Term Paper:

Cost-Effectiveness of EUROCONTROL
Air Traffic Management System
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## I. List of Abbreviations

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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ANSP</td>
<td>Air Navigation Service Provider</td>
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<tr>
<td>ATC</td>
<td>Air Traffic Control</td>
</tr>
<tr>
<td>ATCC</td>
<td>Air Traffic Control Center</td>
</tr>
<tr>
<td>ATCO</td>
<td>Air Traffic Control Officer</td>
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<tr>
<td>ATCT</td>
<td>Air Traffic Control Tower</td>
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<tr>
<td>ATFM</td>
<td>Air Traffic Flow Management</td>
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<tr>
<td>ATM</td>
<td>Air Traffic Management</td>
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<tr>
<td>ATMS</td>
<td>Air Traffic Management System</td>
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<tr>
<td>CDM</td>
<td>Collaborative Decision Making</td>
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<td>CRCO</td>
<td>Central Route Charges Office</td>
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<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
</tr>
<tr>
<td>GA</td>
<td>General Aviation</td>
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<tr>
<td>MTOW</td>
<td>Maximum Take-Off Weight</td>
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<tr>
<td>PRC</td>
<td>Performance Review Commission</td>
</tr>
<tr>
<td>PRR</td>
<td>Performance Review Report</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
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II. Introduction and Motivation

Along with the construction of the European Union, some European countries have decided to create an organization responsible for the coordination of their Air Traffic Control systems: EUROCONTROL. Later came the problem of congestion faced in more and more areas in Western Europe. The need for more optimization of the resources led to strengthen the part played by EUROCONTROL in the European sky, with a final objective: the “European Single Sky”, in reference to the Air Traffic Management system existing in the United States.

By now, EUROCONTROL is in charge of several activities on behalf of the national Air Navigation Service Providers (ANSP), and leads pan-European programs to achieve higher efficiency and reduce redundancies. The organization is currently dealing with 34 countries and as many national air transportation agencies, and is still expanding toward Eastern European countries.

The objectives of EUROCONTROL represent both a real challenge in the current context and the opportunity to study the alternatives, choices and decisions the organization is facing. One of the main challenges is the En-Route Charge policy, based on a full-cost-recovery strategy, which is recognized to be secure and comfortable, but which gives no incentive to increase cost-effectiveness and productivity.

So in this term paper, we will focus on the cost-effectiveness of the Air Traffic Management System of EUROCONTROL, especially on the charging policy, comparing it with the United States’ strategy, and trying to highlight the advantages and weaknesses, as well as the different alternatives between which Europe is going to have to choose in the next years.
III. EUROCONTROL: Characteristics and En-Route Charges Policy

A. Quick facts about EUROCONTROL

1. A pan-European organization

The official name of EUROCONTROL is "European Organization for the Safety of Air Navigation", in reference to its first objectives. It was created in 1960 by 6 countries (Italy, France, Germany, Belgium, Luxembourg, the Netherlands and the United Kingdom). Its aim was to oversee Air Traffic Control (ATC) in the upper airspace of the member states. The European Union is a member of EUROCONTROL (but EUROCONTROL is not part of the EU, especially it represents many more countries).

Currently, 34 countries are members of EUROCONTROL, and the trend is the expansion toward Eastern Europe. Several other countries which are not members have signed bilateral agreements with the organization for a partial cooperation.

In this shape, EUROCONTROL processes 60% of the world’s international flights, representing an average of 25,000 flights per day.

EUROCONTROL employs 2,000 staff in 7 countries. If we take into account the Air Navigation Service Providers of the members, the European Air Traffic system represents 44,000 employees.

2. Goals and Activities: a consensus builder

EUROCONTROL is primarily responsible for Air Traffic Management (ATM) in Europe (at least in the skies of the member states). It has to ensure the development of a coherent and coordinated ATC system in Europe. But it is quite an original organization: the Air Traffic Control Officers (ATCO) are not the employees of EUROCONTROL, but of the national ANSPs. EUROCONTROL is above the national agencies.
The main goals of EUROCONTROL are:

- Heighten Air Traffic Safety
- Increase Airspace Capacity
- Reduce Air Traffic Delay
- Enhance Air Traffic Management System’s Cost-effectiveness
- Minimize Aviation’s Effect on Environment

In June 1997, the Secretaries of Transportation of the member states have signed a new Convention to improve the Agency’s ability to carry out its responsibilities more efficiently (planning, expansion, involvement in GALILEO global satellite navigation system, cooperation, harmonization …). They created as well an ATM performance review and target-setting system, whose reports and comments will be used extensively in this report.

