

AERONAUTICAL TELECOMMUNICATION NETWORK PANEL(ATNP)

Working Group 2

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Redondo Beach, USA

**Experimental ATN Topology and ATN Addresses allocated
in Germany**

- Information Paper -

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Summary

This information paper provides an overview of the Experimental ATN topology established by DFS in its "Demonstrator and ATN Research Testbed" (DART) with the focal point on NSAP addressing. Purpose is to facilitate interconnection with potential partners for future experiments.

1. INTRODUCTION

On the basis of a cost-benefit- and an user requirement-analysis, DFS will decide on a transition to ATN in Germany.

To obtain the necessary information for such analysis, the DFS program "Demonstrator and ATN Research Testbed (DART)" which is supported by the CEC under the name ATIF (ATN Trials Infrastructure), was launched.

Part of this programme is the integration of different ATN compliant subnetworks. For the next months, it is planned to integrate also the following air/ground subnetworks into the DART:

- **End of 1997:** *AMSS/Satcom*
- **End of 1997/Beginning of 1998:** *Mode S*

Joint ATN trials will be performed together with further experimental ATN sites.

To show the benefits of data link applications and services in an international ATN environment, it is recognized that an adequate infrastructure is necessary for this to take place. The DFS therefore fully supports the concept of ATIF for this purpose and has already interconnected with other ATIF sites.

With this paper, a brief overview should be given of the DFS "Demonstrator and ATN Research Testbed" with the focal point on NSAP addressing to facilitate interconnection with potential partners for future experiments.

2. TOPOLOGY

Focal point of the DART concept is to provide an flexible infrastructure which enables his users

- to integrate various systems and subnetworks with less expenditure,
- to interconnect with other Euro-ATIF partners (via different X.25 subnetwork, e.g. Datex-P, Transpac, PSN),
- to configure different ATN scenarios and environments, for example one or more routing domains (including one or more airborne domains).
- to use the facility „Fast Select“ on all systems

To achieve these objectives, the DART routers were installed on two locations. One is the academy of the DFS in Langen (three ground routers plus one airborne router in the end of 1997), the other one is the former research and development center in Frankfurt (one router). The ground routers are connected to the DFS owned Packet Switched Network (PSN), which is a private X.25 network.

Furthermore, an direct access to a public X.25 network, the Datex-P of the Deutsche Telekom, as well as a gateway between the PSN and the Datex-P allow a multiple resp. flexible connectivity to other ATN sides and an extensive investigation of the collaboration of the ATN with X.25 subnetworks of different providers.

In addition to the X.25 connections, an Ethernet backbone connects the three ground routers of the ground routing domain in Langen.

All systems currently used are TAR-TTS systems developed by Vertel under an Eurocontrol contract and are based on HP 9000 work stations.

In the scope of Satcom subnetwork integration in the end of 1997, a combined air/ground BIS, based on a PC TAR, will be installed in the airborne laboratory of DART.
 An other combined BIS/End System, a combination of TAR-TTS and the Trials End System (TES), which was developed under an Eurocontrol contract as well, is already in use.

