Nøkkelinformasjon

Saken / databasen er sist oppdatert	*2024.06.21 06:28:00*
Tittel	**System and method for preventing collisions between wind turbine blades and flying objects**
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Meddelt	2017.04.18
Søker	SINTEF Energi AS (NO)
Innehaver	SINTEF Energi AS (NO)
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Fullmektig	BRYN AARFLOT AS (NO)
Patentfamilie	Se i Espacenet

Sammendrag og figur

Patent Translation picture

A system and a method for control of a wind turbine for prevention of collisions between the rotor and flying objects such as birds, bats, and remotely-piloted aircraft is disclosed. The position and velocity of one or more flying objects is measured. The probability of the positions of the objects when they pass through the surface swept by the rotor blades is estimated. Increasing or decreasing the speed of the wind turbine rotor is performed such that the probability of collision between the rotor blades and the one or more objects is reduced or minimized, while otherwise continuing power production as usual.

Se forsidefigur og sammendrag i Espacenet

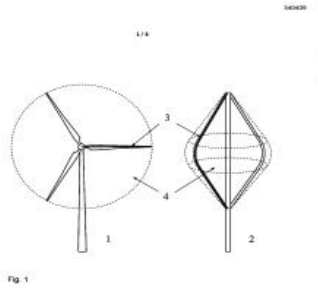

Fig. 1

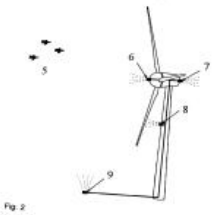

Fig. 2

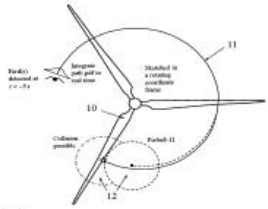

Fig. 3

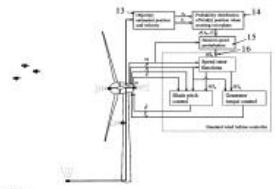

Fig. 4

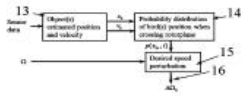

Fig. 5

Beskrivelse og krav

B1

Beskrivelse

INTRODUCTION

The present invention concerns a method, a collision prevention control module, and a collision prevention control system for preventing collisions between flying objects, such as birds, bats, and remotely-piloted aircraft, and wind turbine blades, without significantly changing the operating state or decreasing the energy production of the wind turbines. The invention also concerns a wind turbine provided with a collision prevention control system.

BACKGROUND

Wind turbines represent a hazard to birds and bats. A bird or bat hit by a wind turbine rotor blade will be killed, and the collision may also damage the rotor blade, which may result in stopping of the turbine and costly repairs of the blade. Other scenarios could be envisioned where a collision risk may exist between flying objects and wind turbine blades. For instance, remotely piloted drone aircraft have been proposed for inspection and maintenance of blades, implying that such aircraft will be active within wind farms. A malfunction or other event could cause the aircraft to deviate from the planned flight path. Similar remotely piloted aircraft are also flown for recreation by novices, who might not always have full control over the flight path.

There exist a number of solutions for preventing birds from hitting the wind turbine blades. US 8,742,977 B1 detects birds in the vicinity of wind turbines and engages a deterrent, like intense lights or sounds, to scare the birds away. Similar patents, on detecting and repelling birds, are found in the field of aviation. Employed on a broad scale, such deterrents could have negative ecological

Krav

1. A method of controlling a wind turbine avoiding collision between at least one flying object and at least one wind turbine rotor blade, the method comprising controlling a rotational speed of the wind turbine rotor based on at least one measured position and at least one measured velocity of the at least one flying object, wherein the method further comprising:- estimating a perturbation of the rotational speed of the wind turbine rotor in orderto avoid collision between the at least one flying object and the at least one rotor blade.2. Method according to claim 1, further comprising:- predicting a probability distribution of at least one flight path of the at least one flying object from the at least one measured position and the at least one measured velocity of the at least one flying object.3. Method according to claim 1 or claim 2, further comprising:- estimating a probability of collision between the at least one flying object and the at least one rotor blade.4. Method according to claim 3, wherein the probability of collision is estimated based on an estimated intersection between the probability distribution of the at least one flight path with a swept surface of the at least one rotor blade as a function of position and time.5. Method according to one of claims 1 - 4, further comprising:- measuring the at least one position and the at least one velocity of the at least one flying object at a number of times t providing a number of updated measurements.6. Method according to claim 5, further comprising:- for each of the number of updated measurements estimating a perturbation of the rotational speed of the wind turbine rotor in order to avoid collision.7. A collision prevention control module for a wind turbine, the collision prevention control module being adapted for controlling a speed of at least one rotor of the wind turbine based on a measured position and a measured velocity of at least one flying object avoiding collision between at least one

Hva betyr A1, B, B1, C osv?