The activities of the pan-European organization focus on:

- Management of pan-European programs for ATM
- Research work aimed to increase Air Safety and Capacity in Europe
- Operation of a Central Flow Management Unit
- Collection of Route Charges (€5.6 billion in 2003) through the Central Route Charges Office, CRCO (cf. next paragraph)
- Training, Education and Transfer of Knowledge
- Provision of Air Traffic Services through the management of an International ATCC in Maastricht, Netherlands for 4 states (Belgium, Luxembourg, the Netherlands and Germany). This service is expected to be expanded later to other countries.

As explained in the introduction, we will mainly focus in this report on the “collection of route charges” activity as well as on the “enhance ATMS’s cost-effectiveness” goal.
B. The CRCO and the Charge policy

The CRCO is the “Central Route Charges Office”, part of EUROCONTROL, in charge of collecting the air navigation charges billed for the use of Air Navigation Services provided by the ANSPs.

The cost of the ATM system in Europe in entirely recovered through the en-route and terminal area charges paid by the users (airlines, military and GA). It is interesting to notice, in the case of the airline companies, that in the end, all charges for air navigation services account for about the same amount as the fuel among the operating costs (10%). This is not negligible, and there is therefore, as we will see, high pressure from users to reduce these costs.

The charges are divided in “Route Charges” and “Terminal Charges”. EUROCONTROL collects the Route Charges on behalf of all member states, but collects Terminal Charges for only 5 countries (Italy, Eire, Denmark, France, and Moldavia). Several non-member countries have also signed bilateral agreements with the agency to benefit from partial Air Navigation services from EUROCONTROL.

C. The En-Route Charges

1. Principle

EUROCONTROL charges all users per "chargeable units", expressed in "per (50ton)½ per 100km", the number of units depending on the weight of the aircraft and on the distance flown. The cost of 1 chargeable unit depends also from the country where the unit was "consumed". Thus, the total charge for one flight is defined as the sum over all countries over flown, of national charges:

$$ R = \sum_{n} r_i $$

$$ r_i = d_i \times p \times t_i $$

Distance Factor  
Weight Factor  
Unit Rate

In the next paragraphs we are going to explain in more details the meaning of each term of this product.

2. The weight factor

The weight factor only depends on the weight of the aircraft, or at least, of the most representative aircraft of a given family (airlines communicate regularly the mix of their fleet to EUROCONTROL):

$$ p = \sqrt{\frac{MTOW}{50}} \quad \text{Maximum Take-Off Weight (metric tons)} $$

The factor is no more linear with respect to the weight of the aircraft, and thus reduces the importance of this factor, accounting for the fact that the increment in difficulty for providing air navigation service to a bigger aircraft is not proportional to its weight.

3. The distance factor

The distance factor depends on the distance flown other than the country i, but not on the actual distance. The CRCO takes note of the entry point (or departure airport) and of the exit point (or arrival airport) of the aircraft with respect to the ANSP service area, and computes the great circle distance between these two points, which, divided by 100, provides the distance factor. If the flight crosses several countries, the CRCO has to repeat this operation to compute the different terms of the sum.

$$ d_i = \frac{\text{great circle dist (km) between 1st & last places in country i}}{100} $$
In order to clarify the notions, the following graph, from the CRCO “Guide to services charges” (2004), provides a visual example:

![Graph showing actual routes and great circle distances between countries]

For instance, the distance factor for the “country 2 part of the charge formula” will be “GC-2”/100. As presented, the great circle distance used in the en-route charge formula is smaller than the actual distance.

An International flight from outside the EUROCONTROL service zone will begin to be charged as soon as he enters the territory of one of the member states.

The product of the weight factor and the distance factor gives, for the over-flown country considered, the number of “chargeable units”.