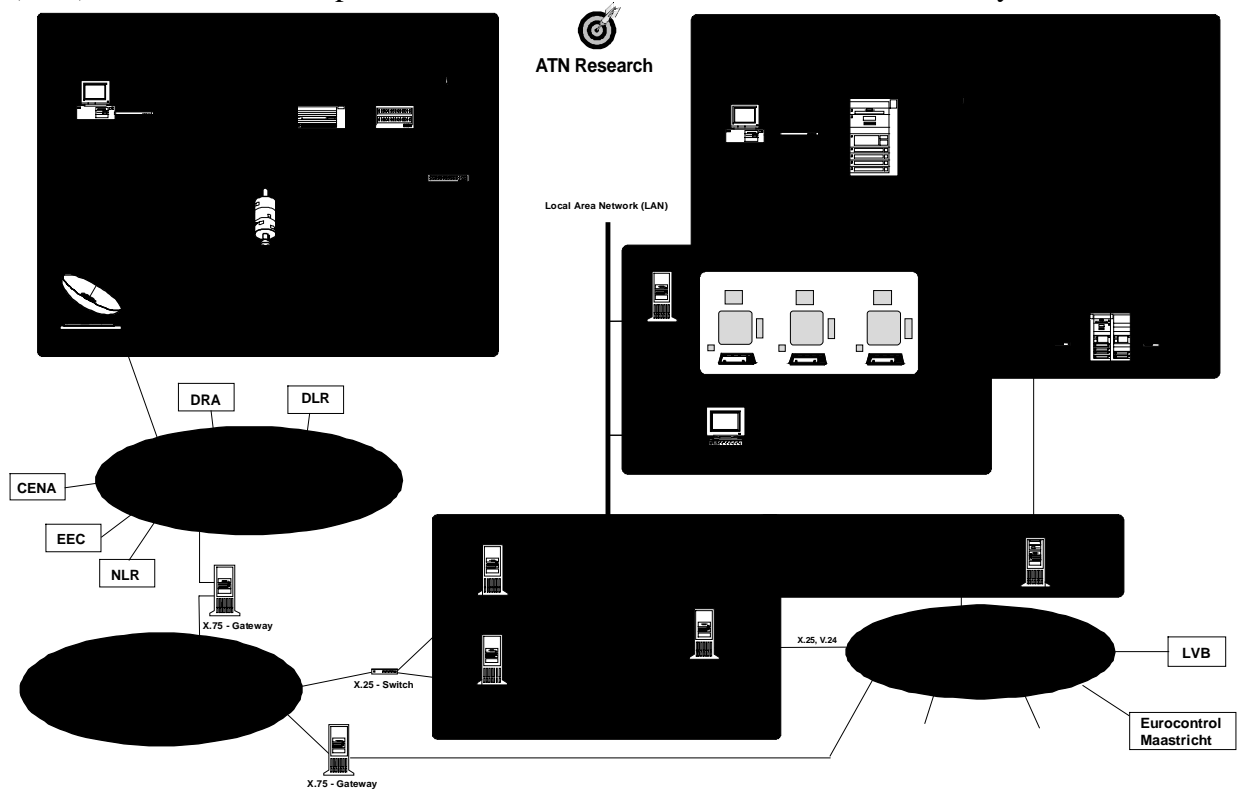


Figure 2-1. Planned infrastructure of the Demonstrator and ATN Research Testbed (DART)

