THE STORY OF RHEIN CONTROL

AIR TRAFFIC CONTROL IN SOUTH GERMANY’S
UPPER AIRSPACE

1957 to 1977

A critical expert evaluation of Germany’s
handling of civil and military air traffic
in the upper airspace

by

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PREFACE

This is a historical facts report and commentary on the development of the German Air Traffic Control Centre "RHEIN CONTROL" as formerly operated by the United States Air Force in Europe (USAFE) and the former German Federal Administration for Air Navigation Services (BFS), assisted by the German Air Force (GAF) at Birkenfeld-Nahe and Frankfurt/Main in Germany.

"Rhein Control" was and still is an upper airspace air traffic control (ATC) centre, formerly responsible for South Germany only, but now also covering all of former East Germany (Berlin UIR).

It is written by a former air traffic controller and air traffic control expert, who meanwhile actively spent 50 years in the ATC profession worldwide, and has had first served 25 years with the German Federal Administration for Air Navigation Services (Bundesanstalt für Flugsicherung – BFS) in upper airspace area control operations, ATC planning and experimentation.
FOREWORD

This compilation of records and experiences fulfils a historical purpose. The idea to compile such a report was born during the DFS celebration of the 50th anniversary of the Rhein Control centre on 19 July 2007 at the present location of the centre in Karlsruhe. It has been compiled by the author independent of any external support on the basis of available source documentation on file with the archive of the International Advisory Group - Air Navigation Services (ANSA) in Switzerland. The elaboration of this report took one and a half years and its production has been privately financed by Mr. F. Werthmann and the author, sponsored by ANSA.

The air traffic control centre “RHEIN CONTROL” was known by many members of the air navigation community of Western Europe in the post-war era as a, if not the only, unique and really jointly operated facility for all civil and military flights in the upper airspace. One can say that RHEIN CONTROL was already confronted with the problems in the late 50’ies, the 60’ies and 70’ies, which other air navigation services providers in Europe only experienced many years later.

The author has had first hand experience being assigned to RHEIN CONTROL for almost 17 years as area (radar) controller and civil servant of BFS from 1959 to 1975. He tries to present this centre’s history and evolution in an unbiased way, based on the presentation of still available evidence material for the purpose of putting them on record for the first time.

The report is written in applying scientific manners. In structuring the report on the development of the centre in three time phases from 1957 to 1977, duplication has sometimes become unavoidable.

Air Traffic Control is a primarily English speaking profession. And Rhein Control was a solely English speaking ATC centre due to its first operator, the United States Air Force Europe (USAFE). Also therefore this report is written in English.

Most records on RHEIN CONTROL of the former German Federal Administration for Air Navigation Services (BFS), the Ministry of Transport and the German Air Forces’ Administration for Air Navigation Services (AFSBw) are no longer available.

The comments on some of the source references in this documentation and all cited references and occurrences used for the purpose of elucidation are based on provable events and corresponding evidence material. They are mainly based on material still available to the author in compiling the report (see the listing on used source material at the end of the report) as well as on his own professional experience and knowledge as an area controller and ATS expert on civil / military coordination, cooperation and integration matters. This source material will later be turned over to a public governmental archive.

In compiling the information for the report, protocols of the former BFS and some of its field units, American facts and historical reports of the 1955 to 1962 years on RHEIN CONTROL, protocols of the two ministries and their subordinate units, discussions with the former staff and unit chiefs, were used, completed by personal experience.

The separate CDs contain a variety of documents, official publications, reports, internal ATS operating procedures, charts and photos and a one-hour long radiotelephony recording of RHEIN CONTROL of the early 60’ies.

If this chronicle gives the impression that Rhein Control was a pure US-military owned and operated ATC facility until August 1960, then this impression is correct. That is what it was. Thereafter it remained to be a USAFE facility until 1964, however, with air traffic services operations now managed by a civil organization, BFS, over all the years assisted by a GAF Detachment.

Rhein UAC was the cradle of a variety of air traffic control methods and operational procedures, which hitherto were either not required in civil air traffic services operations or unknown to all other ATS units under civil administration, and mainly handling only civil traffic.

This air navigation facility, its type of joint civil / military integrated operations and control procedures was unique throughout all of Western Europe until 1977, and also after it became a “co-located” civil / military centre under EUROCONTROL until 1986.

Why was it unique? It was the combination of its joint operations and staff, upper airspace organization and control procedures with all personnel controlling all types of traffic, at least in its first years of existence, with the mainly military training and special flights and large NATO exercises handled.

Frank W Fischer
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**NOTE** The numbering of the shown attachments is not consecutive, because all attachments of the missing numbers are to be found on the attached CD. This means of presentation has been chosen in order to limit the large number of pages of the report. See the attachments list at the end of the report for details and note the corresponding references throughout the text. Some of the original attachments are in German. All translations of german source documents into English have been done by the author in an effort to stick to the original contents a verbatim as possible.
INTRODUCTION

THE WAY THINGS WERE BACK THEN!

Who knows Erbeskopf mountain in the Hunsrück mountain range in Germany, except the inhabitants in its immediate vicinity, this solitary area with the small city of Idar-Oberstein, the jewelry centre, as the most well known city in its neighbourhood? Only a few!

To these few belong the civil and military air traffic controllers of the former German Federal Administration for Air Navigation Services (BFS) and the US and German Air Forces, who had operated the RHEIN CONTROL air traffic control centre here from 1957 until 1968. Germany, at that time, was divided into West Germany (Federal Republic) and East Germany (Democratic Republic) and had no sovereignty over its airspace until 1955.

As regards the history of civil and military Air Traffic Control in Germany’s upper airspace especially RHEIN CONTROL, the upper area control centre (UAC) near Birkenfeld-Nahe on Erbeskopf mountain played a significant role over all those years.

RHEIN CONTROL as a unique combination of joint civil and military ATC operation underwent several changes in ownership. Operational concepts, mixed control of civil and tactical flights and the existing severe difficulties did not reach the media or public discussion. This is why this chronicle is written.

A recent telephone interview with RHEIN CONTROL’s first military chief controller, Mr. Owen B. Teel, who now lives in Michigan / USA, may bring back to formerly involved readers many past experiences on how difficult things went some 50 years ago (listen to the interview on the attached CDI).
Before being assigned to RHEIN CONTROL under his USAFE assignment in 1957 he had already worked at Tempelhof Berlin Airlift. Returning to the 619th Tactical Control Squadron at Birkenfeld and preparations for the establishment of an ATC centre under the 12th Air Force. He was assigned to the Traffic Control Centre, then Rhein UIR conducting tactical control in the 1950s of the air navigation system began in the first half of the 50’s, i.e. under the “See and Be Seen” rule, leaving the avoidance of collision solely to the pilots. To this amount of uncontrolled flights, at least for the en-route portion, contributed mainly airline flights and military airplanes under operational (mostly training) missions, very many of them flying high altitude and at low level. Germany was overcrowded with VFR and IFR low level routes and areas constituting practically one large military training area. Unfortunately, Rhein Control operating methods and procedures had never been taught in ATC school nor had they been published before. This is another reason for writing this report.

