

**SINTEF Telecom and Informatics**

Address: NO-7465 Trondheim
NORWAY

Location Trondheim:

S.P. Andersens v 15

Location Oslo:

Forskningsveien 1

Telephone: +47 73 59 30 00

Fax: +47 73 59 43 02

Enterprise No.: NO 948 007 029 MVA

SINTEF REPORT

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Aircraft Noise Measurements at Gardermoen Airport, 2001.**Part 2: Technical memos produced during the study.**

AUTHOR(S)

S. Å. Storeheier, R. T. Randeberg, I. L. N. Granøien,
H. Olsen, A. Ustad

CLIENT(S)

Norwegian Air Traffic and Airport Management¹,
Oslo Airport AS²,
Norwegian Defence Construction Service³.

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K. H. Liasjø¹, K. Holen², N. I. Nilsen³

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PROJECT MANAGER (NAME, SIGN.)

Svein Å. Storeheier

CHECKED BY (NAME, SIGN.)

Idar L. N. Granøien

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Odd Kr. Ø. Pettersen, Research Director

ABSTRACT

In June of 2001, SINTEF Telecom and Informatics, with assistance from Norwegian Air Traffic and Airport Management, Oslo Airport AS and Norwegian Defence Construction Service, carried out an aircraft noise measurement study at Oslo Airport Gardermoen.

The main objective of the study was to investigate the causes of observed differences between predicted and measured aircraft noise levels around the airport. The measurements were conducted on scheduled air traffic, at 5 measurement positions reasonably close to the airport area. Efforts were made to collect and synchronize relevant aircraft data with the acoustic measurements. An essential contributing factor to this was the access to flight recorder data from the airline company SAS for the monitored flights. The number of selected flights in this study totals 155, including both take-off and landing operations.

Part 1 of this report overviewed the measurement layout, including data collection and data processing routines. The main results relate to noise source directivity, differences between estimated and predicted lateral attenuation and aircraft noise emission (Noise-Power-Distance) data.

Part 2 includes all technical memos produced during the study.

KEYWORDS

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GROUP 1

Acoustics

Akustikk

GROUP 2

Noise

Støy

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Aircraft

Flytrafikk

Noise level prediction

Støyberegning

PREFACE

This report and the underlying investigation was managed by SINTEF Telecom and Informatics as contract research for a joint client group including Norwegian Air Traffic and Airport Management, Oslo Airport AS, and Norwegian Defence Construction Service.

Flight recorder data for a number of flights were collected through arrangements made by Scandinavian Airline System (SAS). Oslo Airport AS and Norwegian Air Traffic and Airport Management made practical arrangements (transport, admission to airport area facilities, etc.). The client group participated during the field investigation by providing equipment and personnel for the acoustical measurements, and also in the collection of flight recorder data from SAS.

SUMMARY

In June of 2001, SINTEF Telecom and Informatics, with assistance from Norwegian Air Traffic and Airport Management, Oslo Airport AS and Norwegian Defence Construction Service, carried out an aircraft noise measurement study at Oslo Airport Gardermoen (OSL). The main objective of the study was to investigate the causes of observed differences between predicted and measured aircraft noise levels around the airport. The measurements were conducted on scheduled air traffic, at 5 measurement positions reasonably close to the airport area. Efforts were made to collect and synchronize relevant aircraft data with the acoustic measurements. A contributing factor to this was the access to flight recorder data for a significant part of the monitored flights. The number of flights in this study totals 155, including both take-off and landing operations.

The main results are:

1. The basic assumption, used by all fixed wing aircraft noise models, that the aircraft noise emission is cylindrical symmetric is wrong and need to be corrected for in next generation models.
2. The differences between observed and recommended lateral attenuation are significant, the order of magnitude have influence on prediction accuracy.
3. The differences between observed and in use Noise-Power-Distance data are statistically significant.
4. Flight profiles are different from the standard profiles used by the noise models.
5. The results indicated in this study are in broad accordance with recent findings in international investigations.
6. The noise measured by the NTMS can be expected less than 1 dB higher relative to calculations, because measurements take place at 6 meter height and calculation are done for 1.5 meter.

CONTENTS

Memo number	Memo content
40-NO 020031 (2.9 MB)	Comparison of measured Noise-Power-Distance data and NPD data from NORTIM.
40-NO 020033 (4.5 MB)	Comparison of INM profiles and measured flight profiles at Gardermoen.
40-NO 020034 (1.0 MB)	Comparison of tracks and profiles from flight recorder and from the radar tracking system at Gardermoen airport.
40-NO 020036 (0.1 MB)	Noise and track monitoring system (NTMS) at Oslo Airport Gardermoen. Validation of information on aircraft type, operation, runway use.
40-NO 020038 (0.7 MB)	Meteorological registrations at Oslo Airport Gardermoen, during the aircraft noise measurement period, June 2001.
40-NO 020041 (2.4 MB)	Influence of local microphone placement concerning the Oslo Airport Gardermoen NTMS (noise and track monitoring system).
40-NO 020043 (15.7 MB)	Aircraft directivity.
40-NO 020044 (0.2 MB)	Simulated Lateral Attenuation.
40-NO 020045 (0.5 MB)	Flystøymålinger Gardermoen juni 2001. Instrumentering og prosedyrer.
40-NO 020046 (0.5 MB)	Flystøymålinger Gardermoen juni 2001. Instrumentering og prosedyrer. Del 2.