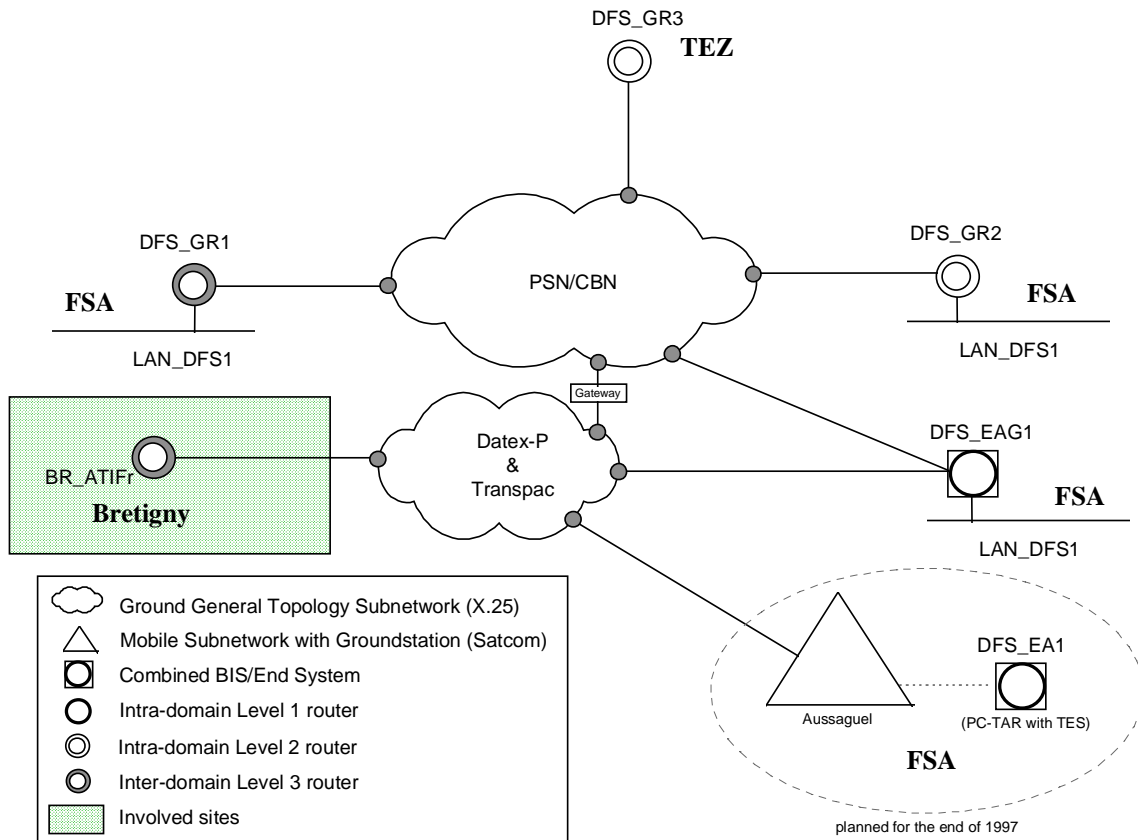


Figure 2-2. Present physical configuration of the DART

It has to be mentioned that the environment of the EEC Bretigny does consist of more than one router as shown in figure 2-1. It is reduced in these figure to the BIS which provides the connection to the DART.

3. NSAP ADDRESSES

System name definition and address allocation followed with keep to the naming and addressing scheme, defined in the ATN Guidance Material and to the arrangements of Euro-ATIF sides.

All NSAP addresses are, as defined on the last ATNP WG2 meeting in Langen, registered on the ATNP NSAP Address Repository.