The evolution of this unique European air traffic (control) services centre was and still is manifold. Founded by the 12th US Air Force and established on Erbeskopf mountain in Rhineland-Palatinate in the mid 50’s, in 1964 taken over by BFS, the centre moved on to Frankfurt airport in the spring of 1968 and further on to the city of Karlsruhe in 1977 under the auspices of the European Organization for the Safety of Air Navigation (EUROCONTROL). There, it still exists under the same radio call sign of RHEIN CONTROL / RHEIN RADAR as a unit of the German Air Navigation Services Limited Liability Company “Deutsche Flugsicherung GmbH”, a solely government owned enterprise, which was established by the German Government in 1993 as a successor of the “Bundesanstalt für Flugsicherung” (BFS), which assumed ownership over the centre in 1986 and continued to operate it in so-called co-location with the German Air Force’s MATRAC.

Unimaginably nowadays, decisions were taken by the german administration and the stationary forces, as the victorious powers were now called, whose consequences were not fully realized. But there was a need, so something had to be done. In the case of ATC service provision in the upper airspace of South Germany USAFE was the „driver“. And so it happened. A tripartite unit was formed, managed as a military facility by THE 619th Tactical Control Squadron of USAFE. But the different civil and military aircraft operators had diverging interests; foremostly the Royal Air Force (RAF) in the north of then West Germany.

All political decisions were dependent on consequences of the East – West conflict between the world’s powers, resulting in endless numbers of military manoeuvres and flight missions of NATO units in Germany and Western Europe. The majority of flights in the UIRs was military with 5 to 10 % civil flights compared to today’s proportion of 95 % civil and 5 % military, if at all. Traffic situations were very complex and not uniform, changing continuously because unscheduled traffic was the norm. Most of the time airspace blocks during military manoeuvres were not put in place, because the whole UIR was the airspace bloc. The situation with the lower airspace ACCs constituted „peace time“ compared to the one in the upper airspace with „front line“ activities.

The introduction of radar and data processing machinery in ATC did not change that situation significantly, but made those flight operations only more efficient and to a limited extend also safer. The overall development took long. Germany was full of aerodromes, among them 22 military air bases subjacent to the Rhein UIR conducting instrument flights with over 1,000 military jet aircraft plus five international airports; see Attachment No. A1-1 (BFS Aerodromes Map of 1957). Of 282 aerodromes 47 were military bases with instrument (IFR) operations.

The development of the air navigation system began in the first half of the 50’s and was caused by the positive attitude of the occupation forces towards the increasing problems of flight safety due to the ever increasing number of flights, at least so in the American Zone of Germany.
There were many players besides the US, Canadian, French and evolving German Forces in 1956. ICAO with its regional office for Europe in Paris and about ten years later also the EUROCONTROL Agency had their word heard in cooperation or coordination with the new German Ministries of Transport and Defence, the BFS and all the various NATO and military organizations, which additionally had to reach acceptable agreements with NATO’s Central European Advisory Council (CEAC) and their civilian partners.

The former military and civil organizations in charge of the RHEIN CONTROL centre faced many difficulties since no similar concepts, rules and experience existed. Every step further was a “first” and dependent on several shortcomings on behalf of the German parties involved. RHEIN CONTROL’s staff had to invent new procedures and operations methods from scratch and were hindered in the sought improvements by lack of money, experts and experience on behalf of its superior government administration units. Urgently needed planners did not exist. Lack of understanding with superiors at headquarters was a daily experience. So the operators had to help themselves.

Apart from that one can say that the technical and operational development of RHEIN CONTROL reflects the inadequate development nationally and in other West-European countries over all those years. The greatest drawback was the lack of ATC staff. There were only a few qualified controllers available, since USAFE needed its own controllers at other locations urgently and BFS and the GAF in the years up to 1962 were in a permanent selection, hiring and training process for additional controllers primarily for assignments in the lower airspace units.

Due to the lack of experienced and qualified planners, if there were any at all, duplication of effort was often unavoidable in finding the right solution for the design of new operations procedures and the development of the centre itself, coupled with the necessity of reaching mutual acceptance in the cooperation with NATO, ICAO and the German authorities, as well as between the appropriate military organizations of the USA, France, the UK and Canada.

The RAF in the North of Germany was very reluctant in changing the immediate post war situation on air navigation and especially France was a negative example of this kind with their stated inability (or unwillingness?) to operate in accordance with ICAO procedures in the German military terminal control area (MTMA) of Lahr, which for that reason then was declared to be a danger area in the lower airspace under instrument flight conditions.

And when the EUROCONTROL Agency joined the game the overall situation complicated even more. Many plans, proposals and concepts on RHEIN CONTROL’s improvement proved unrealistic, unacceptable, impracticable or plainly too premature. Even though a good number of them proved to be the wrong way, especially so as regards the coordination of civil and military air traffic, RHEIN CONTROL managed to handle the many flights, but with difficulty. The never solved controversy of improperly applied directives and jurisdiction should have its negative effects to all operations personnel working at Rhein UAC and its civil and military airspace users for many years to come.

All of the above caused considerable delay in the solution of the existing problems, unacceptable conditions and necessary improvements for at least ten years, when the centre moved to Frankfurt and in 1977 to the city of Karlsruhe. And if, despite all international agreements, such as under the Conventions of ICAO and EUROCONTROL on the authority over the handling of military traffic, it had remained so, it certainly would have had a better future than it had. But so, as unusual as it might sound, it had become a military centre operated by a civil organization, or perhaps better, a civil centre handling mainly military traffic. But a good number of “survival” procedures elaborated by operations personnel worked well and helped this ATC facility to last through its most critical years between 1961 and 1977 with dramatically increasing numbers of civil and military flights. Among them was the continued joint handling of civil and military flights, development of reduced military high altitude holding patterns, implementation of military traffic flow control measures, control sector delineation, sector working position layout and air route and flight level assignment procedures.

This report on the former legal basis, work methods, operations procedures and conditions is written for the wider air navigation and flying community. It shall permit civil and military airspace users and other interested parties insight and understanding on the origin, the development phases and the then existing shortcomings. However, besides the historical facts, this chronicle still is a personal report.

**TANGO OSCAR’s MEMORY on RHEIN CONTROL**

Air Traffic Controller Karl-Otto John recalls his experience when arriving at Birkenfeld in 1957 to work with RHEIN CONTROL.

“My god, if I had known in 1957 what I was up to, when I, assistant controller at Hannover Center, signed up for Birkenfeld to help build-up a new air traffic control facility for the upper airspace there on Erbeskopf mountain in the Rhineland. I was the youngest of the first six German civilian BFS controllers permanently assigned to the 619th Tactical Control Squadron of the USAFE at Birkenfeld.
This became necessary due to the fact that Viscounts, Caravelles and Comets now mingled with F-86’s, F-102’s and F-100’s above 20,000 feet.

Birkenfeld was a little town in the Hunsrück mountain range, like out of a fairy tale; behind the mountains, with an own idiom (never heard before), a rough climate and folks very disliking foreigners. Coming from North Germany also I was considered a foreigner. But I was welcomed by the 619th Tactical Control Squadron of USAFE, was given the equivalent rank of an officer and lived in the US bachelor officer’s quarters (BOQ) downtown Birkenfeld together with other American and German officers, who also belonged to the Rhein Control staff.

