

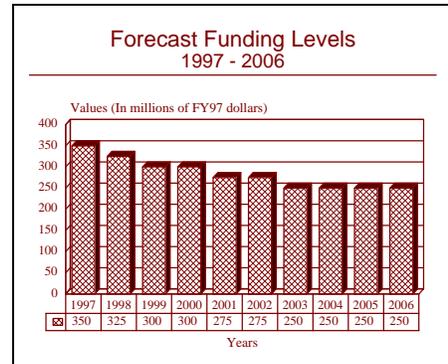
# ARCHIVED REPORT

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## ATC - Central Europe - Archived 8/97

### Outlook

- Unified ATC system to be developed
- Central European countries to be integrated
- Funded by individual countries with EU support
- Extensive loan facilities made available
- Intense competition from European suppliers



### Orientation

**Description.** Composite of Central European nation air traffic control modernization programs.

**Sponsor.** Various.

**Contractors.** Various.

**Licensee.** No production licenses have been granted.

**Status.** Continuing development.

**Total Produced.** The program objective is to develop a modern unified air traffic control (ATC) network across the Central European nations which is compatible/ integrated with the Western European ATC network by the first decade of the 21st century.

**Application.** Central European nation air space planning, operation and control.

**Price Range.** Indeterminate.

### Technical Data

**Characteristics.** For the purposes of this analysis, the Central European air traffic control region is defined here as the area covering the former Soviet Union satellite countries' network. Hence, it deals with those formerly referred to as Eastern Bloc countries, plus those having become independent from the Soviet Union. The Russian Republic itself, which is in Eastern Europe, is discussed in a separate report.

This region exhibits certain ATC requirements which are highly similar to those of the Western European region. Specifically, the area consists of a group of moderately sized countries which share common boundaries and exchange increasing volumes of air traffic. Each region is

threatened by delays due to equipment capacity limitations, political divisions, language differences and the ability of existing independently developed systems to communicate electronically.

The overall Central European air travel system (i.e. route structure, facilities, etc.) differs from Western European nations, however, in that when released from Soviet control, it was the most poorly developed in Europe. This is due to the fact that while under the Russian influence, the emphasis was placed on Soviet air system development due to the long distances involved, etc. In quantitative terms, in 1988 the per capita air travel in Russia was 80 percent of that in Western Europe whereas

in Central Europe the level was only one sixth that of Western Europe. When coupled with the demonstrated economic progress and growing cooperative spirit which is developing within Central European nations, this represents a high potential for air travel growth.

**Operational Characteristics.** A central agency similar to the FAA in the US, Eurocontrol in Western

Europe or Raduga in Russia to organize and administer a regional ATC system and/or procure/manufacture equipment for its implementation does not exist for this region. On a practical basis, countries are currently sharing air traffic information and serious discussions have been underway between seven Central European nations since the summer of 1994 for the formation of such a central regional organization.

## Variants/Upgrades

In order to provide an easily assimilated analysis of the extensive greater European ATC market, Forecast International has elected to divide this topic in succeeding reports into the following convenient categories based on the relative size and activity levels within primary areas of interest:

1. European ATC System Analysis (Overview, including Eurocontrol and European Commission activities).
2. Western European Individual Country Programs.
3. This report, Central European Programs (Individual programs and integration, as appropriate).
4. Russian Programs (Individual programs and integration, as appropriate).

## Program Review

**Background.** As late as the early 1970s former Soviet block countries were equipped with outdated and inferior equipment which severely limited safe air travel. By the mid 1970s a mix of US and French equipment began to be procured to correct the acknowledged chaotic situation. Although an improvement, the effectiveness of this equipment has remained limited for an extended period. In 1993, for example, a newly installed Westinghouse secondary surveillance radar (SSR) could not track 50 percent of the aircraft in Polish air space due to the fact that Russian aircraft did not carry compatible transponders.

When the Soviet Union was formally dissolved in 1991, its so-called satellite nations were faced with a situation which accelerated the need to modernize their ATC systems. These conditions were: 1) the withdrawal of Soviet military equipment which was in extensive use, and 2) the anticipated rapid growth in air traffic to and from the West and within Central Europe, which had already been experienced to a degree.

