

## CAPITAL REQUIREMENTS FOR THE AIR TRANSPORT INDUSTRY

by George James

A. T. A.

July 20, 1972

### Abstract

~~Over the past two years~~ the U.S. scheduled airline industry has been involved in the largest re-equipment program in its history. This program which is still continuing involves the addition of hundreds of new wide-body and other aircraft to the airline fleet. Capital expenditures for the twelve major airlines alone during the past two years have amounted to nearly \$4 billion. As of June 1, 1972, the U.S. scheduled airlines had orders for 243 aircraft for delivery in 1972 and beyond. The requirements for new aircraft and ground support equipment have come at a time when the industry has experienced very adverse financial conditions. The costs associated with the purchase of this new equipment along with the other costs involving such matters as the environment and security are presenting the carriers with significant financial challenges.

350

One of the problems in trying to forecast the capital requirements for the air transport industry, is that we have to make many assumptions. We try to put together the best assumptions and even then there can be a number of errors, and as you will see as we go through this series of slides, some of the assumptions are quite sensitive to the results. I will try to identify those and indicate to you how sensitive they may be.

This is a two part program this morning. I'm going to try to show what the needs are in the industry and then Don Lloyd-Jones will tell you how easy it is to raise the money to meet those needs.

Looking at the first slide. Now, all I'm trying to show here is the methodology and then to show you in very gross terms, what steps we took, and then some of the data we try to rely on as we made the forecast.

You have to begin with attempting to anticipate what the level of traffic growth would be in the period, in this case, between 1972 to 1980, and then give the traffic growth, as well as try to indicate what the present capacity is; and what the future capacity is likely to be; and the measurement of that capacity against the traffic growth, and some indication of the load factor that might be involved in the time period will give you then an idea of how much additional capacity you might need. From this

cost estimate of capacity need, you can figure out your capital requirements.

On the traffic side, there are a number of groups which have made forecasts of airline traffic growth, throughout this period of 1972 to 1980 or even to 1985, and some even go out to the year 2000. What we have done, of course, within the industry itself is our own forecasts which we have developed in the last three or four years and have had one revision in that regard.

Now, if you just take the passenger growth from 1972 to 1980. One group that has forecast in this area is the FAA. They indicated about 10  $\frac{1}{2}$ % per year average annual growth in our domestic revenue passenger miles. The aviation Advisory Commission has worked with the figure of about 10% per year. Sam Brown from the Civil Aeronautics Board is giving a speech in Milwaukee today in which he will indicate that the figure for the CAB is approximately 8% per year average annual growth over this time period.

Now you see on this second slide the ATA forecast. The top figure that you see for domestic passenger growth average annual from 1972 to 1980 is 8.8% per year. The figure that we are using falls somewhere in this spectrum but more on the low side perhaps with CAB's at 8%, and to ourselves 8.8%, and to Aviation Advisory Commission's at about 10% and the FAA about 10  $\frac{1}{2}$ %. We are using our figure because we did it. And we have, through a committee composed of as many as a hundred representative personnel from

the various carriers working two or three years hammering out this particular forecast and came up with 8.8%. So it is not the figure that is identified just with the staff of ATA, but with the industry as a whole. At the same time, the international passenger growth figure they used is 12.4%. The domestic cargo at 16.3% and the international cargo at 15.9%. The aggregate of this in terms of revenue ton mile growth will actually give you a figure of average annual growth of 10.5%.

Let me try to show you what the 8.8% per year means between 1970-1980. We have 95 billion passenger-miles in 1970, 144 by 1975 and 220 billion by 1980. So we are talking on the level of one and a half fold increase from '70 to '75 and about 2.3 fold increase from '70 to '80 between 95 and 220 billions. If you used the 8% figure that the CAB was using, they will have 2.2 fold increase between '70 and '80. So our figure is not too far away from this. In terms of enplaning passengers, this 8.8% per year domestic passenger growth that we have, would have 149 million passengers as a base in 1970, 214 by 1975, and 325 million by 1980.

