



WP5 List of scientific publications

D5.4 - LoSP

PNOWWA

Grant:	699221
Call:	H2020-SESAR-2015-1
Topic:	Sesar-04-2015
Consortium coordinator:	Finnish Meteorological Institute
Edition date:	[7 March 2018]
Edition:	[00.01.00]
Dissemination level:	PUBLIC (PU)

Founding Members



Authoring & Approval

Authors of the document

Name/Beneficiary	Position/Title	Date
Elena Saltikoff / FMI	Science and WP Manager	6.3.2018
Heikki Juntti / FMI	Quality Manager	6.3.2018
Martin Hagen / DLR	WP 3 leader	6.3.2018
Rudolf Kaltenboeck / AUC	WP 4 leader	6.3.2018
Thomas Gerz / DLR	WP 7 leader	6.3.2018

Reviewers internal to the project

Name/Beneficiary	Position/Title	Date
Harri Haukka / FMI	Project Manager	7.3.2018
Elena Saltikoff / FMI	Science and WP Manager	7.3.2018

Approved for submission to the SJU By — Representatives of beneficiaries involved in the project

Name/Beneficiary	Position/Title	Date
Ari-Matti Harri / FMI	Project Coordinator	7.3.2018
Harri Haukka / FMI	Project Manager	7.3.2018
Elena Saltikoff / FMI	Science and WP Manager	7.3.2018
Martin Hagen / DLR	WP 3 leader	7.3.2018
Rudolf Kaltenboeck / AUC	WP 4 leader	7.3.2018
Thomas Gerz / DLR	WP 7 leader	7.3.2018

Rejected By - Representatives of beneficiaries involved in the project

Name/Beneficiary	Position/Title	Date
------------------	----------------	------

Document History

Edition	Date	Status	Author	Justification
00.01.00	7.3.2018	First release	Elena Saltikoff Harri Haukka	

PNOWWA

PROBABILISTIC NOWCASTING OF WINTER WEATHER FOR AIRPORTS

This document is part of a project that has received funding from the SESAR Joint Undertaking under grant agreement No 699221 under European Union's Horizon 2020 research and innovation programme.



Abstract

This document gathers together the list of WP5 scientific publications. There were 5 peer-reviewed conference papers, 1 conference paper, 2 presentations and 1 other dissemination activity (webinar).

Table of Contents

- Abbreviations* 5
- List of Figures*..... 6
- List of Tables*..... 7
- Executive Summary*..... 8
- Introduction*..... 9
- 1 Peer-reviewed journal papers*..... 10
- 2 Magazines* 11
- 3 Thesis* 12
- 4 Peer-reviewed conference papers*..... 13
- 5 Conference papers* 15
- 6 Presentations*..... 16
- 7 Other dissemination*..... 17
- 8 Conclusions*..... 18
- References*..... 19



Abbreviations

ATM	Air Traffic Management
PNOWWA	Probabilistic Nowcasting of Winter Weather for Airports
WP	Work Package

List of Figures

None

List of Tables

None

Executive Summary

The Single European Sky Initiative (SESAR) coordinates all the European Union R&D activities concerning Air Traffic Management (ATM). The SESAR Exploratory Research projects are the first research instruments to tackle a certain ATM discipline. PNOWWA - Probabilistic Nowcasting of Winter Weather for Airports – is a SESAR exploratory research project developing methods to support the Air Traffic Management (ATM) challenged by winter weather.

Introduction

PNOWWA - Probabilistic Nowcasting of Winter Weather for Airports – is a research project developing methods to support the Air Traffic Management (ATM) challenged by winter weather. This includes developing new probabilistic radar-based nowcasting methods and tools, assessment of the potential of such ATM tools, and demonstrating the effect of those tools at airports during winter weather conditions. In the winter 2017, PNOWWA organized a real-time demonstration campaign providing to selected end-users very short-term (0-3h nowcast) probabilistic winter weather forecasts in 15min time resolution based on extrapolation of the movement of weather radar echoes.

This document brings together the list of publications to be collected within the deliverable 5.4. These publications are published either in peer-reviewed journals, in the outcome of scientific webinars and meetings or in scientific conference proceedings.

