I. PERSONNEL

In addition to the Principal Investigator, this research involved the graduate students David Vogel, Georg Haubs, Ulrich Steiger, and Bruno Eckhardt, the post-doctoral student, Franco Vivaldi, and the visiting professors Dr. G. H. Walker (University of Tennessee at Chattanooga), Dr. Giulio Casati (University of Milano), Dr. Boris V. Chirikov (Institute of Nuclear Physics, Novosibirsk), and Dr. Nobu Saito (Waseda University, Tokyo).

II. ACTIVITIES AND PAPERS

During this three year period, the Principal Investigator has on average participated as an invited speaker at five conferences/year and presented seminar talks at universities in the US and abroad at an average rate of about eight talks/year. He has served as co-organizer of two distinct conferences to be held in June of 1983. During this period he has served as an editor of Physica D: Nonlinear Phenomena and on the editorial board of the Journal of Mathematical Physics.

Copies of the following papers are supplied herewith:

Abstracts for the Master of Science Theses of Georg Haubs and Bruno Eckhardt.


The following papers are at various stages of the publication process. Copies will be forwarded to NSF at a later date.


III. TECHNICAL DESCRIPTION OF PROJECT AND RESULTS

Earlier Progress Reports in concert with the above summary of Part II (Form 98A) and the enclosed reprints describe and summarize our scientific results of the past three years quite adequately. Here we need only briefly outline the contents of the four papers yet to be published. Reference 11 will, at long delayed last, firmly establish that the Fourier heat law is valid for chaotic dynamical systems but not otherwise. Reference 12 establishes that the Feigenbaum period doubling to chaos observed for a mapping system in Ref. 8 also occurs in differential equation systems. Reference 13 studies the character of stability (or its lack) in the solar system using an exotic mapping system. Finally, as mentioned in Part II (form 98A)
above, we have resolved the random-determinate paradox. Since we now know what random is, we also know what not-random is. As a consequence, in Ref. 14 we expose a broad new class of dynamical systems which have meaningful analytic solutions but which are not integrable in the historically accepted sense.