The trouble was that at that time the GI’s were paid in “Military US Dollar Currency”, which we Germans were not allowed to have and use, before the real USD currency was introduced. But our American colleagues helped out. So, BOQ rent, club dues, mess hall charges and beer calls, which we had to pay in US military currency, were no longer a problem. By and by, other civilian BFS controllers arrived from Hannover, Frankfurt and Munich, a few voluntarily, the majority not. Also German military personnel joined us. So, as time went by, we learned how the military “ticks” and with the airmen and non-commissioned officers (NCOs) we learned that enemies did no longer exist among this mixed professional group of american and german air traffic controllers up there at Rhein Control. We worked and lived together, comradeship developed quickly and many became friends.

We worked half underground with control boards made from crate-wood, used telephones as microphones connected to ground radio control (GRC) units with frequencies individually linked to certain aircraft type radios. Over the years we also got radar installed, which took five years to become operational and helped us in reducing the much larger procedural separation minima between flights. The controlled area was large, all of South Germany, and one had a lot to learn. The traffic was complicated and increased tremendously over the years. I got my area controller rating and years later the first females joined us as flight data assistants.

While I initially was mad at “Birky Town”, I must admit that the following years turned out to be the best and most interesting of my professional ATC career. The ATC work at Rhein Control was most challenging and due to the remoteness of the centre comradeship and team spirit were strong. Some friendships founded at Rhein Control in Birkenfeld lasted my whole further life and I often think back to the times on Erbeskopf at 816 m elevation, 10 feet below the surface.

TANGO OSCAR

Being permanently transferred from a civil german air traffic control unit of BFS, the german administration, to a US Air Force facility under US military command at Birkenfeld without any official duty assignment, proper orders, applicable rules and regulations, information and briefing caused considerable irritation for many.
A brief Overview on the Development

This overview shall facilitate your understanding on the development of Rhein Control over time as described in the following chapters.

Until 1952 Germany with its US, soviet, britisch and french occupation zones consisted of the Bad Eilsen, Berlin, Frankfurt, München and Strasbourg FIRs with the embedded CTAs and their corresponding designations. These consisted of a few airways and ADRs without an upper limit (see Figure 2-2.3). The Strasbourg FIR/CTA encompassed all of the Saarland, part of Rhineland-Palatinate and Baden-Württemberg.

As of 1953 this airspace organization changed and three flight information regions (FIR) without an upper limit had been established in West Germany, Hannover, Frankfurt and München.

The upper limit of the embedded control areas (CTA) was reduced to 19.500 / 20.500 feet on 1 February 1954. In the same year BFS ATS units ceased to provide ATS above 19.500 / 20.500 feet. In the airspace above 19.500 / 20.500 feet only the Allied Forces (RAF, USAFE, FAF) now provided ATS to all types of flights, seeking ATS assistance, including civil airliners.

BFS as the sole administration for air navigation services in the FRG existed since 1953, subordinate to department L6 of the ministry for transport with L6 constituting the civil aviation authority (CAA) of West Germany. As of May 1955 the FRG regained limited sovereignty over its airspace.

In 1956 also Germany joined the International Civil Aviation Organization (ICAO) as a member state, whereas BFS had already operated in accordance with ICAO standards and recommended practices (SARP) since 1953.

In South-Germany above 19.500 / 20.500 feet of altitude, i.e. within the limits of the Frankfurt and München FIRs, USAFE provided ATS to non-air defence flights in accordance with ICAO SARP on order of headquarters USAF in Washington, at first in the form of traffic information and direction finder services only.

This service in the upper airspace was extended to include also air traffic control (ATC) service for the establishment of ICAO – type separation between flights by the ground stations in 1956/57 by USAF air defence units RACECARD and CORNBEEF (see CORNBEEF CONTROL).

Both these two units provided ATS to all flights on non – air defence missions without an upper limit. In 1956 USAFE decided to separate the provision of ATS from the air defence organization and demanded the set-up of a pure ATS centre for the upper airspace from the german government.

Since BFS was unable to fulfil this request at that time it was decided to establish such ATS centre as a USAFE facility at Birkenfeld-Nahe, operated by the 619th TCS and thereafter by the 7424th SUPRON. The centre became operational on 1 June 1957 under the radio call sign of RHEIN CONTROL.

RHEIN CONTROL took over all ATS operations from CORNBEEF CONTROL and provided ATC service, flight information (FIS) and alerting services with USAF controllers, assisted by ATS personnel of BFS and the GAF until August 1960.

From June 1957 to May 1959 ATC service was provided without an upper limit in two airspace sectors in quasi uncontrolled airspace, because this operation had been implemented without the consent of ICAO. Between May and October 1959 this airspace was re-sectorized with an added third sector providing separation (ATC) above 27.000 feet over the whole area of responsibility (above the Frankfurt and München FIRs), all of it practically constituting air traffic advisory service (ADS) only.

As of October 1959 only the sector above 27.000 feet was declared “uncontrolled airspace” and the airspace below (20.000 to 26.000 feet inclusive) as “controlled airspace”. As of January 1960 and now with the consent of ICAO the whole Rhein Control area was officially declared as Frankfurt UIR with the embedded UTA from flight level 200 to 250 inclusive only, because the RAF had intervened.

Two UTA sectors were operated. The UAC was still wholly operated by USAFE until August 1960. At that time the remaining last eleven USAF controllers were re-assigned to other units and only BFS assisted by GAF staff provided all ATS to all types of traffic not operating under the direction of air defence units.

ATS operations were now turned over to BFS only in accordance with the agreement between the MoT and the MoD of April 1959. The overall Rhein Control facility, however, remained under the command of the 7424th SUPRON (USAFE) until 1964, respectively February 1966.
In 1964 BFS took over the whole facility from USAFE and now operated the centre together with a GAF component, which was called a MATRAC; under EUROCONTROL authority as of 1965.

The agreement between the governments of the USA and the FRG however remained in force until April 1968, when the centre was moved to Frankfurt airport.

### Rhein Control’s Chronology

**1956**  
Negotiations on the establishment of a joint civil/military upper airspace control centre (UAC) for South Germany are being held between USAFE 12th Air Force, the German Ministries for Defence and Transport, represented by the German Air Force (GAF) and the Federal Administration for Air Navigation Services (BFS).

**6 May 1957**  
USAFE 12th Air Force, GAF and BFS agree on the establishment of a UAC on Erbeskopf mountain near Birkenfeld-Nahe at the air defence direction finder network station CORNBEEF (CONTROL) in combining the flight movement functions of the two air defence stations CORNBEEF and RACECARD (near Freising in Bavaria) for the provision of Air Traffic Control Service (ATC) under ICAO standards and practices to civil and military flights in the airspace above 19,500, respectively 20,500 feet above the Frankfurt and München FIRs.

**1 June 1957**  
The newly established Rhein Control centre is being commissioned under the command of the 619th Tactical Control Squadron of USAFE. 31 USAF controllers and assistants of the AACS are being assigned to Birkenfeld.

**July 1957**  
The first 12 GAF military controllers and assistants are being assigned to Rhein Control constituting the GAF ATS Staff Detachment, under the command of the 619th TCS, which belonged to the 501st TCS.

**August + Sept. 1957**  
The first four BFS civilian controllers are being assigned to Rhein Control, constituting the BFS ATS Staff Detachment under the command of the 619th TCS.

**24 February 1958**  
Headquarters USAFE transfers the responsibility over Rhein Control from the 501st TCW to USAFE ADVON with responsibility for operations and technical maintenance to the 7030th Support Squadron, succeeded by the 7424th Support Squadron.