After decades of developing an inadequate, heavily USSR influenced ATC network devoted primarily to the management of air traffic to and from the East, these nations were suddenly faced with having to re-equip and finance new systems in a depressed economy, and to learn new disciplines and procedures, all of which needed to be compatible with Western nations.

As is the case with the former USSR, in addition to the stimulating effect which efficient air transportation

inherently provides for national economic growth, the promise of hard currency revenues from over-flight and in-country air space user fees provided added reason to promote ATC modernization as a high national priority.

Several easily identified factors forecast the explosive growth of air traffic in these Central European states and underscored the need for effective ATC development: 1) quickly expanding business ties with the West, 2) slow surface rail travel (i.e. twice the time required per trip in Western Europe), and 3) an anemic intra-Central European air travel route structure. In 1990, for example, of the 21 inter-capital routes, nine did not have daily scheduled air service and only two had two daily flights. This need translates into a projected annual growth in air travel of 7-10 percent or more per annum for the ten year period from 1990-2000. The corresponding projected expansion of the Central European air fleet during this period is as high as 150 percent. In comparison, the estimated global air traffic growth rate is 4.0 percent a year.

For all of the above reasons, Western ATC equipment suppliers were quick to seize the opportunity, and successful competitors have benefited from this growth market. The realization of funding for these enterprises has been, and continues to be, a pivotal consideration in program success. A number of innovative approaches including international banking loans, foreign government subsidies and third-party leasing have been addressed or implemented.

As indicated above, Central European nations quickly realized the importance of having ATC equipment and procedures that are compatible with the West. In response to a well founded sense of urgency, initial improvements were undertaken on an individual nation basis. In support of these activities, early interest was expressed in the International Civil Aviation Organization (ICAO), Association of European Airlines (AEA), European Civil Aviation Conference (ECAC) and Eurocontrol, the voluntary membership European air traffic control organization. In 1990, Hungary and Poland joined the ECAC/ Eurocontrol. Membership has since been expanded to include, Romania, Bulgaria, Lithuania, the Czech Republic, Slovakia, Slovenia and Latvia from this report's Central European region, as well as Denmark, Finland, Norway and Sweden

Having started independently, Central European nations began to interact and work increasingly on a cooperative basis, eventually headed for a program to develop a semi-autonomous, Eurocontrol-compatible ATC network. This approach, which is in tune with the political and economic climate, provides individual nations the opportunity and time to update and expand their facilities and to integrate them at an intermediate level prior to eventual assimilation into a pan-European system.

A typical example of cooperation took place in the spring of 1993 when Hungary and Denmark agreed to cooperate on the implementation of a Danish developed, ICAO endorsed, method to improve the coordination between civil and military air traffic controllers in order to free up much needed air space. Instead of defining dedicated military and civilian areas in the limited available air space, the new air space management method treats the entire air space as a single entity with military restricted areas identified only a short time before they are actually needed and then only on a temporary basis. Similar assistance and recommendations were offered to, and are being evaluated by the Czech and Slovak Republics.

Today inter-country cooperation has grown to the point where Hungary, for example, supplies SSR radar data to several surrounding states.

A good indicator of the growing spirit of cooperation within the Central European states and of the highly probable establishment of a central air traffic management center to serve the Central European region was provided in the summer of 1994. At this time representatives from seven Central European nations (Austria, Croatia, Czech Republic, Hungary, Italy, Slovakia, and Slovenia) met and gave themselves one year to decide on the specifics of a new upper air

control (UAC) center for Central Europe. At the time of this writing, the location of the center, which would be functionally equivalent to the Western European Maastricht UAC, remains undecided as does the responsibility for management of the center. It has been reported that most countries favor Eurocontrol (which runs the Maastricht center) to manage the center.

Enabled by the relative availability of internal and/or other sponsorship funding, equipment procurements have proceeded in national agendas on a more or less regular basis since 1990. As indicated in detail in the Recent Contracts section, this includes substantial wards in 1994. This activity level is reflective of the solidification and understanding of the status of key Western European ATC operational objectives, and technical and interface requirements.