4. The Unit Rates

The unit rates depend on the country and on the year. They are re-set every year by each country. Here is the explanation for the term “full cost recovery” charging policy: each member state provides every year 2 forecasts: the expected costs of the national ATMS (route services) and the expected number of chargeable units to be provided. The unit rate for each country is then obtained by dividing the total costs by the number of units:

\[
 t_i = \frac{\text{National Costs (i)}}{(\text{Italy})} + \frac{\text{EUROCONTROL Costs (i)}}{€39,000,000} - \frac{\text{Exempted Flights (i)}}{€35,000,000} + \frac{\text{Balance Year n-1}}{€13,000,000} = \frac{€68}{(50\text{ton})^{1/2} \times 100\text{km}}
\]
In the above formula, we notice that also appear the expected cost for EUROCONTROL itself relative to the country \(i\), as well as the exempted flights (training, military, sanitary, ...), and the balance of the previous year. The numbers in grey correspond to the computation of the unit rate in the case of Italy in 2003 for 2004.

As one can expect, these rates are going to vary as a function of the countries:

\[
R' = \text{MTOW}^\alpha \times \text{Unit Rate}
\]

The general formula to compute these terminal charges is:

The Maximum Take-Off Weight, like in the previous formula, is expressed in metric tons. The parameter \(\alpha\) and the Unit Rate depend on the country, but generally:

- \(0.9 < \alpha < 1.0\)
- Unit Rate < €10 per metric ton

This report will not focus any longer on the terminal charges, given that they only apply to 5 countries out of 34, but they needed to be explained because they will be mentioned again in the next paragraphs.
E. Example: London-Köln

For each flight operated other the EUROCONTROL area, a bill is produced, detailing the different parameters and the amount corresponding to each country over-flown. In order to clarify somewhat the ideas, this is an example (provided by the CRCO “Guide to customer charges”) of computation of the charges for the case of a 57.6 ton-MTOW aircraft which takes-off in London (UK) and lands in Köln (Germany):

| Flight connection: EGLL (London LHR) – EDDK (Cologne) |
| Aircraft Type / weight: B733 / 57.6 metric tons |
| Flight Date: 1 January 2004 |

Route as described in Field 15 of the ICAO flight plan:

DVR6K DVR L9 KONAN UL607 SPI T857 NOR DCT

Point sequence (NAV Aids, Waypoints) established with the route:

EGLL EPM DET DVR KONAN KOK REMBA SPI KOGES NOR EDDK

Based upon the above routing, the following distances are established in the charge areas concerned:

- United Kingdom (EG): 155 km (Distance factor 1.55)
- Belgium (EB): 301 km (Distance factor 3.01)
- Germany (ED): 55 km (Distance factor 0.55)

Taking the MTOW of the aircraft concerned (57.6 metric tons) the weight factor of 1.07 is established (see formula on page 3).

The Unit rates used in this example are those valid for January 2004.

Calculation:

<table>
<thead>
<tr>
<th>State</th>
<th>Distance Factor</th>
<th>Weight Factor</th>
<th>Unit Rate (Jan. 2004) (Euro)</th>
<th>Charge (Euro)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.K.</td>
<td>1.56</td>
<td>X</td>
<td>82.77</td>
<td>138.16</td>
</tr>
<tr>
<td>Belgium</td>
<td>3.01</td>
<td>X</td>
<td>90.86</td>
<td>292.63</td>
</tr>
<tr>
<td>Germany</td>
<td>0.55</td>
<td>X</td>
<td>89.54</td>
<td>52.69</td>
</tr>
</tbody>
</table>

Total Charge = 483.48

To ease the understanding of the charging policy which may appear a little complex, EUROCONTROL/CRCO provides on its web site (www.eurocontrol.org/crco) a software which allows to compute the charges for a given route and a given aircraft.
IV. A comparison with the FAA’s ATM

Trying to compare EUROCONTROL with other organizations in the world dealing with comparable amount of traffic reduces the possibilities. Fortunately, as we will see, the characteristics of the American Federal Aviation Administration (FAA)’s Air Traffic Management system are, if not equal, at least reasonably comparable with EUROCONTROL’s. But yet, EUROCONTROL is not Europe’s FAA.

A. Observations and numbers

The next table compares some significant parameters of both systems, and will be later more extensively commented.