So the ratio here is slightly less than the 1.5 and 2.3 from '70 to '80 which is largely do to forecast the increase in length of haul. So we're actually cutting down the number of passengers relative to the increase in revenue passenger miles.

still though, you have 65 million more passengers in 1975 than you have in 1970. We have another 175 million more in 1980 over 1970. In other words, the increment of 175 million is actually greater than 149 million that you were carrying in 1970.

This 325 million is a lot of passengers, and all we are working at is an 8.8% growth which is not too far out of line. Given some of our growth factors in the latter part of the '60's which ranged as high as 19% to 20% in certain years and given the performance that we have had this year so far which is bordering on the level of about 11%, it seems very high compared with 1970. In 1971 we are showing a nearly flat growth, no change over 1970 however. Now, if we return to the particular methodology that we were talking about, we now have the traffic on one side and what we attempt to do now, given this traffic growth of 8.8% per year or the 10  $\frac{1}{2}$ % revenue ton mile figure when you make the composite with passenger and cargo, and domestic and international. We now try to measure against what the present fleet is, take out the anticipated retirements to get a net figure on that, add the planned additions that the carriers' plans show, and determine whether or not that is enough to carry that particular traffic at a particular load factor. And that if it does not we will have to go out to purchase some additional ATMs (available ton miles) in order to provide sufficient capacity to carry that amount of traffic, as you have just seen, something on the order of 325 million passengers by 1980. We get the information on the

present fleet and the planned additions from two sources at this point. About 6 to 9 months ago, a comprehensive study was obtained by the ATA from the carriers on their present fleet and anticipated plane additions up to 1980, for environmental purposes, particularly with regard to anticipating the need for noise retrofit. And then each year, we get from the carriers, sometimes about twice a year, a survey on their new equipment they plan on purchasing over the next two or three years. So when we combine these two, we are able to get a figure within this block, if you will, to tell us what the capacity the carriers are planning over this time period at this time. Normally, a carrier has a more finite plan for the next three years than they might have for 1975 to 1980.

Let's take a look at the present fleet and the planned additions--the aircraft type 707, 727, 737, and so on down to DC10, L 10-11 and the 747; what the inventory was in 1970, what the carriers are planning for 1975, what are the plans for 1980. Notice that a number of these are being retired. The 707, with an inventory of 412 in 1970, dropping to 263 by 1980 is one example. The 720's will be phased out by 1980. The DC8's would drop from 258 to 172. On the other hand, there are some others growing, of course. The 747 from 40 up to 173, and we didn't have the 3-engine wide-body in the fleet in 1970, they will grow to 555 by 1980. Now, if you put all this together, you end up

with an inventory of 2007 in 1970, 2110 in 1975, 2307 in 1980. So that you are adding about 300 from '70 to '80. But at the same time, you are retiring 458 in this process. These drops in 707's, 720's, DC 8's and so forth add up to 458 taken out of the fleet, but the addition, in the wide-bodies in particular, bring on additional 758. So you have a net growth of 300 in that time period. These do not include the new types of aircraft -- the A300, the Concorde, or even the twin-engine DC 10 STOL. This is only the anticipated addition from the present aircraft that are now being manufactured. 707's will retire 149, 720's will retire 126, DC 8's will retire 76 over the time period of 1970 to 1980. In addition, we have in terms of new orders of aircraft, 243 are actually on order as of June 1 of this year. And you notice that 88 of those were scheduled to delivery in 1972, 78 next year, 52 in '74. They may have plans of adding additional aircraft which have not been decided yet. But as far as orders are concerned, as of June 1, 243 have been confirmed and are valued in today's dollars at \$4 billion.

Now, most of these will be stretched 727 - 200's. On order are approximately 180 of the wide-body tri-jets: DC 10, L1011 and 6, at this point, 747's on order. 747's reached their peak of delivery last year, the DC 10's will reach peak this year, and L 1011 will kind of split as far as the peak of delivery is between '73 and '74, because of the stretch out of Rolls Royce engines.