Klasser

IPC-klasse

F03D 7/00

G01S 13/56

G01S 7/41

G01S 13/93

G01S 13/933

CPC-klasse

F03D 7/00

F03D 11/00

F03D 11/0041

G01S 7/415

G01S 13/56

G01S 13/93

F03D 11/0091

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Din referanse: 124441/KR

Anførte dokumenter

US 2008260531 A (A)

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Sakshistorikk

Statushistorie

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2017.04.18 Meddelt	2017.04.06 Patent meddelt (B1)
2015.06.08 Under behandling	2017.01.28 Godkjent til meddelelse
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2015.06.08 Under behandling	2015.06.11 Formaliakontroll utført
2015.06.08 Under behandling	2015.06.11 Mottatt

Korrespondanse

Dato	Type korrespondanse	Journal beskrivelse
2017.05.03	Utgående	PT Batch Varsel om betaling av første årsavgift (3317)
2017.04.19	Utgående	PT Registreringsbrev Nasjonal Patent (15)
2017.03.15	Innkommende, AR186608112	Korrespondanse (Hovedbrev inn)
2017.02.01	Utgående	Intention to grant
2016.06.03	Innkommende, AR149025183	Korrespondanse (Hovedbrev inn)
2015.12.08	Utgående	Realitet patent
2015.09.08	Innkommende, AR115876529	Korrespondanse (Hovedbrev inn)
2015.06.11	Utgående	Formal Examination 1
2015.06.11	Utgående	Infobrev til oppfinner
2015.06.08	Innkommende, AR105720725	Søknadsskjema Patent

Informasjon om ikke tilgjengelige dokumenter

Betaling

Til betaling:

Betalingshistorikk:

Beskrivelse / Fakturanummer	Betalingsdato	Beløp	Betaler	Status
Årsavgift 10. avg.år.	2024.06.19	4160,0	CPA GLOBAL (PATRAFEE) AB	Betalt og godkjent
Årsavgift 9. avg.år.	2023.06.16	2850	BRYN AARFLOT AS	Betalt og godkjent
Årsavgift 8. avg.år.	2022.06.10	2550	BRYN AARFLOT AS	Betalt og godkjent
Årsavgift 7. avg.år.	2021.06.04	2200	BRYN AARFLOT AS	Betalt og godkjent
Årsavgift 6. avg.år.	2020.06.03	2000	BRYN AARFLOT AS	Betalt og godkjent
Årsavgift 5. avg.år.	2019.06.04	1650	BRYN AARFLOT AS	Betalt og godkjent
Årsavgift 4. avg.år.	2018.06.06	1350	BRYN AARFLOT AS	Betalt og godkjent
Årsavgift 1. tom 3. avg.år.	2017.06.07	2100	BRYN AARFLOT AS	Betalt og godkjent
31701906	2017.03.31	2450	Bryn Aarflot AS	Betalt
31508229	2015.07.10	7900	Bryn Aarflot AS	Betalt

Denne oversikten kan mangle informasjon, spesielt for eldre saker, om tilbakebetaling, internasjonale varemerker og internasjonale design.

Publikasjon(er)

Lenker til publikasjoner og Norsk Patenttidende (søkbare tekstdokumenter)

Siste publiserte versjon av patent

Allment tilgjengelig patentsøknad

Norsk Patenttidende - ved meddelelse

Nye digitale Norske Tidende, nyhet om tjenesten ved lansering

Om Norske Tidende

Lenker til publikasjoner (ikke søkbare tekstdokumenter)

B1

A1

Hva betyr A1, B, B1, C osv?

Kapitler uten data er fjernet.

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