The ATC equipment contracted in the early 1990s is now coming on line with encouraging functional and economic results. The Thomson CSF equipment procured in 1992 to upgrade the Czechoslovakian ATC went on line in an interim Eurocat 200 configuration in the Czech and Slovak Republics in August 1993 and the spring of 1994, respectively. (Note: The division of Czechoslovakia into the Czech and Slovak Republics did not disrupt the program). These systems are scheduled to be upgraded to full Eurocat 2000 status during 1995. The upgrade to this paperless system will enable full electronic coordination with adjacent European ATC centers, provide an improved conflict alert capability, and increase the number of radars supplying data.

In a similar program, a full configuration Thomson-CSF Eurocat 2000 control center installation was dedicated on November 24, 1994, at Lithuania's Vilnius airport, three weeks ahead of schedule. Currently promoted as one of the most advanced of its type in the world, the system consists of the Eurocat center for en-route and approach control at Vilnius plus two radars, one at Vilnius, the other at Klaipeda in the west of the country. Each radar facility is equipped with a TA 10MTD approach radar and an RSM 970 en-route radar. A VOR/DME in Kaunas and two further DME stations complete the structure which provides a paperless electronic strip ATC system, complete with large format pixel color displays. An extension of the system to Kaunas and possible regional center status for the three Baltic states are envisioned.

The demonstration by modern ATC centers to be financially self sustaining is a key element in solidifying confidence in the system and maintaining development support. In 1993, the Czech ATC agency generated revenues of approximately US\$18 million versus expenses of US\$13 million. The enthusiastic organiza-

tion is seeking to break its ties with the government and become a privatized, fully independent ATC commercial venture. Similarly, the Lithuanian ATC system has visibility of generating US\$4-5 million in 1995, more than enough to cover its US\$2.5 million annual loan payments.

## Funding

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The Central European ATC modernization program is being conducted and supported individually by nations in the region, with major underwriting financial support during the development/procurement phase provided by the European Union banking system and individual countries. A detailed total compilation of allocated funds is unavailable as a result of the multi-national participation and complex funding interrelationships.

Funding support from a variety of sources has been substantial and sustained. The underwriting provided by the EU through its banking system has probably been the most influential single factor in the ATC modernization process throughout greater Europe. In 1992, at its Edinburgh Summit Meeting the EU determined that infrastructure development projects (including ATC) for Central European states would be covered under its US\$6.14 billion Growth Initiative, whereby 75 percent of the total cost of a project could be covered by loans from the EIB and EBRD.

While EU financial backing is of major significance, it has not been the only means of obtaining quickly accessible financial support. Directly negotiated financial support by independent European governments on behalf of benefiting native industries has been another important enabling factor. As evidenced by the contracts list provided in a following section, the net result has been a steady flow of funds and ATC equipment into Central European nations in recent years. Numerous examples of funding support of these contracts can be cited. These include:

1. US\$17 million 1992 loan by the EIB to Hungary to upgrade its ATC system by 1995.
2. US\$70 million loan by EIB to Poland to modernize Warsaw Okęcie airport (Note: Not limited to ATC)
3. US\$34 million financing by the German Hermes credit agency for purchase of Siemens-Plessey en-route and terminal radars by Slovenia.
4. US\$12 million French government loan to Lithuania to revamp its ATC system with Thomson CSF equipment.
5. US\$27.3 million 1993 EIB loan to Romania for radar and display equipment for three ATC centers.

Support for Central European ATC development is also coming from other sources. The International Air Transportation Association (IATA) is offering technical advice on how to identify and solve ATC problems and how to ensure that monies earmarked for a specific project reach their destination. The services provided include assistance in collecting overflight charges (Ukraine and Lithuania), cost effective recommendations for upgrade strategies and equipment purchases, and the establishment of an English language school in Prague for air traffic controllers.

Related support is also coming from such diverse organizations as the US Air Force which is assisting Hungary in the upgrade of its air traffic management system under a US Foreign Military Sales project which includes the installation of IFF equipment at four radar sites, as well as the installation of US-made transponders on Hungarian MiG fighters.

