LIST OF FIGURES

1. INTRODUCTION

Since the early days of the development of turbomachines, cascade measurements are used as a cheap means of acquiring detailed blade performance data. Turbine and compressor designers require cascade data to be measured with an accuracy of 0.5 points with respect to the blade losses and 0.5° with respect to the flow angles. In view of the numerous possible error sources like f.i. differences in blade and cascade geometry, finite extension of cascade, measurements in critical Reynolds number range, etc. among which the probe measurement error is only an additional error source, it is not always immediate to meet these requirements. Nevertheless, it seems that these requirements can be fulfilled for subsonic cascade testing if enough care is taken. With the development of turbines and compressors working in the transonic and supersonic domain, the cascade tunnel operator is faced with measuring problems by far more difficult than those encountered in plane subsonic flow. It is probably honest to say that in supersonic cascade flow measurements an accuracy of 1 point in blade losses and 1° in flow angle can be considered as a very reasonable result. The problem of measuring in a transonic flow field is different in the sense that it is not so much a problem of measuring correctly the total pressure, static pressure and flow angle in the measuring plane but rather the problem of a significant modification of the flow field by the probe itself.

Besides the measurements of the two-dimensional blade performance major activities are devoted to the investigation of secondary flows in cascades. These investigations are in a certain sense even more urgent than two dimensional performance measurements as the flow mechanism is far less understood. The use of low aspect ratio blades in modern turbomachines requires much more reliable data than are presently available. These investigations