sewers, and to the health risks caused by diseased arteries, to name but a few examples. Understanding and modeling the physics of turbulent motion is the basis of predicting its effects in these and numerous other examples and controlling it in engineering applications such as the design of air and surface vehicles, efficient engines for propulsion, heat exchangers and stents and heart valves.