<table>
<thead>
<tr>
<th>USA</th>
<th>CHARACTERISTICS</th>
<th>Europe</th>
<th>Ratio EU/US</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.8</td>
<td>En-Route Air Space (10⁶.km²)</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ATC-Organization (civ+mil)</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>En-Route-Centers</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Operating Systems</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Programming languages</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>17.6</td>
<td>IFR Flights (million)</td>
<td>8.1</td>
<td>0.46</td>
</tr>
<tr>
<td>24.9</td>
<td>Flight hours controlled (million)</td>
<td>10.2</td>
<td>0.41</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>USA</th>
<th>EMPLOYEES</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>34.5</td>
<td>Total employees (thousand)</td>
<td>46.1</td>
<td>1.33</td>
</tr>
<tr>
<td>17.3</td>
<td>Operational ATC Officers</td>
<td>12.8</td>
<td>0.74</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>USA</th>
<th>COSTS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0</td>
<td>Total costs (€2001 billion)</td>
<td>5.7</td>
<td>0.71</td>
</tr>
</tbody>
</table>

These numbers (especially employees, traffic and costs) refer to 2001. Source: EUROCONTROL, IATA and Lufthansa.

At first glance, both systems seem comparable. Nevertheless, before going further, it is to be pointed out the need for keeping in mind the legal, economic, social, cultural and operational differences between the 2 regions.

Europe and the US have a comparable air space size, even if Europe’s sky keeps expanding toward the East. But everything is not that similar... On contrary, the American ATM system is composed of 1 organization, against 47 in Europe.
(sometimes even more than 1 per country...). The United States ATCOs handle twice as many flights as European ATCOs do (this is due to higher traffic in the US), but the FAA employs fewer staff (34,500 against 46,100), even if more ATCOs. Non-controller employees are very numerous in Europe.

The fact that EUROCONTROL is trying to build a common ATM system with 47 existing system can explain some of the differences between the 2 systems (in terms of redundancies, differences of programming languages...), but in fact, as we will see, some of these differences are due to the way EUROCONTROL operates.

B. Productivity comparisons

The data available to compare both FAA and EUROCONTROL is quite old – 2002. But these numbers already give a good idea of the differences in productivity. The first graph represents the labor productivity in terms of average number of flight-hours controlled per ATC Officer. As expected from the numbers previously shown, the productivity is much lower in Europe, by 44% in 2002.

This second graph is more related with cost-effectiveness. It represents the average costs of providing en-route air navigation services, for 2002 and for both regions, in terms of per average flight, per 1000km and per flight-hour. In all cases, these costs are – from far – higher in Europe than in the US.
As explained above, the cost per flight-hour has been chosen by EUROCONTROL as indicator for cost-effectiveness. In 2003, it was 62% higher in Europe than in the US.

The third graph represents the support staff ratio, which is the ratio between the number of non-controllers and the number of controllers for each ATMS. Again, these support costs are higher in Europe than in the US. In the US, for each controller, there are on average 2 non-ATCO staff. This number grows up to 3.6 when we look at Europe.

![Support Staff Ratio Graph](data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAAnAAAAAACAQMAAABWAK5AAAABGdBTUEAAl3sAAAAAElFTkQ\n...)

Data source: EUROCONTROL PRR#6, 2003

Obviously, the corresponding support costs are (57%) higher in Europe than they are in the US.

So, after having seen all these comparisons, the direct conclusion is the obvious advantage of the FAA ATMS over EUROCONTROL. The costs are lower, productivity is higher. Let’s try now to understand the reasons underneath these numbers, and what the mechanisms are, that EUROCONTROL has not implemented, and which would allow EUROCONTROL to become competitive with respect to the FAA.

**C. Explanations**

From the previous graphs, we have shown that productivity is higher in the US: on average, the ATCOs handle each year 80% more flight hours. It happens that they work more hours per month, and their monthly wages are higher, so that in the end, the hourly cost of employing ATCOs is equivalent on both continents. But this does not explain the fact that the American ATCOs handle twice as many flights as the European whereas they are only 50% more in terms of staff.

The higher productivity of the American system is due to:

- Higher flexibility of resources: the US centers have the ability to adapt their staffing to the variability of demand, resulting from more staff planning and management practices
- Uniformity of the US ATM system: the nature of EUROCONTROL itself (creating a common ATMS from x different national ATMS) means that the management of x ATMS will let appear some redundancies or some lacks in the organization, leading inevitably to losses of productivity. For instance, EUROCONTROL is facing many problems of interoperability between sectors.
For the same reason, the co-operation between civil and military in the US is much easier than between EUROCONTROL and the 34 different European military departments... and a non-negligible part of efficiency depend on the success of such collaboration.