What we have done then is we've taken a look at the traffic growth, the 8.8% passenger and 10 1/2% revenue ton mile growth, and taken a look at the present fleet and the planned addition now, and how then to consider whether or not they have plans to meet this particular growth pattern.

We have to do it on a load factor assumption. So that we need a guideline then. Once more, incidentally, I should mention that throughout all of this we are attempting now to stick with basic forecasting that may have been done in one of the areas and try to remove the element of apparent judgement as much as possible. So here is the study that has lasted 2 or 3 years to give us that particular figure. This information is now coming from the surveys that ATA has done with the carriers. And what do you do here. Well, the one thing you can do is to assume that we will get the load factor standard that was laid down in the recent domestic passenger fare investigation by the CAB at 55%. We have attempted to see what would happen if this were set at 55%. But, on the other hand, we also said that it may be that you will reach a point in this growth pattern that you might even go higher than 55% before you trigger the need for additional ATMs or additional capacity for a number of reasons. One of these is that the carriers are under severe financial situations in recent years and they will look for every wedge they possibly can to minimize the additional capital cost and the additional capacity that might



result from that. So, consequently, we have a triggered system here, that we will start ordering for more capacity at 55%, but we will go up to 57  $\frac{1}{2}$ % towards the end of the 1970's before we actually drew the line and said that we must have new capacity beyond that point. What I'm saying is if we move up of that 55% load factor, we begin to order some, but as we get to 57  $\frac{1}{2}$ %, we hold at that. We do not allow the load factor to rise beyond 57.5%.

What we now have then in this figure is we get here, with the assumption I just gave you for a cut-off at 57.5%. We have today in 1970 a ton mile load factor of 44.3% and by 1980 we would have a ton mile load factor of approximately 55.7%. This is almost a 25% increase in load factor alone, in terms of this particular model, before you actually go out and place market demand for new equipment.

As far as the principal characteristics are concerned, we will break it down to 2 time periods, '71 to '75 and '76 to '80. The domestic passenger growth we already indicated at 8.8% per year in '71 to '75 and '76 to '80 period, the load factor we are raising throughout this period from 48.5 to 55%, and from '76 to '80 it continues to grow from 55% to 57.5% cut-ff. The utilization we take at an average of 9 hours per day which is the utilization we were getting the '70 to '71 period, that is relatively low at this point in time, a lot of it due to the fact that we have to

cut back during the '70 to '71 recession. One can expect us to increase utilization as the traffic grows. So we will increase it about 10% or about 10 hours per day in '76-'80 period.

Now for the seating configuration that we are using in the '71 to '75 period. The seating configuration that we had in the '70 to '71 period, that also is low. You can increase the seating capacity through elimination of lounges or reseating the present seating configuration in particularly the wide-bodies. So we assume that you hold the present base until this traffic grows to a point when you need to get additional capacity, hopefully without having to purchase. So you expect to expand seating configuration about 1974 and the expansion takes you for the next 3 years up to 1977, and it grows, gradually increasing from 10 to 15% depending upon whether you are working with a 727-200 standard jet or a wide-body 747. We use a different growth figure on the seating configuration depending upon the type of aircraft, but it runs about 10 to 15% in total. These are the characteristics that you are now getting in '71 to '75 and '76 to '80 period.

You notice the various assumptions that are built in to each of these time periods '71 to '75, '76 to '80. Now, when you take all of this growth against what the carriers had planned, you come up with insufficient amount of capacity. You now have to add capacity and there are some capital costs in that and then you cost out what they have already planned. You added

the two, what they planned, what additional they will need. That factors out in the '71 to '75 period to a little under \$6 billion of flight equipment alone in that 5 year period. Historically, we have run a factor of about 17% of our flight equipment that comes out in ground equipment. If we continue to use that 17% relationship, that's another billion dollars. And, of course, we have to assume that we aren't going to be able to purchase those in the future at the same dollar values of today. We have assumed a 4% per year inflation. That costs us in this time period another half billion dollars. So we end up with a little under 7 ½ billion dollars in the '71 to '75 time period. So for a five year basis, it is averaged at a billion and a half a year and that is about our present rate; we are running as high a 2.3 billion as in the latter part of the '60's and we cut back as you well know. So this assumed about a billion and a half rate.