3.1. Routing Domains defined for DART:

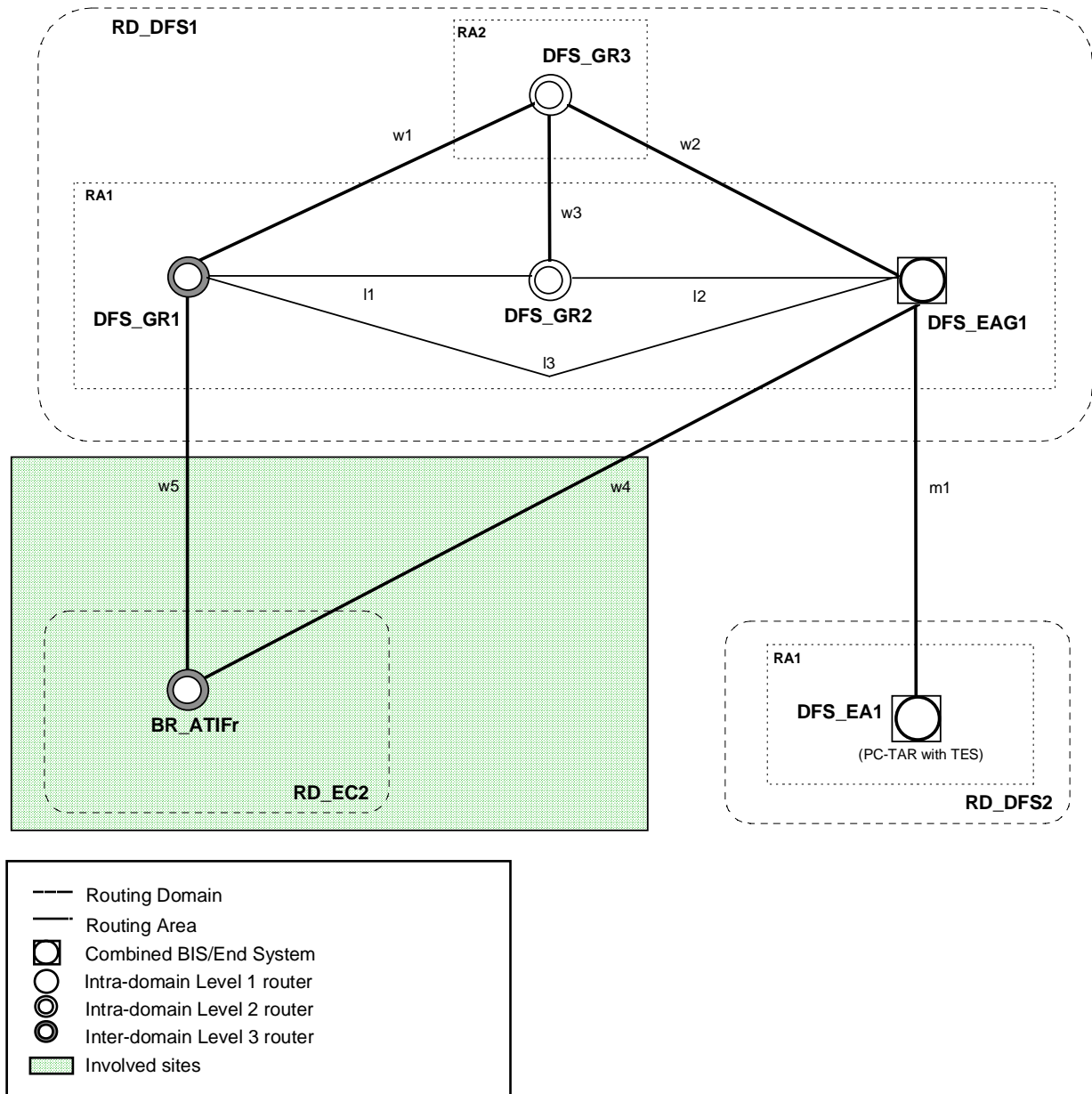


Figure 2-2. Routing domains and routing areas of the DART (with two connections to the EEC Bretigny)

RD_DFS1 (ground): 4700278144455500465331
AFI=47
IDI=0027
VER=81
ADM=444555 (DEU)
RFD=00
ARS=465331 (FS1)

RD_DFS2 (air): 47002781444555003C9A61
AFI=47
IDI=0027
VER=81
ADM=444555 (DEU)
RFD=00
ARS=3C9A61 (German 24Bit ICAO Aircraft address)

3.2. NSAP addresses of involved systems:

Ground-Ground Systems:

DFS_GR1: {+RD_DFS1}000144465347523101
DFS_GR2: {+RD_DFS1}000144465347523201
DFS_GR3: {+RD_DFS1}000244465347523301

Air-Ground-End Systems:

DFS_EAG1: {+RD_DFS1}000144465341473101

Airborne Systems:

DFS_EA1: {+RD_DFS2}000144465345413101

4. CONCLUSION

To attain the objective to be well prepared for a decision in the end of 1998 with regard to a transition to ATN in Germany, DFS will integrate, as mentioned before, a Mode S subnetwork in the testbed very soon. Beyond this, work has already started to connect the ATN environment with the ATC simulator in Langen. This will optimize further trials and investigations with respect to realistic surroundings. This complex research system will obtain an, as it where, real ATC environment.

In this connection, DFS is interested in a co-operation with other partners (aircraft or ground) within the ATN validation resp. evaluation, because an global, international ATN environment will substantiate the basis on which the decision will made and synergy effects resulting from an international co-operation, will optimise the way to this goal.

ATN NSAP Registration Form

Administrative Authority	DFS Deutsche Flugsicherung GmbH						
	Fixed						
Geographical	Country	City		Facility			
	Germany	Langen		DFS Academy			
	Mobile						
Location	Aircraft type			Registration/Tail			
Address Status	Operation		Trials	x	Reserved		
Description/ Comments	DFS ground router #1 of DART Infrastructure						
Address Type		NSAP		NET		RDI	RDCI
		x					
Address Length (octets)		20					
System Type		Class 1 IS		Class 2 IS		Class 3 IS	Class 4 BIS
		Class 5 BIS		Class 6 BIS		Class 7 BIS	ES
	Fields	Nb	Authorised Values		Hexadecimal Value		
	AFI	1	47		47		
	ID	2	0027		0027		
	VER	1	01-41-81-C1		81		
Fields Values	ADM	3	<i>n/a</i>		44 45 55		
	RDF	1	00		00		
	ARS	3	<i>n/a</i>		46 53 31		
	LOC	2	<i>n/a</i>		00 01		
	SYS	6	<i>n/a</i>		44 46 53 47 52 31		
	SEL	1	<i>n/a</i>		01		

Associated Contact Person			
Name	Firstname	Address	
Schade	Thomas	Paul-Ehrlich-Straße 37-39	
City	Postcode	Region / State	Country
Langen	63225	Hessen	Germany
Phone Number	Fax Number	E-Mail	
(+49) 6103/707-783	(+49) 6103/707-742	schade@se.dfs.de	