A special comment regarding ATFM: this system is handled very differently on both sides of the Atlantic Ocean: it is more decentralized, more flexible, more responsive, faster, more adaptable and based on CDM in the United States, whereas in Europe, it is very centralized, slow and less responsive.

As pointed out, the support costs in Europe are significantly higher than in the US (about 35% higher). And this results, since all costs are taken into account when measuring the cost-effectiveness, in lower efficiency and in a non-negligible part of the difference in cost-effectiveness between both continents. The centers in Europe spend much more money for other expenses than employing ATCOs than the FAA’s centers do.

The conclusion of this comparison is quite bitter for EUROCONTROL: costs are higher than they are for the FAA, and productivity is lower. The reasons for that come from the nature of EUROCONTROL: some kind of pre-federal ATMS. We are going to point out more precisely in the next section the mechanisms of the current EUROCONTROL organization which lead to this lack of cost-effectiveness.
V. Weaknesses of EUROCONTROL’s current En-route Charge Policy

In this paragraph, we will go through the description of a series of “dysfunctioning” aspects of EUROCONTROL which could be held as responsible for some decrease in cost-effectiveness. EUROCONTROL is working very consciously on itself, and as a result, this section is partially based on the comments from the performance review committee regarding the en-route charge strategy.

A. The full cost recovery en-route charges policy

This strategy is a secure and efficient source of financing which insures the countries to recover their costs at 100% as shown on this graph presenting the recovery rate after one year as well as at the beginning of 2004:

![Graph showing recovery rate](image)

Data source: EUROCONTROL PRR#7

The main drawback of such a strategy is the lack of incentive to improve performance and to be responsive to user needs (some facts we pointed out to be responsible for the bad performance of EUROCONTROL with respect to the FAA). Whatever amount the countries decide to dedicate to the en-route charge system, as long as their forecasts in terms of chargeable units are not too far from reality, they are almost 100% sure to recover these costs without making any effort to reduce their operating costs.

B. The lack of reactivity regarding demand variability

The ANSPs are very slow to adjust their resources to the variability of demand. The consequence of this lack of reactivity is the fact that users (mainly airlines) are bearing most of the business risk in this environment: if demand increases and the number of ATCOs remains the same, the airspace gets congested and airlines bear the costs due to delays. If, on contrary, demand decreases, ANSPs are going to increase their unit rate (to compensate for the shortage in chargeable units – this is a consequence of the full cost recovery strategy), and again, airlines bear the cost of the variability of demand.
The following graph presents the cost per km and the trend in average delay per movement.

It illustrates perfectly the previous comment: during period 1, there is a drop in demand (delays are very low), but Unit Rates are very high. During period 2, on contrary, demand peaks as well as delays, and the related costs for the airlines. EUROCONTROL lacks joint-management of costs and capacity, which are addressed individually at this point by each country.

C. The linear trend between costs and traffic

On the next graph are plotted the trend in EUROCONTROL total cost as well as the trend in the total traffic handled by the agency (index 100 = 1990).

As one can observe on this graph, both total costs and total traffic are very closely and linearly correlated: total costs increase almost instantly after the increase in traffic. This situation (closely related to the absence of incentive of the full-cost recovery regime) leads to endless increase in costs and does not allow any
economies of scale. One the contrary, FAA has managed to achieve higher efficiency to deal with incremental demand. As a result, the cost curve has been curbed and is no more linearly correlated to the traffic curve:

\[ \text{index} \]

\[ \text{traffic} \]

\[ \text{costs} \]

\[ \text{year} \]

\[ 100 \]

**D. The lack of transparency**

It comes with the mandatory power of EUROCONTROL, which is still not very strong. The agency cannot require any justifications or even details (staff costs, assumptions made...) for the computation of the forecasted costs used to obtain the unit rate. No harmonization has yet been done in terms of accounting procedures, which leads to some strange accountings and large differences between member states.

EUROCONTROL only gives advice and recommendations, but “the application of these principles is the responsibility of each individual state” (form EUROCONTROL, PRR#7). This lack of mandatory power is a real disadvantage for EUROCONTROL in its effort to recover the gap in cost-effectiveness between itself and the FAA’s ATMS.

