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Notes on the Discussion in Washington of Some
Aerodynamic Problems of the C-105 Aircraft Project

1. In relation to the importance and cost of the C-105 project, it appears that the whole scale of basic activity is seriously inadequate. For example, in the absence of commercial competition, insufficient variety of configuration is on view, and the existing wind tunnel tests (to Mach Number 1.23) barely enter the supersonic range which is said to extend to M = 2.0 for this aircraft; and serious assessment of the aeroplane is hampered by lack of straightforward interchange of numerical information.

2. In support of each of the three difficult aerodynamic design issues, viz: - drag reduction, aircraft stability, and intake drag and stability, the NACA recommend an intensive programme of wind tunnel work. It is an urgent matter to arrange a better integration of the available effort if the wind tunnel and analogue computer and simulator investigations are to be a creditable job.

3. If sustained progress is to be made in a technical atmosphere free from carping acrimony, it is essential that discussion be concentrated on definite numbers and numerical estimates. How widely these latter may vary can be illustrated by a schedule of estimated values of the drag coefficient of the C-105 aircraft at zero lift, viz:-

C-105 Design Study, May 1953	at	M = 1.5	C_{D_o} =	0.014
NAE Report, November 1953		M = 1.5	C_{D_o} =	0.0183
A.V. Roe assessment of Cornell wind tunnel measurements, September 1953	at	M = 1.23	C_{D_o} measured	0.025
	at	M = 1.23	C_{D_o} corrected to be	0.016 - 0.018
A.V. Roe Brochure, July 1954		M = 1.5	C_{D_o} =	0.0157
NACA Langley Discussion, November 1954		M = 1.5	C_{D_o} =	0.023 - 0.028
NACA Ames Discussion, December 1954		M = 1.5	C_{D_o} =	0.025 - 0.030
NACA Washington Discussion, December 1954. On the basis of the redrawn configuration now presented, the NACA estimate that with intensive design work and wind tunnel development, an ultimate supersonic figure of C_{D_o} = 0.20 should be aimed at.				

4. With the upper limit of the NACA Ames estimate, the C-105 aircraft is barely capable of level flight at M = 1.5 and 50,000 ft., while the ultimate figure of C_{D_o} = 0.020, proposed in Washington as a goal for the redrawn aircraft, would lead to the attainment at M = 1.5 at 50,000 feet of a load factor of 1.60, which corresponds to a steady turning radius of 8.7 nautical miles.

5. For an advanced and difficult aircraft, careful discussion of other quantities than C_{D_o} and some re-drawing (even with the expenditure of some time) would appear to be advantageous to both the R.C.A.F. and to A. V. Roe Limited.

6. It would be an important step to find out the other reasons for the technical fog surrounding this particular project, e.g. whether this is due to misunderstanding on the part of the N.A.E. for example or to lack of definiteness in prescribing what is to be done, or whether, in ignorance of R.C.A.F. decisions, the N.A.E. is working at cross purposes. To the N.A.E. it is not at all clear that its efforts are proving to be of real assistance to the R.C.A.F.