## Recent Contracts

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(All contracts expressed in US\$ millions)

<b>Contractor</b>	<b>Award (\$Millions)</b>	<b>Date/Description</b>
Westinghouse		April 1990 — Poland Airports Authority to upgrade Poland's ATC system. System consists of two AMS-200 Enroute Systems and ASR-9 approach control radar at Warsaw Airport, and four monopulse secondary surveillance radars (MSSR) and supporting communications links. The ASR-9 radar is identical to that being installed at US airports by the FAA.
Thomson CSF		Summer 1990 — Upgrade and expansion of Yugoslavian ATC system to provide entire en-route radar surveillance capability. Contract included upgrade of two long range primary radars originally delivered in the 1970s, including the addition of two monopulse secondary radars, and the installation of a third secondary radar in the southern part of the country.
Selenia		1990 — Contract to modernize West German radar network and provide turn key ATC system for what was then East Germany. The West German program included 11 primary monopulse radars, modernization of three Enroute stations with monopulse secondary radar and a maintenance center equipped with a fifteenth primary monopulse secondary radar station. The East German program included a network of two primary and four monopulse secondary radars. ATC Lease Management of Switzerland arranged a rental agreement form of payment based on user fees.
Thomson-CSF	60 (Est)	December 1991 — Contract with Omnipol, the Czechoslovakian (Now Slovakia and Czech Republic) import agency to supply a complete ATC system for that country's Air Traffic Control Administration. The system includes two Eurocat 2000 air traffic control systems for Prague and Bratislava, and three RSM 970 autonomous monopulse secondary radars. (Thomson CSF has previously installed two primary radars and an Astre radar at the Prague airport used for airfield surface movement control).
Thomson-CSF	15	1992 — Contract with Lithuania for Eurocat 2000 en-route and approach control at Vilnius plus two radar stations, each equipped with a TA 10MTD approach radar and RSM 90 en-route radar.
Siemens	26	Mar 1992 — Contract to equip newly independent Republic of Slovenia (Formerly Yugoslavia with a complete air traffic control center and related ATC equipment including radars and navigation aids.
Siemens	1	Aug 1992 — Study of Ukrainian ATC system modernization improvements.
Marconi	0.8	Apr 1994 — Contract with Polish Airport State Enterprise - Air Traffic Agency (PATA) division to supply two complete approach control radar systems including S521H primary radars, S470 Messenger secondary radars and Nova 9002 display systems. Systems are to be installed at Gdansk and Krakow regional airports.
Hughes Electronics	--	Sep 1996 — Hughes Electronics recently finished installing an advanced air traffic control system designed for training purposes in Warsaw, Poland. The system will provide the Polish Airports State Enterprise (PPL) a safe and efficient method for training ATC personnel.

## Timetable

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Mid	1970s	Initial US and French equipment sales to the region.
	1990	Poland and Hungary joined ECAC/Eurocontrol. Dissolution of USSR.
July	1992	Final report of the Task Force on Airspace and Management published.
Spring	1993	Danish and Hungarian governments agreed on merger of civilian and military air space.
March	1994	Report of the Airspace & Navigation Team (ANT) on Organizational Structures and Procedures Required for the Application of the Concept of the Flexible Use of Airspace.
April	1994	Concept supported by the EATCHIP Project Board.
May	1994	Concept supported by the NATO Committee for European Airspace Coordination (CEAC).
Summer	1994	Seven Central European nations set one year agenda for decision on establishing centralized control center.
June	1996	Lithuania, Latvia and Estonia accepted President Clinton's offer of assistance to upgrade their ATC systems. Already the US Gov't has pledged \$25 million in Czech & Slovak Republics, Poland and Hungary to establish central airspace management systems.
Sep	1996	Romania joined Eurocontrol as its 22nd member-state.
Jan	1997	Spain and Slovakia joined Eurocontrol.
March	1997	Croatia joined Eurocontrol.
	2000-2005	Planned schedule includes improvements to the infrastructure, enhanced ATM working practices, computerized support for tactical ATC functions, and the introduction of new open data processing systems.
	2002-2006	Planned schedule includes introduction of free routings starting in the upper airspace.
	2005-2012	Planned schedule includes enhanced planning functions, increased user involvement in real-time decision making, optimization of runways and CNS/ATM infrastructure, enhanced airport capacity in low visibility conditions, air-ground integration, gate to gate integration.
	2010-2015	Planned schedule includes optimizing conditions for maximized freedom of movement to the greatest possible extent and the exploitation of new technologies for that end.