**E. The lack of visibility on the terminal charges**

At this point, only 5 countries have asked EUROCONTROL to collect Terminal charges on their behalf. So the pan-European agency has collected detailed data regarding these 5 countries, but very few regarding the situation among the 29 other member states. Terminal area charges are non-negligible with respect to en-route charges, and would need to be taken into account when looking at the overall cost-effectiveness. It is currently not possible due to this lack of visibility. The collection of terminal area charges with en-route charges would be beneficial for both the ANSPs and EUROCONTROL: the ANSP would reduce their costs, and EUROCONTROL would get the data needed without increasing its operating costs given that it would use the same structure as the one used to collect the en-route charges.

**F. The lack of consultation of users**

The airlines are generally kept apart from the unit rate forecast process at the member states level. There are more often conflicts than agreements between providers and customers, this being mainly caused by the full cost recovery strategy. At the moment, the ANSPs are satisfied by the current regime, which ensures them to recover their costs, whereas users complain because prices keep increasing. And when such bilateral meetings occur, it seems that EUROCONTROL gets very little feedback, whether from the ANSPs or from the airlines.
The way EUROCONTROL sees the consultation of airlines is the signatures of agreements between the service providers who accept to provide services at a given unit rate, and the users who accept to pay this price.

G. The lack of long-term forward-looking plan

It seems that the European ANSPs are not looking much further than the next year or very few years, and this in order to forecast their costs and amount of chargeable units to finally compute their yearly unit rate. Unfortunately, the member states do not build – at least – medium term plans in which they could set objectives or caps for the growth rate of their unit rate. Such forward-looking plans are essential to build strategies and back cost-effectiveness, but they require operational, staffing, investments and financial break-downs plans as well.

Then, at a higher level, these national plans would allow EUROCONTROL to build some more accurate pan-European forward-looking plans, to control deviations from targets, to detect lack of coordination ...

As we have observed, there are many aspects in the organization of ATM in Europe which still need lots of improvements. At the national level, the lack of European vision, as well as the lack of longer-term vision are obvious and need to be addressed in order to move forward. At the European Level, EUROCONTROL lacks from visibility and mandatory power, as well as from a clear and effective charging policy in order to really be able to take decisions and have them enforced and respected. Otherwise, in case things stay as they are today, the situation (productivity, costs) will only get worse.
VI. Looking ahead: possible future strategies

The Performance Review Commission (PRC), created in 1997 by the EUROCONTROL Convention of the Secretaries of Transportation of the member states, has pointed out and analyzed the inefficiencies inside the Air Traffic Management System in Europe. From this analyze, came both short term decisions and advice, as well as longer-term visions of EUROCONTROL.

A. **Short term decisions**

Their goal is to address the critical problems which could be solved easily in a short term. They involve:

- More transparency in data reported from states when dealing with the setting of the unit rates: the PRC asks for detailed and identical business plans for each member state, including assumptions, forecasts of capacity and costs.
- Longer term focus (productivity, performance) and medium term (unit rates)
- Involvement of users in the decision making process, with contractual agreements, and visibility from the point of view of EUROCONTROL.

But as it is their aim, these decisions will not impact the fundamental questions of the full cost recovery regime.

B. **Longer-term strategic orientations**

The Performance Review Report #7, issued 2004, has addressed this question of a longer-term vision for EUROCONTROL, and presented a choice of alternative strategies which could be the future of EUROCONTROL, or at least try to solve the problem of the en-route charge regime.

1. **The Full Cost Recovery Regime**

It is basically the “do nothing” option: the status quo. As it is, this regime is applied in almost all member countries (except UK). It is already in place and do not need any change! It is a comfortable strategy from the ANSPs point of view, almost risk-free. But as pointed out, it implies a constant increase in costs, a quasi-stable (but not very good) productivity, and the increasing opposition of airline companies. It gives indeed no incentives to slow down the costs increase and keeps the ANSPs in a short-term strategy.