**Spring 1958**  

**April 1959**  
The Ministries for Defence and Transport agree to assign BFS as the sole provider of ATS to civil and military flights in area control operations within lower airspace CTAs and upper airspace UTAs.

**1 May 1959**  
The airspace under the responsibility of Rhein UAC is being horizontally divided into three control sectors.

**25 May 1959**  
The airspace under the responsibility of Rhein UAC is being re-sectorized horizontally into two sectors from 20,000 to 26,000 feet, both inclusive and a “High” sector for all airspace at 27,000 feet and above for the provision of control (ATC) and advisory (ATAS/ADS) services.

**1 August 1959**  
BFS informs the airspace users on the pending implementation of upper flight information regions, upper control areas and a predetermined route network to become effective in 1 October 1959. The implementation finally became effective on 15 January 1960.

**1 October 1959**  
USAFE publishes a notice to airmen (NOTAM) to the same effect.

**1 October 1959**  
The Government Agreement (Staatsvertrag) between the USA and the FRG on the logistic services of USAFE for Rhein UAC is being signed and published. It shall last until 26 April 1968.

**1 January 1960**  
With the consent of ICAO / Europe and NATO / CEAC Germany’s upper airspace with effect of 15 January is being declared Upper Flight Information Regions (UIR) from flight level 200, inclusive, with embedded Upper Control Areas (UTA) from FL 200,
inclusive up to and including FL 250. All airspace above the UTA is now uncontrolled airspace in which only FIS is being provided.

April 1960
The last eleven USAF controllers leave Rhein Control for other assignments. BFS and GAF controllers and assistants still operate under USAFE 7424th Support Squadron command.

August 1960
The responsibility of the 7424th Support Squadron under operational control of USAFE ADVON for Rhein UAC ATS operations is being delegated to BFS.

September 1960
The BFS Staff Attachment (ANS Sub-unit Birkenfeld) assumes responsibility for all ATS Operations at Rhein UAC. The overall responsibility for the whole facility remains with the 7424th Support Squadron until March 1964.

March 1964
The BFS Air Navigation Sub-unit Birkenfeld under the control of the Frankfurt RANSU becomes an independent Air Navigation Unit (FS-Stelle) now reporting directly to headquarters BFS at Frankfurt.

8 April 1965
The south sector of the Frankfurt UIR, i.e. all airspace above the München FIR is being delegated to München ACC to relieve Rhein UAC from the ever increasing traffic increase.

15 May 1965
EUROCONTROL, having been founded as an association in 1960, now assumes overall responsibility over Rhein UAC as an Agency, but transfers responsibility for the ATS back to BFS as its agent the same day. BFS will retain this function until 26 February 1977.

15 June 1965
The premises of the Rhein Control facility on Erbeskopf are being transferred from USAFE to the FRG with this process being completed by February 1966.

7 October 1965
The implementation of a EUROCONTROL sector of the Rhein UIR over the München FIR is being finalized between EUROCONTROL and BFS and is completed later the same year.

1 June 1967
The lower airspace FIRs upper limit is being raised up to and including FL 245; the Rhein UTA now becomes Frankfurt CTA; The airspace from FL 245 up to and including FL 460 is being classified as Upper Advisory Area (UDA) with the PDRs now becoming Upper Advisory Routes (UDR); an additional TACAN Route network is being implemented for military flights.

26 April 1968
Relocation of the centre from Birkenfeld to Frankfurt / Main airport into the old airport terminal. The State Agreement between the USA and the FRG on Rhein Control ceases.

13 April 1972
Relocation of the centre into the former control room of the Frankfurt ACC in the old airport terminal takes place.

26 February 1977
Rhein UAC is being relocated to the city of Karlsruhe. It becomes part of the overall Air Navigation Facility “Karlsruhe UAC” together with the GAF’s Military UAC Component “MATRAC”. Rhein UAC Operations become a separate unit under BFS administration called Air Navigation Area Facility (FS-Leitstelle). The MATRAC Operations become a separate unit under GAF (FS-Sector South) administration. EUROCONTROL never became responsible for ATS operations.

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Additional Attachments on CD.

For the additional attachments in English and/or German, which are contained on the attached CD, refer to the list of attachments at the end of the book.
ATTACHMENT A I/1

Attachment A I/1 - All German Aerodromes in 1957
Chapter 1

„RHEIN CONTROL“
WHAT IS BEHIND THAT NAME AND WHAT MEANS „AIR NAVIGATION“?

What is behind that Name?
And what means Air Navigation?
How does Air Traffic Control Work?

The Foundation of ICAO
Air Traffic Control, a Service that one cannot reject?
What is “Air Traffic Control Service”?
Applications of the Rules of the Air
Collision Risk
What can go wrong?
The Requirement to communicate
Separation Assurance
Navigational Accuracy
Civil versus Military Interests
The Human Aspect

The Air Traffic Controller’s Tools
Rhein Control’s ATS System Philosophy
The Legal Backbone
BFS – Bundesanstalt für Flugsicherung
Administrative Provision on BFS
ATC Operations Manual

Federal Employees Collective Tariff Agreement
THE STORY OF RHEIN CONTROL
by Frank W Fischer

"RHEIN CONTROL"
WHAT IS BEHIND THAT NAME AND WHAT MEANS "AIR NAVIGATION"?

What is behind that name?

Established as early as 1954 by the US Air Force in Europe (USAFE) RHEIN CONTROL operated since 1957 under this radio call sign on “Erbeskopf” mountain near the small city of Birkenfeld-Nahe in Rhineland-Palatinate as a civil / military integrated ATC centre. Erbeskopf mountain was an ideal location due to its elevation of 816 m, 70 miles west of the Rhine river in the “Hunsrück” mountain range, far away from the eastern border and major cities.

"RHEIN CONTROL" is the radio call sign of an air traffic control centre for the upper airspace of Southern Germany. Since 1957 it provided “air traffic services” above 19.500 feet of altitude and as of 1967 above 24.500 feet all over Southern Germany south of a line between the cities of Aachen and Kassel.

This air traffic control centre evolved from a direction finder control station of the 501st Tactical Control Wing of USAFE, which also operated from Erbeskopf under the radio call sign of CORNBEEF as part of the UHF direction finder network to which also various other stations such as LOGROLL, GUNPOST and RACECARD of the air defence network belonged in Germany, also cooperating with the FORENO direction finder stations of the French Air Force in the southwest of the country.

The designation RHEIN was chosen after the most prominent landmark in the region. The aeronautical radio communications term CONTROL was assigned to the centre on the basis of international ICAO rules, indicating to pilots that this station was providing air traffic control service in applying conventional, non-radar, procedures for the separation of flights under all weather conditions. The unit also used INFORMATION as a second call sign for its services to flights in the uncontrolled airspace above an altitude of 25.000 feet as of 1960. This meant that only traffic information, weather reports and navigation warnings were provided up there, but no separation between flights. Later on, when radar (control) services were implemented the call sign RADAR was added.

After some eleven years of operation from Erbeskopf this centre, as of 1964 belonging to the German Federal Administration for Air Navigation Services (BFS), was re-located in 1968 to Rhein-Main airport at Frankfurt/Main and in 1977 to its final location in the city of Karlsruhe. It is now a unit of the German Air Navigation Services government corporation “Deutsche Flugsicherung GmbH”, when BFS after 40 years of existence was transformed into a limited liability government enterprise.

