

GENERAL

The design of missile configurations is one of the most interesting and challenging fields - and perhaps the most complex - for the aeronautical design engineer. It requires a reasonably broad knowledge of the fundamentals of many technical specialities - aerodynamics, thermodynamics, kinematics, propulsion, structural design, etc. No missile would ever be designed if an individual design specialist had complete control of the design.

'MISSILE DESIGN IS A COMPROMISE'

In general, the optimisation of a design is gained by careful analysis of some of the following considerations:-

1. Efficient and simple external configuration to minimise development time and costs.
2. Efficient aerodynamic control surfaces to simplify control, guidance circuits and minimise servo power sources.
3. Missile range, speed, performance characteristics that satisfy the mission requirements.
4. Adequacy of the airframe from the standpoint of stability, manoeuvrability and dynamic response.
5. Simple, efficient, reliable power plant.
6. Low cost, producibility and lightweight airframe construction.
7. Reliability of the complete weapon system.
8. Efficiency of packaging.
9. Accuracy of control guidance systems to accomplish mission.

ITEM 1 : to develop a simple and yet efficient external configuration - is possibly the primary goal of the aeronautical design engineer. The compromises he has to make, however, frequently means that many alternative designs are evolved for any given system specification.

In the following sections the various design configurations open to the designer, together with their associated advantages and disadvantages, are discussed.

Following this assessment some of the design principles and techniques used to arrive at a particular configuration are outlined.

It is hoped that this general lecture on the overall missile design will increase your appreciation of the more specific topics to be covered during this week and in particular, the need to consider their implications in relation to the overall missile system.