1 Peer-reviewed journal papers

- None

2 Magazines

- None

3 Thesis

- None

4 Peer-reviewed conference papers

1. Pulkkinen S., Saltikoff E., von Lerber A. and Hagen M., 2017, Improving Snow Nowcasts for Airports, Seventh SESAR Innovation Days, November, 28-30, Belgrade, Serbia

- Available:

http://www.sesarju.eu/sites/default/files/documents/sid/2017/SIDs_2017_paper_43.pdf

PNOWWA (Probabilistic Nowcasting of Winter Weather for Airports) project has studied methods to forecast snowfall for next few hours by extrapolating movement of radar echoes. Three different methods to create motion vectors (a simple method, a method used operationally and a new method) as well as three methods to produce probability forecasts with help of a motion vector field have been studied.

2. Pulkkinen S. and Koistinen J., 2016, Probabilistic Nowcasting of Snowfall for Aviation, the 9th European Conference on Radar in Meteorology and Hydrology (ERAD2016), 10-14 October, Antalya, Turkey.

- Available: <https://erad2016.mgm.gov.tr/abstracts?userId=235> (abstract)

Reliable forecasts of heavy snowfall are critical for air traffic, as such events can cause major disruptions and additional costs. Aiming at aviation applications, we have developed a probabilistic radar-based nowcasting method for snowfall and associated phenomena. The presented approach is an extension of the stochastic ensemble prediction system (STEPS) [Seed 2003 and Bowler et al. 2004, 2006]. For estimating the advection field, we utilize an improved multiscale optical flow technique aiming at maximization of consistency between forward and backward flows [Pulkkinen et al. 2016]. We have studied the geographic, flow- and scale-dependency and growth and decay of snowfall and validated the nowcasting method by using the C-band dual-polarization radar located at Vantaa, Finland.

3. Pulkkinen S., Koistinen J. and Harri A.-M., 2016, Consistency-Driven Optical Flow Technique for Nowcasting and Temporal Interpolation, the 9th European Conference on Radar in Meteorology and Hydrology (ERAD2016), 10-14 October, Antalya, Turkey.

- Available: <https://erad2016.mgm.gov.tr/abstracts?userId=89> (abstract)

Determination of motion vectors from consecutive precipitation fields is a key task in radar meteorology. A novel consistency-driven optical flow technique is proposed for motion estimation. The proposed method aims at minimization of a cost function that penalizes intensity changes.

4. Haukka H. et. al, accepted, Probabilistic Nowcasting to increase airport safety and capacity, European Geosciences Union General Assembly 2018, 8–13 April 2018, Vienna, Austria.
5. Harri, A.-M., 2017, Winter Weather - Probabilistic Nowcasting to Increase Airport Safety and Capacity, Seventh SESAR Innovation Days, November, 28-30, Belgrade, Serbia.

5 Conference papers

1. Juntti H. et al, 2017, Probabilistic Winter Weather Nowcasting supporting Total Airport Management, *WMO Aeronautical Meteorology Scientific Conference*, , 6-10 November, Centre International de Conférences, Météo-France, Toulouse, France

6 Presentations

1. Saltikoff E., Juntti H. and Kaltenboeck, 2017, Snow forecasts for airports, *7th National Pyry-seminar organized together with EU:n COST ES1404/HARMOSNOW*, November 1, Helsinki, Finland.
2. Juntti H. et al. 2017, Provision of probabilistic nowcasts (PNOWWA project), International Workshop on Meteorology and Air Traffic Management “Management of Meteorological Uncertainty”, May 24.-25, Sevilla, Spain.

7 Other dissemination

1. Webinar, October 4, 2017

- H. Juntti and R. Kaltenböck, Synthesis of user needs for Probabilistic Nowcasting of Snow at the Airports (WP4 and WP5)
- Prof. M. Laine, Approaches of probability forecasting, guest speaker
- E. Saltikoff, S. Pulkkinen and M.Hagen, Snow nowcasts with extrapolative methods. Case studies and lessons learned. (WP2 and WP3)

All webinar presentations are available in PNOWWA webpage <http://pnowwa.fmi.fi>.

8 Conclusions

PNOWWA project WP5 dissemination achieved its goals mainly as planned. Some planned articles were submitted later than planned and some were postponed for future or cancelled. PNOWWA was visible e.g. in SID's, AMS and EGU receiving a good reception from the ATM.

References

- None