And what means Air Navigation?

The German Federal Air Navigation Services are part of the global and extensive ground organization of international, european and german aviation and encompass those tasks and facilities, which serve the purpose of conducting air traffic in a safe, orderly and expeditious way. This far reaching objective generally refers to all types of aircraft, but not all are being separated by ground stations from each other during flight.

Already in the early days of internationally applicable rules and procedures, as agreed upon between the member states of the International Civil Aviation Organization (ICAO), the provision of air navigation service adhered to a multitude of rules and procedures of ICAO. The air navigation services, as a generic term, were divided into aeronautical telecommunication service (COM), aeronautical information service (AIS), air traffic services (ATS) and lately also air navigation communication, navigation and surveillance equipment technical services (CNS). All of these services were and are provided in conformity with ICAO standards and recommended practices, except CNS, which remained to be a national responsibility.

When the Federal Republic of Germany joined ICAO as a member state in 1956, the director of the newly established BFS (1953), Dr. O. Heer, wrote in an introductory on the “now” applicable new rules and procedures:

“As an especially important circumstance one must consider that – similar to other countries – all of the controlled airspace of Germany is now under the jurisdiction of one organization, the BFS, and that all flights, whether civil or military, now have to adhere to the internationally agreed regulations of ICAO, as implemented in Germany!” Regarding the upper airspace of Germany this remained more or less wishful thinking.

Back to the subject of RHEIN CONTROL. This report almost exclusively deals with the development, conditions and occurrences of this ATC centre since its establishment in 1957 until the year 1977, when it moved to Karlsruhe, and confines itself mainly to the air traffic services as delivered by this centre.

For a better understanding of readers not familiar with ATC the diagram shown under figure 1-1 presents the division of the various air navigation services in accordance with the ICAO Convention of 1944 as amended over the last 20 years.
THE STORY OF RHEIN CONTROL  
by Frank W Fischer

ORGANIZATIONAL STRUCTURE OF THE AIR NAVIGATION SERVICES

ANS = ATM + COM + AIS + CNS/Epmt

CNS = COM + NAV + SUR

ATM = ATS + ATFM + ASM

ATS = ATC + ADS + FIS/AFIS + ALRS

ATC = TWR + APP + ACC

Legend

<table>
<thead>
<tr>
<th>ANS</th>
<th>Air Navigation Services</th>
<th>ATM</th>
<th>Air Traffic Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC</td>
<td>Area Control Service</td>
<td>COM</td>
<td>Telecommunication Services</td>
</tr>
<tr>
<td>AIS</td>
<td>Aeronautical Information Service</td>
<td>AFIS</td>
<td>Aerodrome Flight Information Service</td>
</tr>
<tr>
<td>ATS</td>
<td>Air Traffic Services</td>
<td>TWR</td>
<td>Aerodrome Control Service</td>
</tr>
<tr>
<td>ATFM</td>
<td>Air Traffic Flow Management</td>
<td>ASM</td>
<td>Airspace Management</td>
</tr>
<tr>
<td>ATC</td>
<td>Air traffic Control Service</td>
<td>APP</td>
<td>Approach Control Service</td>
</tr>
<tr>
<td>ADS</td>
<td>Air Traffic Advisory Service</td>
<td>ALRS</td>
<td>Alerting Service</td>
</tr>
<tr>
<td>FIS</td>
<td>Flight Information Service</td>
<td>CNS</td>
<td>Communication, Navigation, Surveillance</td>
</tr>
</tbody>
</table>

Source: ICAO 9713 Vocabulary

How does Air Traffic Control work?

The air transportation system consists of three quasi separate professional environments, the Airport world, the Airspace User world, and the Air Navigation Services world. In the past the latter performed its business in isolation, with air traffic control affecting both the airspace users and the airports as an intervening factor.

With air traffic control’s main objective of separating flights from each other in avoiding collisions between them, it is a fact that one flight at a time does not require collision avoidance service, as well as two flights at a time over two widely separated geographical locations. However, this situation changed with many aircraft planning for flight at the same time from one and the same location to another common destination during those early years in Germany.

The Foundation of ICAO

At the Versailles peace conference in 1919, an International Commission for Air Navigation (ICAN) was set up and out of the conference was created the following rule: "Every aircraft in cloud, fog, mist or other condition of bad visibility shall proceed with caution, having a careful regard for the existing circumstance". This rule says it all and nothing at the same time. And one must stand back in awe and marvel at such rule revelling in its glitter emptiness, because it ignored the realities of flying an airplane in cloud and relied on the fact that few airplanes were aloft at any given moment.

So, resulting from experience in the mass movement of aircraft during World War II, a large number of nations of the world established the International Civil Aviation Organisation (ICAO) in 1944 to serve as the medium through which the necessary international understanding and agreement could be reached. ICAO’s membership now comprises 190 sovereign states and in 1947 became the specialised international civil aviation agency with the United Nations.
One of ICAO’s chief activities is the establishment of international standards, recommended practices and procedures covering the technical fields of aviation, such as “rules of the air” and “air traffic services”. Annex 11 to the Convention of ICAO contains the standards and recommended practices on the provision of the air traffic services, including the air traffic control service in ICAO Member States.

**Air Traffic Control, a Service that one cannot reject?**

Generally, civil aviation opinion considered it the pilot’s right to accept or reject the use of a specific air traffic service, leaving the ultimate authority as to the disposition of an aircraft under his command. International standards to this extent are laid down in Annexes 2 (Rules of the Air) and 6 (Operation of Aircraft) of ICAO.

This opinion, however, is only partly true, since the pilot is forced to accept air traffic control ‘service’ at all times under specific conditions, such as during instrument meteorological conditions or for the commercial transport of passengers and freight on scheduled flights while operating in controlled airspace. This rule makes the acceptance of air traffic control service mandatory, and the pilot’s adherence to air traffic control clearances and instructions become a must in order not to endanger his and other flights. Corresponding international standards are contained in Annex 11 (Air Traffic Services) of ICAO.

The standards and recommended practices in Annex 11, together with the standards in Annex 2 (Rules of the Air) govern the application of the "Procedures for Air Navigation Services - Rules of the Air and Air Traffic Services" as contained in ICAO Document 4444, the ATC bible, nowadays called PANS-ATM.

Annex 11 (Air Traffic Services) pertains to the establishment of airspace, units and services necessary to promote a safe, orderly and expeditious flow of air traffic. A clear distinction is made between air traffic control service, flight information service and alerting service. Its purpose, together with Annex 2, is to ensure that flying on international air routes is carried out under uniform conditions designed to improve the safety and efficiency of air operations.

**What is “Air Traffic Control Service?”**

It is a service provided for the purpose of 1) preventing collisions a) between aircraft, and b) on the manoeuvring area of aerodromes between aircraft and obstructions, and 2) expediting and maintaining an orderly flow of air traffic. Air traffic service, incorporating air traffic control service, means variously flight information service, alerting service, air traffic advisory service, air traffic control service, area control service, approach control service or aerodrome control service.

Another basic rule to remember is that the issuance of ATC clearances to pilots "constitutes authority for an aircraft to proceed only in so far as "known" air traffic is concerned. This rule should become a major obstacle for RHEIN CONTROL during the first 20 years of its existence, as we will see later. Also, clearances issued by controllers relate to traffic and aerodrome conditions only and do not relieve a pilot of any responsibility whatsoever in connection with a possible violation of applicable rules and regulations.