The surprise then comes in the '76 to '80 period which as you see the flight equipment now goes up to \$13 billion. A 17% ground equipment would account for another \$2.2 billion and the inflation factor accounts for \$5 billion on this 4% per year. So now you have a total of about \$20 billion in this time period. And, of course, almost \$28 billion in the decade for 1970-1980. What is this compared with history? Well, interesting enough, the schedules airlines' capital equipment expenditures from '61 to '65, \$4 billion; from '66 to '70, \$12 billion; '71 to '75, \$7 billion; '76 to '80, \$20 billion. You can see the extreme cycles

that are going on which is hitting the bottom in the first half of the decade and hitting the peaks in the last half. The '71 to '75 figure is \$3 B more than that from '61 to '65, and the \$20 B for '76 to '80 is \$8 B more than the \$12 B for '66 to '70 period. It is interesting to look at this \$12 B and increase it for the '76 to '80 period at 4% per year inflation. If you do and take the \$12 B figure and run it up at 4% per year until you go to this time period, it comes up to about \$19 ½ B. So in one respect this \$20 B is only buying in constant dollars about \$12 B worth in the '66 to '70 period. What I want to point out is, of course, that we have a lot of inflation to swallow in this '76 to '80 period.

Now, let me take the \$20 B in the '76 to '80 period and break it down into \$13 B of flight equipment without inflation; \$15 B of flight and ground equipment without inflation, and then \$20 B for flight and ground equipment with inflation. So the flight equipment alone in this time period -- \$13 B -- is just slightly more than our total expenditures of \$12 B in 1966 to 1970 period, and the \$5 B of inflation between these 2 figures is actually greater than all of our expenditures in the period '61 to '65 which is \$4 B. So we will have to pay more for inflation before we can get hold of our equipment, than we pay for equipment in '61 to '65.

Just how good is this forecast of capital requirements in 1960 to 1980 of some \$20 B. We have to look more or less at the

validity of assumptions on utilization, seating, load factor and traffic and retirement. We can say, as far as utilization of seating, since we have expected utilization up about 10%, and the seating configuration up between 10 to 15%, this is a pretty fair assumption, the rate at which you do it may be subject to some question. Some may feel the load factor may not get that high before it actually triggers the demand for equipment because you have that kind of growth and irregular competition among the carriers to get a larger share of market of capacity, before you get to 55% or 57 ½% load factor. The traffic may be subject to some question. But at this point, the spectrum of forecasts that have been done may be slightly on the low side, but the retirement is probably accurate because pressures have been put on to make the noise retrofit adjustment.

To give you some idea the sensitivity of it. If the load factor grows from 55 to 60%, that 5% of additional load factor in '76 to '80 period, this \$20 B will be reduced by about \$1.6 B. Or, if you can get another 10% of utilization, this is worth about \$2 ½ B. If you didn't retire any of you aircraft which have been scheduled to retire between '76 to '80, that will be worth about \$1 ½ B. If you took a combination of these: another 5% increase in load factor, and 10% increase of utilization, may be worth as much as \$4 B. So you now have some trade-off. But even if you took the combination that I just indicated, worth \$4 B, you still;

have about \$16 B which is a significantly large amount for air carriers to finance.

You have a range in the change of cost of aircraft from 7 ½% to about 18%. Certainly, there is some quality improvement in the aircraft itself. You can't say that it is not exactly the same aircraft. But still these figures are more markedly above the 4% we have put into the assumption; so it is very possible that inflation will be greater than what we have indicated.

I would summarize by saying that it would appear to us and we've just now gone through this exercise and we still have some other adjustments that we have to make in order to shake it down some. I think we can conclude that the capital requirements on the industry in the latter half of the '70's with inflation would be greater than they were in the '76 to '80 period. This is going to put increasing pressure on the carriers to maintain an adequate level of earnings in order to finance themselves through this time period, hopefully providing an adequate public service without congestion problems, and so forth as in the latter half of the '60's.

363