## Worldwide Distribution

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By definition, the scope of this program is geographically restricted to Central European former USSR satellite and adjacent nations. The long range goal of the program is to become a functional element of an integrated global ATC network.

## Forecast Rationale

As of today, US manufacturers have an edge in securing ATC contracts in Central and Eastern Europe by going after and getting very large contracts that often include providing complete turnkey systems for countries or ATC authorities. This trend has signaled a shift away from governments automatically awarding a large portion of a major contract to a manufacturer from the same country.

Raytheon, for instance, is already set to install its equipment at Schiphol, Langen, and Munich in Germany, and also in Norway and Denmark. Hughes Electronics recently finished installing an advanced air traffic control system designed for training purposes in Warsaw, Poland. The system will provide the Polish

Airports State Enterprise (PPL) a safe and efficient method for training ATC personnel.

Western European leaders/companies are currently pressuring authorities (ECAC/Eurocontrol) to commit to a DGPS-based ATC technology. This stems at least in part from an admitted concern that Western European manufacturers could be losing time in developing products to protect the greater European markets they have invested heavily in to develop. Conversely, a major change in ATC technology would represent a major international window of opportunity for those US organizations willing to make a well-timed business commitment. Regardless of who secures the market, an anticipated switch to DGPS ATC technology would

create significant additional sales opportunities early in the 21st century.

European companies, such as Alenia, are also scrambling for a share of the growing number of contracts in this region. The company is currently installing several systems across Italy, and also has projects under way across Eastern Europe, including Lithuania, Poland, Estonia, the Czech Republic, Romania, Bulgaria, Croatia and the Slovak Republic.

Many of these Eastern European countries such as the Czech Republic, Romania, Estonia, Lithuania, Croatia and the Slovak Republic have recently become involved with EUROCONTROL the central regulatory authority for Western Europe, and ECAC (the European Civil Aviation Conference.) Through their involvement with Eurocontrol, the Eastern European nations hope to implement modern ATC systems in their countries based on one standard which will allow ease of travel and interoperability of equipment across Europe.

A growing trend in these countries is to cut costs by implementing one flexible ATC network for both military and civilian use. This concept was introduced in 1994 in a Eurocontrol report entitled the Concept of the Flexible Use of Airspace (CFUA), and operates on the principle of immediately being able to assign use in real time and to change from civilian to military usage as needs arise. The Czech Republic is working toward implementing a CFUA system through its membership in Eurocontrol and ECAC, as well as forming a relationship with NATO's Committee for European Airspace Coordination (CEAC). The Czech Ministry of Defense is also on-board with the plan. According to some schedules, CFUA systems could be implemented within two or three years.

The early expression of interest shown by Central European countries was read by the ECAC as a catalyst to accelerate the ATC harmonization process and caused it to ultimately expand its boundaries to include Central European countries. This interest was rewarded by ECAC financial and technical support of initial planning activities in these financially strapped countries. As discussed further below, the European Union (EU) has expanded this support in form of major financial backing of equipment procurements in subsequent years. This early leg up involvement provided important knowledge to assure that equipment purchased for, and procedures developed under, individual country ATC modernization programs would be compatible with emerging Western European equipment and functional interfaces.

The specific strategy of the EU has been to include Central European countries west of the Commonwealth of Independent States (CIS), i.e. the former USSR, in

the ECAC sponsored European Air Traffic Control Harmonization Integration Project (EATCHIP). In this environment, the EU is the owner/director, the ECAC the strategist, Eurocontrol the implementor, and various European financial institutions, such as the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD), the financiers. Individual Western European nations also support programs of strategic importance to their native industries in this scenario.