The decision on the implementation of air traffic control service is governed by a number of different elements, such as the mixture of different types of air traffic with aircraft of varying speeds (propeller, jet, etc.) necessitating the provision of air traffic services whereas a relatively greater density of traffic where only one type of operation is involved, would not. In the upper airspace the German authorities failed to properly do so until traffic in the Hannover UIR was controlled by the Maastricht centre and that in the Rhein UIR by the Karlsruhe centre.

As regards the operation of the air traffic control service the international standard foresees that ATC units shall be provided with information on the intended movement of each aircraft, or variations thereof, and with current information on the actual progress of each flight well in advance. They shall coordinate clearances as necessary with other neighbouring units, whenever a flight might otherwise conflict with traffic operated under the control of such other units, and before transferring control over a flight to such other units.

**Application of the Rules of the Air**

The rules for pilots say that an aircraft shall not be operated in such proximity to other aircraft as to create a collision hazard. That sounds fine, but it was not the pilots fault that an inefficient ATS system such as that of RHEIN CONTROL would bring them in such close proximity, often without the possibility of becoming aware of it due to flight in clouds or for other reasons. The given set of rules for the operation of aircraft and the provision of air traffic control services did not leave much room for the escape of conflict situations. BFS either would have had to fulfill all the rules in an utmost manner without exceptions with all airspace users fulfilling all the agreed standards and recommended practices, or stop flying. But, BFS did not fulfill and also did not stop flying.

Traffic collision avoidance systems (TCAS) or ground-based short term conflict alert functions (STCA) are only "last minute" escape tools and were not available in the old days. Until 1977 TCAS and STCA was talked about, but not yet available. A good number of airplanes was not even equipped with secondary radar transponders at that time. Non-directional radio beacons (NDB) and automatic direction finder (radio compass / ADF) equipment
followed by VHF omni-directional radio ranges (VOR) and distance measuring equipment (DME) and combinations thereof (Tactical Air Navigation – TACAN) were the radio aids and avionics of that time.

**Collision Risk**

To realistically portray how serious the situation was, one must take into consideration the "near collision" statistics. When a "near collision" incident report is filed, it reflects a virtual collision and that the ATC system has failed in some way. West Germany for instance, with traffic densities higher than the Chicago control area, reported "only" 48 such cases in 1985, compared to a record 483 15 years earlier. The situation in all of the western European countries was not very different, comparing their geographical size. And none of the european nations’ ATC systems was prepared to cope with the real demand of air traffic at that time.

Apart from technical deficiencies, collision risk is greatly influenced by pilot and controller alertness. In today’s advanced ATC systems most of the mistakes by pilots, which can result in mid-air collisions can be detected by controllers in their consequences, provided digital radar presentation with SSR modes A (identification) and C (altitude) information being available. In situations of instrument weather conditions (IMC), i.e. flight in clouds and under reduced visibility, pilots back then were helpless in any unknown conflict situation, because they could not see. Even if they learned by radio from another pilot or controller that such conflict existed, they had to rely on the controller's or other pilots' action exclusively.

**What can go wrong?**

Almost anything can go wrong in the ATC system, like in any other system operated by man. Unfortunately, it, however, will normally fail or go wrong at times, when we do not want it or are not prepared for it to go wrong. "Murphy’s Law", that everything, which could go wrong, will go wrong, but at one time, has been proven all too often in ATC.

Besides the lack or malfunctioning of technical equipment most discrepancies, irregularities and failures, which result in incidents and accidents, are to be found in the area of human factors. Generally speaking,

- wrong SSR codes are being assigned to controlled flights by mistake;
- flights are being assigned wrong altitudes, which go unnoticed during "omit position report" procedures;
- wrong radio telephony frequencies are being assigned to pilots by mistake under stress conditions;
- re-routings and diversions are forgotten in required coordination with adjacent control sectors and ATC units;
- controllers do not actively listen to the contents of pilot reports by radio, but believe, what they want (expect) to hear;
- hardware and software component limitations are not being considered or observed in their full operational consequence;
- coordination is performed in the mother language by telephone instead of in English as required or one of the other official international aviation languages (Spanish, French and Russian);
- more traffic is being accepted than the system is designed for, hoping that everything will operate normal, weather will be good, equipment will not fail, enough licensed and position rated personnel will be available and will be proficient enough to handle the traffic, and so on.

The number of resulting incidents stemming from operational errors, however, was high, the world over. General shortcomings and inadequacies in the air navigation systems relate to hardware, software and liveware (people and procedures). Most of the shortcomings at RHEIN CONTROL again related to operational matters, such as system rules and regulations, operations procedures and the like. Proper maintenance of equipment came next.

**The Requirement to communicate**

Until the days of digitised radar data presentation with flight call signs, flight levels, headings, etc. displayed to the controller on radar screens, the backbone of all ATC operations was radio contact between the aircraft and the controller. Radio contact as a means to coordinate pilot intentions as to the planned progress of the flight, constitutes a basic requirement.

Since speeds and corresponding closure rates are so high that one can no longer rely on the pilot’s capability of visual collision avoidance, besides flight in clouds, there is a need for one central point of coordination of the above mentioned intentions. Since aircraft are made to move, this point must be on the ground. It is the ATC units with an individual controller per defined airspace sector as a focal point of coordination, which fulfils this function.
Flying speeds are high and the detection of conflict situations, conclusions for solution and avoidance commands and evasive action are often to be performed within seconds. This clear requirement, however, is being impaired by the fact that not all controllers and not all pilots speak the same language, such as “controlleree”. ICAO has decided on four international aviation languages, English, French, Spanish and Russian. In most parts of the world, English is being used as the primary language in ATC communication on the basis of an international set of phraseology. In the 50’ies and 60’ies many pilots were not yet conversant with ATC phraseology and often caused critical situations.

In fulfilling its various tasks on coordinating the actual and intended movement of flights Rhein UAC with its 60 coordination partners required to exchange a multitude of messages relating to the control over flights. This coordination effort was enormous, too much time consuming and hampering an efficient provision of service. A situation, which lasted almost 20 years.

**Separation Assurance**

All aircraft constitute objects, be they civil or military, light or heavy. All of them constitute a collision risk to one another, if their speed is high enough to cause damage upon impact. Collision risk calculations and past mid-air collisions have proven without doubt that the risk is high.

Air traffic control systems in providing air traffic control service without the use of radar are often classified as “conventional” or “procedural”, since all control is based on available information as received by reports from pilots on the basis of the teletype flight plan (AFTN FPL messages), by telephone and via radio. This is the situation, which prevailed at RHEIN CONTROL until 1964/65.

Applying conventional control methods and corresponding procedures stands for the application of procedural separation minima, which differ according to the navigational aids and avionics systems available on the ground and in the aircraft, leaving navigational responsibility completely with the pilot. However, exercising radar control stands for the application of radar separation minima, cutting distances between flights up to a factor of ten.

For RHEIN UAC the implementation of radar control was long overdue and a very effective tool in the determination of navigational deviations off cleared tracks and in assisting pilots in navigation, but it resulted in the controllers being tasked with monitoring everybody under very reduced separation minima, increasing the collision risk and cutting their time budget to sometimes “nil”, and now becoming responsible for the navigation of aircraft under radar vectoring.

