INTRODUCTION

An interesting foreword to the AGARDograph 167 has been written by M. Pianko and we quote from Ref. 1 :

"As a matter of fact, with the increasing complexity of turbine engines, one is greatly tempted to isolate difficulties and improve understanding by separating the various stages of the study. ... The increasing complexity of turbine engines leads to an augmentation of the interaction phenomena taking place between the different components as well as of phenomena considered up till now as secondary and accessory".

The complexity of a turbomachine and the environment in which it has been used, propulsion or power generation, has been realised since a long time. The limited analytical tools on one side and the crude instrumentation forced the designers to split the whole unit into more comprehensive parts and simplified the problem definition. We see that a propulsion unit has been taken away from the vehicle and splitted up into an intake, nozzle and engine component. Similar splitting up has occurred in the automotive and power generation application where the turbomachine has been divorced from its intake and exhaust ducts. (Fig. 1).

A further subdivision is then made, talking about a compressor, combustion chamber, turbine and afterburner. The multistage units are thereafter separated in L.P., I.P. and H.P. blocks and finally one arrives at the single stage compressor or turbine. These elements are further treated as a quasi three dimensional problem through the definition of a meridional plane and a cascade plane, where extensive analytical and experimental work has been performed.

The designer works his way back up by using these elementary information and building stage by stage his turbomachinery component and delivering it for further integration in