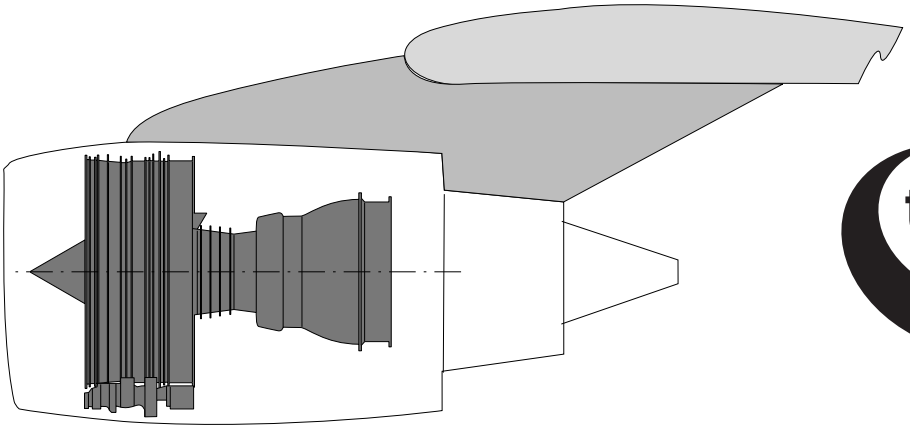

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The Fundamental Problem of Aeroengine Development by ‘Newcomers’.

Why obviously the attempt of dedicated national projects for an entrance into the aeroengine development is often desillusioning, even after efforts over many years?

The crucial problem seems to be a **not sufficient practical hardware experience**. It can not be purchased at the market, because this touchs the matter of survival of the few successful original engine manufacturers (OEM). So it comes to the **overestimation of computer calculations** in the framework of dimensioning and design. This first phase is a great progress and nowadays irreplaceable. The necessary computer programs are frequently offered at the ‘free market’. Anyway the safety and competitiveness (reliability, minimum life time, overhaul intervals) under real operation conditions is not guaranteed. The actual **time and cost intensive step** comes after this ‘paperphase’ as **hardware development, testing/proof** up to the **approval**. This can require decades without guarantee of success.

What is the reason:

Essential are the component specific design and production caused **longtime depending operation influences**. These act mutual, what from experience can not be covered satisfactory with calculation. So an evolutionary developmen is necessary. For example if today civil aeroengines must guarantee 20 000 operation hours up to the first overhaul are demanded with equivalent proofs, the problem of an own development without longtime experiences with an own (self developed) gets clear. So if (when this is possible at all) **experience and know how** must be **purchased very high costs** (markedly above the design phase) must be expected. These go into many millions and rather do not orient itself at hourly wage rates, but at the estimated **experience value** (similar a juridical counsel).

Recommended approach:

The project of the **hardware development** with testing based proofs must be primarily considered in the budget. In contrast the phase of computer based dimensioning calculation are rather low and short time.

So **experiences with the long time behaviour** must be compiled which are based on the own components develoment. This **application based knowledge** is earls indispansable. It enables as well the estimation of the failure mechanisms influences as also the hopefully early identification of the component specific weak points.

Compared with the mostly more theoretically oriented calculation experts (frequently with university background) **hardware specialists** with the necessary experience is considerable more difficult to get,especially to evaluate their offered expertise.

What is not promising:

A **clone of succeddful designs/aeroengines by competitors is no alternative**! This is also true if for example a long time licence production is on hand. The reason for example is, that the licensor does not give the hnow how about why it is made in the required manner because of self-care. The ugly surprises often show not before in combination with own developments during long time application under real operation conditions.

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Remember: **There is no cheap way to get an OEM with aeroengine development!**