**Navigational Accuracy**

The need to navigate accurately was and is great. Independence from ground source radio navigation aids during en-route phases of flight was only available with INS equipped military aircraft. ATC relied mainly on non directional radio beacons (NDB), MF radio ranges (RNG), VHF omni-directional radio ranges (VOR), distance measuring equipment (DME), and TACAN stations as far as navigational accuracy had an effect on separation minima. Area Navigation techniques (RNAV) were not known, except for the RAF, whose aircraft were equipped with DECCA using the german DECCA chain signals allowing to navigate very accurate, i.e. down to ± 15 m.

Most of todays technical innovations in air navigation did not exist and took 10 to 15 years to become reality. Terms like CONSOL, GEE, DECCA, DECTRA, HARCO, RACON, D/F, NDB, RNG and VAR were common in daily ATC operations. RNAV, ATFM & CFMU, MLS, GPS, FDP, RDP, SCTA, SSR and TCAS were the names of distant nav aids to be discovered only years later. VOR, DME, TACAN and analogue radar constituted the bridge in that development. That meant that navigational inaccuracies were large. Lateral procedural separation between ground nav aids was 16 NM for parallel tracks to be flown. Only a few really knew how large NDB, VOR or TACAN holding pattern airspace areas were up there at FL 350.

However, all that was no longer usable for the types of aircraft flown and the large volume of traffic compared to the available navigable airspace.

And when ICAO introduced the 5 to 3 minute longitudinal separation minimum without air traffic flow control under radar „monitoring“ conditions, which did not mean radar „control“, controllers were often pushed into a radar control „vectoring“ role, but could not limit the number of aircraft under their control.

The variety of aircraft performances was great, especially for the military one had to know a lot of details especially on the possible rates of climb and descent and minimum cruising speeds. There normally was no time to ask someone else.

**Civil versus Military Interests**

The public’s opinion that civil aircraft are always controlled by civilian ATC units and that military flights are always controlled by military ATC units is widespread, but wrong. There are actually only two different systems, one being the air defence system in providing air surveillance services (non-ATS) for military purposes and the
other being the air navigation services systems in providing ICAO-type air traffic services. As regards air traffic, the first normally brings airplanes together and the latter tries to keep them apart. Also, there are civil and military ATS-type traffic control systems, but all handle military traffic.

With RHEIN CONTROL having been an integrated and then officially co-located civil/military ATC unit, coordination with many other civil and military ATC units was required, besides coordination with up to ten air defence units.

The Human Aspect

One of the major causes for the sometimes inefficient provision of ATC service, besides technical shortcomings, resulting in incidents and accidents, was the human’s incapability to always perform in an utmost manner in this profession. Controllers worked by unwritten laws of behaviour requiring the controllers’ and his assistants’ permanent vigilance, alertness and never-ending willingness to check, re-check and check again on each and every possible source of error. The correction of mistakes in navigation, undetected by pilots, often had to be detected and corrected by the controller.

Over many years often long overtime hours were worked during day and night shifts, all adding to the real stress in this profession, with time budgets often limited to seconds only, incomparable with normal governmental type of work. The operational tasks of air traffic controllers, in brief, could be summarised as alert, inform, advise, control = separate, as far as aircraft pilots are concerned, and as coordinate, assist, relay, simulate, train, supervise, monitor and broadcast as far as system internal operations are concerned; see figure 1-3 (diagram).

Figure 1-3 – The ATS System Interconnectivity

This diagram resembles the functional structure of ATS systems, including radar but lacking satellite air navigation data and signal input, such as by GNSS or ADS-B. It shows, which data are being produced by the ATS system’s subsystems and for which operational functions of ICAO type services, such as ALS, FIS, ADS and ATC and internal coordination as performed by ATS personnel, these data are used. The interconnectivity between the different subsystems is indicated by lines and arrows. The shown subsystems are:

- PER personnel
- COM air/ground radio and ground/ground voice or data communication
- AID aeronautical information and data processing and presentation
- NOTAM notices to airmen as part of AID
- MET weather messages as part of AID
- NAV navigation aids as part of AID
- FPP flight plan (data) processing and presentation (FDP)
- RADAR radar data processing and presentation (RDP)
- D/F direction finder data processing and presentation
- SMC system monitoring and control
- LOG logistics
THE STORY OF RHEIN CONTROL
by Frank W Fischer

The Air Traffic Controller’s Tools

Until 1964 the Rhein Controller in order to be able to provide air traffic services to flights required only basic hardware and liveware, i.e. regulations and procedures. The minimum required tools for procedural non-radar air traffic control, i.e. the establishment and maintenance of standard separation minima between flights in accordance with ICAO standards are, equipment-wise:

- a two-way radio for air/ground voice communication
- a discrete teletype system
- a discrete telephone system
- a flight progress board
- flight progress strip holders
- flight progress strips
- a pen

The regulations and procedures consisted of:

- a set of standard separation minima for longitudinal, lateral and vertical separation between flights
- a set of standard flight rules to be followed by aircraft pilots (rules of the air)
- a set of standard ATC operations regulations and procedures
- aircraft flight plans
- pilot position reports
- pilot intentions
- navigation equipment status
- notices to airmen
- weather reports and forecasts

Figure 1-4 - One of ATC’s Minimum Requirements

Rhein Control’s ATS System Philosophy

In contradiction to a normal (ICAO) ATS system, air traffic control, flight Information and air traffic advisory service at Rhein UAC was provided under the following conditions:

- the system is a non-obligatory service system in providing information, advice, clearances and instructions to pilots,
- the system’s operation is based on the assumption that not all information available is correct,
- such information, required for the provision of air traffic services to flights mainly constitutes position, time, speed, altitude, intention, weather, topography, operational and technical status of available equipment, availability of portions of the airspace and of airports,
- pilots remain responsible for the pilotage and disposition of their aircraft,
- controlled flights will not be under the control of only one control unit at any given time,
- responsibility for the control of all aircraft operating within a given block of airspace will not be vested in a single control unit,
- the control of flights may be delegated to other ATC units operating within the same airspace, even though prior co-ordination between all ATC units concerned is not assured,
- the ATC system is premised on navigational responsibility being vested within the aircraft, i.e. pilots are responsible for navigation,
• during radar control "vectoring" the navigational responsibility for the aircraft rests with the air traffic controller, whereas under radar "monitoring" it does not (such as with non-ATS military radar units),
• the prime responsibility of controllers is the prevention of collisions between aircraft,
• the provision of separation is based on the quality of known positional information available to the controller,
• advance coordination on pilot intentions (flight plans and changes thereto) will normally be early and fast enough as to stay ahead of the real flight’s progress, hopeless "hope" as regards the military flights.

The Legal Backbone

The German Aviation Code, the Law on BFS of 23 March 1953 and other subsequent regulations on the provision of the air navigation services contain the basic rules, rights and tasks for the operation of ATC units.

Articles 29 and 30 of the Air Law specify common regulations and state “The prevention of danger for the safety of air traffic as well as for the public safety or order by aviation (air supervision) is the duty of the aviation administrations. They may issue orders and directives in the execution of their air supervision functions. These aviation administrations may delegate these tasks to other units.”