A number of Central European states are already in receipt of ATC hardware, unfortunately not all of which benefited from the now complete EATCHIP Phase I planning and definition activities. The task at hand is to integrate these facilities with those of Western Europe. This task has fallen to the Air Traffic Services Route Network (ARN) working group within EATCHIP. The interim mechanization which appears to be emerging is the development of a Eurocontrol compatible, semi-autonomous Central European control center.

To assist in the multi-faceted interactions required for the successful development of a modern ATC system, the Eurocontrol Advisory Service (EAS) was established in June 1993 specifically to serve as a focal point for consulting services for those countries seeking to achieve compatibility with ICAO and Western European ATC standards.

Several major factors can be identified which have affected the accelerated rate of development and current status of ATC development in these Central European nations, in contrast with Russia. These include longer term involvement with Western countries, and more aggressive supplier marketing. The single most discriminating factor, however, has been, or is, the ability to secure program funding. This is traceable to higher confidence in the political stability, economic foundation and more certain future growth of the Central European nations.

The overall assessment of the ATC modernization program in these Central European countries is that it is fully committed and will remain a growth market well into the 21st century. This is supported by the following facts: 1) the early recognition by the countries involved that a modern, globally compatible ATC system is key to their continued economic development in a Western culture, and 2) the strong financial backing, which continues to be provided both by the European Union as a whole and by individual Western European countries.

While significant procurements have already taken place and these systems are currently achieving initial operational status, the need, particularly when considering future growth and higher level integration

opportunities, has not been satisfied. Additional purchases to currently defined technical guidelines will be made to bring the system to full capacity and keep pace with growing demands. In the immediate and near term time frames, these procurements will be based in the acquisition of mature, low risk, existing products which are designed to operate using current ATC technologies and procedures.

In this regard, the product opportunities which will be available to suppliers may be more extensive than typically estimated, due to lack of development, or compatibility of, support facilities in these countries. This category covers such products as aircraft transponders, communication equipment, etc.

Western European nations have aggressively pursued the Central European ATC market with both technical and financial support strategies and have made obvious in-roads in the current market place. It is also perceived in Europe that this will slow down US manufacturers in their market penetration attempts and encourage the use of European subsidiaries and/or the formation of joint ventures or other alliances with European companies to increase their market presence.

In the longer term, it is important to keep in mind that while the Central European ATC system is being developed to existing standards, the global future course of ATC technology is currently very much in question.

Due to the research and development expenses involved, Western European, Central European and Russian nations, and indeed the ICAO, are being forced to follow the technological leads of the US Federal Aviation Authority (FAA), in order to achieve the global harmonization its systems.

The ten-year forecast presented herein is based on the determination that Central European nations are irrevocably committed to the development of a modern ATC system which is fully compatible/integrated with a global network to assure their continued economic growth. It is also considered that established financial backing for development and procurement will be maintained without interruption until these systems become self sustaining.

Due to the multi-national, multi-faceted financial structure of the program, its total program value is difficult to establish using bottoms up estimating techniques. Instead, a comparative evaluation with the more succinctly defined FAA ATC Capital Investment Plan (CIP) was made. FAA program values were adjusted for program status, schedule, and primary and supporting equipment requirement factors. The possible change to a DGPS-based ATC technology is not reflected in the forecast, but it is anticipated it would affect the expenditure schedule by significantly increasing procurements past the year 2000.

## Ten-Year Outlook

		ESTIMATED CALENDAR YEAR FUNDING (\$ in millions)													
Designation	Application	thru 96	<u>High Confidence Level</u>				<u>Good Confidence Level</u>				<u>Speculative</u>				Total 97-06
			97	98	99	00	01	02	03	04	05	06			
ATC -	AIR TRAFFIC														
CENTRAL EUROPE	CONTROL														
	(VARIOUS)	1325.00	350.00	325.00	300.00	300.00	275.00	275.00	250.00	250.00	250.00	250.00	250.00	2825.00	
Total Funding		1325.00	350.00	325.00	300.00	300.00	275.00	275.00	250.00	250.00	250.00	250.00	250.00	2825.00	