This work presents a new air traffic complexity metric based on non-linear dynamical systems. Previous work has shown that the structure and organization of traffic are important factors in the perception of the complexity of an air traffic situation. The new metric captures these important aspects of complexity by identifying the organization of trajectories in a traffic pattern. This paper investigates only the features of this new metric without quantifying directly the connection between complexity and the metric. Authors of previous work in this area have proposed metrics that generally have not explicitly addressed the effects of organization in the traffic flow on complexity. In order to capture the effect of organization, the metric is based on a dynamical system which fits as closely as possible the observations given by the aircraft positions and speeds. This approach, uses a non-linear dynamical system model that fits the observations without error. Based on this non-linear dynamical system the method consist in the computation of the map of the associated Lyapunov exponents. This metric can be used to identify high (or low) complexity areas on a map, and, by capturing the organization properties of the traffic, captures some of the key factors involved in ATC complexity. Such maps are an example of the usefulness of these methods for comparing the relative complexity of different regions of airspace.