2. **The Full Cost Recovery Regime + Individual objectives**

In this case, we keep the full cost recovery discussed above, but we add the obligation, for the member states, to set some individual objectives for the next 5
years (and to publish their targets). That is, each state – or ANSP – decides of objectives to reach for the next 5 years in terms of unit rates: either a growth rate cap, or a fixed price. Moreover, this would be done in consultation with users (airlines). The main advantages of such a strategy are:

- Longer-term focus (medium term)
- Minimal intrusiveness (EUROCONTROL is not going to infer in the setting of the unit rates, this is done only at the national level)
- Some incentives to deliver performance objectives (due to the target, and to the cooperation with users)
- Improvement of the transparency in the accountability

But it remains a full-cost recovery regime, and incentives might not be very strong given that the targets are fixed by the providers and based on the same kind of forecasts they were using in the basic form of the same strategy.

3. The Independent National Economic Regulator Regime

In this case, EUROCONTROL would choose an alternative strategy: an independent organization – regulator – at the national level, would set the unit rates. This regime would have the advantage, this time, to give stronger incentives to the ANSP for reaching the objectives set by the regulator. The ANSP would retain the surplus in case its results outperform the minimum targets.

It is a regime currently tested in UK, and quoting from the PRR, it seems that it benefits airspace users by lowering the en-route charges.

The main drawbacks of such a strategy are the regulatory load to implement and the risk of regulatory fragmentation with the dispersion of the authorities (ANSP, State, Regulator, EUROCONTROL…). And yet it does not address the need for more harmonization at the European Level.

4. The Independent European Economic Regulator Regime

In this last alternative that EUROCONTROL proposes for its future, the organization would create a regulator at the European level which would set the unit rates for all ANSPs across Europe. It would have the visibility over all areas in terms of traffic, forecasts, costs, productivity… and should be able to harmonize and coordinate all national providers. It would “avoid regulatory fragmentation and ensure consistency”. This would maybe not satisfy all members, but would for sure deliver very strong incentives. And finally EUROCONTROL could “control” what is happening in its member states. It would be obviously heavy in terms of regulatory changes (especially to manage, for EUROCONTROL, to get accurate data from the members in order to set the rates).
C. The ultra-liberal alternative...

Although it could seem at this point unfeasible, why not in the end allowing the ANSPs to compete with each other? Ultimately, this would give the strongest possible incentives to be cost-effective! If the Italian ANSP manages to provide services at higher productivity and lower cost, it could ... rule the British sky ... One could argue – and one would be probably right – that this strategy would face strong cultural opposition, and raise many questions, especially regarding safety. It is – in my opinion – necessary for the ANSP to remain either a national (or European) or a highly controlled privatized organization.

We have described and commented 5 possible alternatives for EUROCONTROL regarding its charging policy. There still exist certainly other regimes, but we can already infer that the future of EUROCONTROL will depend on the answer to this question: will the member states allow the pan-European agency to take more control over their national ANSPs?
VII. Conclusions

It is important to first recognize that EUROCONTROL has already achieved a considerable amount of work in beginning the harmonization and unification of the European Air Traffic Management System. From 34 independent states – and agencies, each with their own culture, regulations, operation... - it has already built an organization whose cost-effectiveness and productivity are roughly 50% of the FAA productivity and cost-effectiveness, which is the (almost) equivalent agency but for only 1 country. It is at least the first step toward the goal: the “European Single Sky”.

But as we have noticed during this analysis, there is still a lot to be done! And particularly, there are some important decisions to be taken in order to curb the indicators and catch up with the FAA’s ATMS efficiency.

3 major problems have been highlighted: the low productivity, the high unit rates (and thus low cost-effectiveness), and the high support costs. Moreover, these difficulties remain unveiled by the slow traffic recovery in Europe after 9-11. But after a brief rest, the saturation of the European airspace, especially between London, Amsterdam, Frankfurt and Paris will be soon back and will emphasize again these inefficiencies by adding the delay costs.

There is a real need to control the costs (which were expected to decrease by 3% each year but actually increase by 5% each year) together with a reform of the route charge regime, which currently lacks transparency, user consultation and mandatory power to give incentives to increase the overall performance.

On the other hand, EUROCONTROL is an evolving organization, “in the building” and it takes advantage of this fact: it is not a coincidence if the FAA has decided to follow the principle of EUROCONTROL’s Performance Review Commission. This committee is in charge of evaluating, analyzing and criticizing the performance of the agency and consequently proposes alternative procedures aimed to help improving it.

Following the advice of the performance Review Commission, and I agree with this idea, it seems that EUROCONTROL is looking for a more integrated and cost-effective-oriented route charge regime, including the setting of the unit rates at the European level after consultation of both service providers and users.
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