"The Federal Armed Forces, federal border police, the police and the stationary forces in the FRG may deviate from the provisions of the first part of this law and from the regulations as published for their execution, as far as such deviation is required for the fulfilment of their specific tasks. Deviation from the rules of the air is only permitted for compelling reasons in fulfilment of sovereign rights."

Unfortunately, military flying units of NATO, USAFE, RAF, CAF, FAF and GAF made widespread use of this rule already since the early days of RHEIN CONTROL in applying it too generously also for the conduct of their training missions. This tendency led responsible government representatives to neglect a number of already taken decisions on the authority over the control of military traffic in the upper airspace by BFS.

BFS
Bundesanstalt für Flugsicherung

BFS, the german Federal Administration for Air Navigation had been established in 1953, before West Germany regained sovereignty with some exceptions as regards the airspace, i.e. air defence authority, and three years before the german Federal Armed Forces came into being at the same time when also Germany joined ICAO as a member state in 1956.

Being permanently transferred from a civil german air traffic control unit of BFS, the german administration, to a US Air Force facility under US military command at Birkenfeld without any official duty assignment, proper orders, applicable rules and regulations, information and briefing caused considerable irritation for many.

Unimaginably nowadays, decisions were taken by the german administration and the stationary forces, as the victorious powers were now called, whose consequences were not fully realized. But there was a need, so something had to be done. In the case of ATC service provision in the upper airspace of South Germany USAFE was the „driver“. And so it happened. A tripartite unit was formed, managed as a military facility by USAFE. But the different civil and military aircraft operators had diverging interests; foremostly the Royal Air Force (RAF) in the north of then West Germany.

All political decisions were dependent on consequences of the East – West conflict between the world’s powers, resulting in endless numbers of military manoeuvres and flight missions of NATO units in Germany and Western Europe. The majority of flights in the UIRs was military with 5 to 10 % civil flights compared to todays proportion of 95 % civil and 5 % military, if at all. Traffic situations were very complex and not uniform, changing continuously. Being put in place, because the whole UIR was the airspace bloc. The situation with the lower airspace ACCs consisted „peace time“ compared to the one in the upper airspace with „front line“ activities.

In repeating, most of todays technical innovations in air navigation did not exist and took 10 to 15 years to become reality. Terms like CONSOL, GEE, DECCA, DECTRA, HARCO, RACON, D/F, NDB, RNG and VAR were common in daily ATC operations. RNAV, ATFM & CFMU, MLS, GPS, FDP, RDP, SCTA, SSR and TCAS were the names of distant stars to be discovered only years later. VOR, DME, TACAN and analogue radar constituted the bridge in that development. That meant that navigational inaccuracies were large. Lateral procedural separation between ground nav aids was 16 NM for parallel tracks to be flown. Only a few really knew how large NDB, VOR or TACAN holding pattern airspace areas were up there at FL 300 and above.

However, all that was no longer usable for the types of aircraft flown and the large volume of traffic compared to the available navigable airspace. And when ICAO introduced the 5 to 3 minute longitudinal separation minimum
without ATFC under radar „monitoring“ conditions, which did not mean radar „control“, controllers were often pushed into a radar control „vectoring“ role, but could not limit the number of aircraft under their control.

The variety of aircraft performances was great, especially for the military one had to know a lot of details especially on the possible rates of climb and descent and minimum cruising speeds. There normally was no time to ask someone else. Being civil government employees, the air navigation academy of BFS unfortunately did never train its upper airspace area controllers handling mainly military flights on high performance aircraft performance characteristics and flight procedures. But the foremost experience of air traffic controllers working at Rhein UAC during those years was the lacking sense of justice on behalf of the german (air navigation) administration.

Too many cases had occurred which resulted in blaming operations’ staff for incidents, irregularities, separation infringements, etc. which actually happened due to technical, procedural and operational shortcomings, inadequate ATS system rules or procedures due to incompetence or misbehaviour of superiors, which were often backed by BFS headquarters. Controllers were considered opponents and not partners. These occurrences must be attributed to the misproportion in the number of the many young controllers in operations and their often much older counterparts in administrative positions, having grown up in the hierarchical system of the „Third Reich“, and not having been part of the air navigation system development between 1945 and 1953 in the rest of the world.

The Law on BFS states its tasks as follows:

"The administration’s tasks are especially the planning and testing of technical procedures and installations for air navigation, assistance in the investigation of aviation accidents and the conduct of air navigation services operations. This specifically includes air traffic control with flight movement control in the airspace and on the manoeuvring areas of airports."

In 1959 the last rule did not specify if BFS was also responsible for the provision of ATS to military flights; a matter of significant controversy between BFS and especially german military air navigation units of the Ministry for Defence for a long time, i.e. until 1959, when the MoD and MoT decided that this indeed was so. But when BFS was established in 1953, the Federal Armed forces did not yet exist. In looking back all these events happened in quick succession and were „young“, or better said; not much in civil and military aviation and air navigation had settled yet. The establishment of Rhein Control in 1957 is proof that a lot still had to be done.

**Administrative Provision on BFS**

General administrative provisions on the Law on BFS have been published by the Ministry for Transport with NOTAM I, number 110/68 stating that

"Air navigation services operations are to be conducted in accordance with these provisions and those directives as issued by BFS";

"The task of air navigation operational services is the averting of dangers to the safety of air traffic as well as public safety and order by aviation";

"Air traffic control service is to be performed for IFR flights within controlled airspace";

"Should the conduct of air traffic control service be impossible due to insufficient information on military flights then air traffic advisory service (ADS) within the scope of an extended flight information service can be provided. This service must separate known aircraft, which conduct IFR flights within uncontrolled airspace";

"Required details for the adherence to these administrative provisions are to be regulated by BFS in conforming with the respective ICAO standards and recommended practices".

The administrative provision of “allowing” the implementation of air traffic advisory service for IFR flights above flight level 250 in the uncontrolled airspace, even if flying in clouds, constituted a negation of the basic requirement for control for all those civil and military flights for a period of 20 years! And it is remarkable that this provision was only issued in 1968 after ten years of not providing any separation service at all for all those flights above FL 250.

**ATC Operations Manual**

This manual, the controller’s bible, issued in September 1968, contained the following rule on ATC service functions and general duties:

"All personnel performing ATC service functions are obliged to exercise all effort in order to achieve a, safe, orderly and efficient traffic flow."
For the controllers it remained to be an unanswered question of how to achieve a safe conduct of flights under the given circumstances. Active operations staff, time and again, complained, warned and suggested, but met with lack of understanding and ignorance like talking to a concrete wall, a more than frustrating experience.

**Federal Employees Collective Tariff Agreement**

The collective agreement for federal employees (BAT), to which air traffic controllers belonged until 1963, states under SR 2, Article 8, number 3 on general obligations that “the air navigation services employee shall, as far as recognizable, not obey orders, which would be contradictory to current operational rules of the air navigation services and endanger flight safety.” If Rhein Controllers tried to fulfil this obligation or demanded its adherence, they either met disciplinary action on behalf of the administration or were accused of trying to work “to rule”, which was considered “strike like” action.

As a result, the vast majority of controllers “gave up” and continued working under any and all conditions, hoping that they would never get involved in an accident. Regular involvement in serious incidents was already routine anyhow. Fate was kind to all, because over all those years only one mid-air collision and one shoot-down occurred in the Rhein Control area, but these were already two too many.

![Figure 1-5](image-url) - This Facility serves the Safety of Aviation