ATN NSAP Registration Form

Administrative Authority	DFS Deutsche Flugsicherung GmbH								
	Fixed								
Geographical	Country	City		Facility					
	Germany	Langen		DFS Academy					
	Mobile								
Location	Aircraft type			Registration/Tail					
Address Status	Operation		Trials	x	Reserved				
Description/ Comments	DFS ground router #2 of DART Infrastructure								
Address Type		NSAP		NET		RDI		RDCI	
		x							
Address Length (octets)		20							
System Type		Class 1 IS		Class 2 IS		Class 3 IS	x	Class 4 BIS	
		Class 5 BIS		Class 6 BIS		Class 7 BIS		ES	
	Fields	Nb	Authorised Values		Hexadecimal Value				
	AFI	1	47		47				
	ID	2	0027		0027				
	VER	1	01-41-81-C1		81				
Fields Values	ADM	3	<i>n/a</i>		44 45 55				
	RDF	1	00		00				
	ARS	3	<i>n/a</i>		46 53 31				
	LOC	2	<i>n/a</i>		00 01				
	SYS	6	<i>n/a</i>		44 46 53 47 52 32				
	SEL	1	<i>n/a</i>		01				

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Administrative Authority	DFS Deutsche Flugsicherung GmbH						
	Fixed						
Geographical	Country	City		Facility			
	Germany	Frankfurt		TEZ			
	Mobile						
Location	Aircraft type			Registration/Tail			
Address Status	Operation		Trials	x	Reserved		
Description/ Comments	<p>DFS ground router #3 of DART Infrastructure</p>						
Address Type	NSAP	NET		RDI		RDCI	
	x						
Address Length (octets)	20						
System Type	Class 1 IS		Class 2 IS		Class 3 IS	x	
	Class 5 BIS		Class 6 BIS		Class 7 BIS	ES	
	Fields	Nb	Authorised Values	Hexadecimal Value			
Fields Values	AFI	1	47	47			
	ID	2	0027	0027			
	VER	1	01-41-81-C1	81			
	ADM	3	<i>n/a</i>	44 45 55			
	RDF	1	00	00			
	ARS	3	<i>n/a</i>	46 53 31			
	LOC	2	<i>n/a</i>	00 02			
	SYS	6	<i>n/a</i>	44 46 53 47 52 33			
	SEL	1	<i>n/a</i>	01			

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ATN NSAP Registration Form

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	Fixed								
Geographical	Country	City		Facility					
	Germany	Langen		DFS Academy					
	Mobile								
Location	Aircraft type			Registration/Tail					
Address Status	Operation		Trials	x	Reserved				
Description/ Comments	DFS combined air-ground BIS/ground ES# 1 of DART Infrastructure								
Address Type		NSAP		NET		RDI		RDCI	
		x							
Address Length (octets)		20							
System Type		Class 1 IS		Class 2 IS		Class 3 IS		Class 4 BIS	
		Class 5 BIS	x	Class 6 BIS		Class 7 BIS		ES	x
	Fields	Nb	Authorised Values		Hexadecimal Value				
	AFI	1	47		47				
	ID	2	0027		0027				
	VER	1	01-41-81-C1		81				
Fields Values	ADM	3	<i>n/a</i>		44 45 55				
	RDF	1	00		00				
	ARS	3	<i>n/a</i>		46 53 31				
	LOC	2	<i>n/a</i>		00 01				
	SYS	6	<i>n/a</i>		44 46 53 41 47 31				
	SEL	1	<i>n/a</i>		01				

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Administrative Authority	DFS Deutsche Flugsicherung GmbH							
	Fixed							
Geographical	Country	City		Facility				
	Germany	Langen		DFS Academy				
	Mobile							
Location	Aircraft type			Registration/Tail				
	Laboratory			D-BFSA				
Address Status	Operation		Trials		Reserved	x		
Description/ Comments	<p>DFS combined airborne BIS/ES #1 of DART Infrastructure</p>							
Address Type		NSAP		NET		RDI		
		x						
Address Length (octets)		20						
System Type		Class 1 IS		Class 2 IS		Class 3 IS		
		Class 5 BIS		Class 6 BIS	x	Class 7 BIS		ES
	Fields	Nb	Authorised Values		Hexadecimal Value			
Fields Values	AFI	1	47		47			
	ID	2	0027		0027			
	VER	1	01-41-81-C1		81			
	ADM	3	<i>n/a</i>		44 45 55			
	RDF	1	00		00			
	ARS	3	<i>n/a</i>		3C 9A 61			
	LOC	2	<i>n/a</i>		00 01			
	SYS	6	<i>n/a</i>		44 46 53 45 41 31			
	SEL	1	<i>n/a</i>		01			

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