

舰载飞机着舰引导与飞行控制

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摘要:

舰载飞机是航母战力的体现,引导与控制是舰载机自动着舰的关键技术。由于着舰环境十分恶劣,舰尾气流、着舰区紊流、舰船甲板运动等扰动作用都会对着舰产生很大影响,极大增加了着舰难度,严重影响了着舰安全。因此本专题旨在展示舰载飞机着舰引导与飞行控制的最新研究成果。

关键词:

舰载飞机、自动着舰、引导与控制

专题内容:

目前用于舰载飞机的一般包括有人机、无人机和直升机,由飞机构型的不同,发展出多种回收方式。自动着舰控制系统是舰载飞机着舰与回收的关键技术之一,一般包括引导系统和飞行控制系统。其中,着舰引导系统主要用于确定机舰相对位置、生成基准下滑轨迹、计算或测量轨迹跟踪误差、并给出引导指令等;飞行控制系统一般由飞行控制策略、甲板运动补偿器、舰尾气流抑制、动力补偿等回路组成。

舰载机着舰过程中受到多种因素的制约,如:①着舰点需控制在期望区域;②控制纵向、侧向偏差防止发生碰撞;③飞机保持适当姿态,使尾钩能够准确钩住拦阻索;④保持合适下滑速度着舰,避免拦阻啮合装置承载过大,或超过起落架承受范围;⑤控制发动机能够迅速响应复飞、逃逸任务。

复杂的着舰环境与严苛的着舰条件对舰载飞机的着舰引导与飞行控制提出了更高的要求。本专题重点旨在围绕以有人机、无人机和直升机为代表的舰载机着舰引导与飞行控制相关原理与技术,汇集相关领域的前沿理论与工程应用方法,推动舰载飞机着舰技术的快速发展。征稿主题范围包括但不限于:

- 基于跟踪雷达的着舰引导系统
- 基于卫星的着舰引导系统
- 基于多源信息融合的综合着舰引导系统
- 舰载机着舰直接力控制技术
- 先进控制理论及其着舰应用
- “魔毯”技术及其着舰应用
- 甲板运动预估与补偿技术
- 舰尾气流抑制技术

➤ 舰载机着舰安全控制技术

特申请设立舰载飞机着舰引导与飞行控制大会特邀专题，作为国际制导导航与控制学术会议的特邀专题进行论文征集。

望批准！

Guidance and flight control for aircraft carrier landing

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Abstract:

Carrier based aircraft can reflect a carrier's combat capability, and guidance and control is the key technology for carrier landing process. Because of the bad landing environment, including the air wake, turbulence in the landing area, movement of the deck and other disturbances, will have a great impact on the accuracy of landing phase, and even seriously affect the safety of both aircraft and carrier. Therefore, this proposed invited session aims to show the latest research of landing guidance and flight control of carrier-based aircraft.

Keywords:

Carrier-based aircraft, auto-landing, guidance and control

Theme:

There are many kinds of carrier-based aircraft, such as manned aircraft, UAV, helicopter, etc. According to this, several recovery methods are developed. The automatic landing control system is a key point of carrier-based aircraft, and it consists of guidance system and flight control system. Guidance system is mainly used to determine the relative position of aircraft and carrier, generate reference glide path, calculate tracking error, and obtain guidance commands. Flight control system is generally composed of flight control strategy, deck motion compensation, air wake suppression, power compensation and other modules.

The landing process is restricted by many factors, such as: ①the touching point should be controlled within desired area; ②the longitudinal and lateral deviation should be limited to prevent collision; ③the aircraft should keep a proper attitude so that the tail hook can accurately hook the arresting cable; ④the landing speed should be kept suitable to avoid that the arresting engagement device and landing gear bear too much load; ⑤the engine should be controlled for quickly responding to overshooting and escape missions.

These complex landing environment and severe landing conditions put forward higher requirements for landing guidance and flight control of carrier-based aircraft. Therefore, this invited session focuses on the principles and technologies related to landing guidance and flight control of carrier-based manned aircrafts, UAVs and helicopters, collects the frontier theory and engineering application in relevant fields, and promotes the rapid development of carrier-based aircrafts. The theme includes but is not limited to:

- Landing guidance system based on tracking radar information
- Landing guidance system based on satellite information
- Integrated landing guidance system based on multi-source information fusion
- Direct force control technology for aircraft landing control
- Advanced control theory and carrier landing application
- "Magic Carpet" technology and carrier landing application
- Deck motion prediction and compensation technology
- Air wake suppression technology
- Safety control of aircraft landing phase

Herein, we suggest to organize an invited session about guidance and flight control for aircraft carrier landing in ICGNC, 2020 conference.