

A COLLECTION OF TECHNICAL PAPERS

Part 1

AIAA Guidance, Navigation, and Control Conference and Exhibit

August 10–12, 1998/Boston, Massachusetts

Space Exploration Technologies; NEW PETITION
Exhibit 1003
Page 1 of 22

**Copyright © 1998 by
American Institute of Aeronautics and Astronautics**

**ISBN
1-56347-269-4**

All rights reserved. No part of this volume may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, for any purpose without permission from the publisher.

Printed in the U.S.A.

Space Exploration Technologies; NEW PETITION
Exhibit 1003
Page 2 of 22

Session 1-GNC-1 Advanced ATM Concepts

98-4101	Agent-Based Performance Assessment Tool for General Aviation Operations Under Free Flight K. Harper, S. Mulgund, G. Zacharias, and J. Kuchar	1
98-4102	Modeling and Identification of an Airline Operations Center as a Multi-Agent Queuing System N. Pujet, E. Feron, and A. Rakshit.....	11
98-4103	Evaluation of a Cooperative Air Traffic Management Model Using Principled Negotiation Between Intelligent Agents L. Jacolin and R. Stengel	20
98-4104	Solution Complexity Metrics W. Niedringhaus	30
98-4105	Real-Time Decision Support for Air Traffic Management, Utilizing Concept Learning J. Nogami, S. Nakasuka, and K. Hori.....	52
98-4106	Comparison of Algorithms for the Dynamic Resectorization of Airspace W. Pawlak, V. Goel, D. Rothenberg, and C. Brinton	67

Session 2-GNC-2 Reconfigurable Flight Control

98-4107	Reconfigurable Flight Control for a Tailless Advanced Fighter Aircraft J. Brinker and K. Wise.....	75
98-4108	Direct Adaptive Reconfigurable Control of a Tailless Fighter Aircraft A. Calise, S. Lee, and M. Sharma	88
98-4109	Control Allocation Approaches D. Enns	98
98-4110	Parameter Identification for Systems with Redundant Actuators M. Elgersma, D. Enns, S. Shald, and P. Voulgaris.....	109
98-4111	Stability Analysis of Reconfigurable and Gain Scheduled Flight Control Systems Using LMIs K. Wise and J. Sedwick	118
98-4112	Reconfigurable Flight Control on Sliding Modes Addressing Actuator Deflection and Deflection Rate Saturation Y. Shtessel, J. Buffington, M. Patcher, P. Chandler, and S. Banda.....	127

Session 3-GNC-3 Missile Guidance I

98-4113	Angle of Attack Guidance via Robust Approximate Inversion M. Innocenti, G. Carnasciali, and F. Nasuti	138
98-4114	A New Missile Guidance Algorithm Against a Maneuvering Target F. Imado, T. Kuroda, and M.-J. Tahk.....	145
98-4115	Guidance-Law Synthesis for Interception and Rendezvous C.-C. Yang, C.-D. Yang, and H.-Y. Chen	154
98-4116	Optimal Guidance of Modified Proportional Navigation F.-K. Hsu and P.-J. Yuan.....	NA
98-4117	A Composite Guidance Strategy for Three-Dimensional Air-to-Surface Missiles D.-R. Taur and J.-S. Chern.....	160
98-4118	An Iterative Numerical Method for a Class of Quantitative Pursuit-Evasion Games M.-J. Tahk, H. Ryu, and J.-G. Kim.....	175

WD—Withdrawn

XI

NA—Not Available

98-4121	Y. Ishijima, S. Matsumoto, and K. Hayashi.....	192
	Robust Nonlinear Model Predictive Control for Agile Interceptor Missiles	
98-4122	R. Mehra, M. Gopinathan, and P. Sistu.....	201
	Minimum-fuel Trajectory along Entire Flight Profile for a Hypersonic Vehicle with Constraint	
98-4123	H. Morimoto and J. Chuang	212
	Aircraft Guidance and Control Using Subspace Stabilization Control Techniques	
98-4124	C. Tournes and C. Johnson.....	225
	Formation Flight as a Cooperative Game	
	M. Anderson and A. Robbins.....	244

Session 5-GNC-5 Space Robotics

98-4125	3-D Guidance and Navigation of Mobile and Flying Robot Using Fuzzy Logic	235
	J. Sasiadek and Q. Want.....	
98-4126	Experiments on Space Robot Path Planning Using the Sensors Database, Part II	252
	T. Iwata, S. Ueno, and H. Murakami	
98-4127	Planning Paths Through Singularities in the Center of Mass Space	261
	W. Doggett, W. Messner, and J.-N. Juang	
98-4128	Attitude Control of a Space Robot Using the Nonholonomic Structure	272
	K. Matsuda, Y. Kanemitsu, and S. Kijimoto	
98-4129	Manipulators with Slewing and Deployable Links: A General Order-n Formulation with Applications	295
	Y. Chen, V. Modi, C. de Silva, and A. Misra	
98-4130	Dynamics of Tethered Multibody Systems with Friction and Impact	278
	S. Matunaga, O. Mori, and Y. Ohkami.....	

Session 6-GNC-6 Robust Control

98-4131	Robust Command Augmentation System Design Using Genetic Search Methods	286
	G. Sweriduk, P. Menon, and M. Steinberg	
98-4132	Robust Flight Controller Design Using H_{∞} Loop-Shaping and Dynamic Inversion Techniques	305
	Z. Smit and I. Craig	
98-4133	Design of Flight Control Laws for a Civil Aircraft Using μ -Synthesis	314
	S. Bennani and G. Looye	
98-4134	A "Modern" Look at Gain and Phase Margins: An H_{∞}/μ Approach	325
	G. Deodhare and V. Patel.....	
98-4135	Parameterization of Model Validating Sets for Uncertainty Bound Optimizations	336
	K. Lim and D. Giesy	
98-4136	Practical Upper and Lower Bounds for Robust \mathcal{H}_2 Performance Under LTI Perturbations	347
	J. Tierno and S. Glavaski	

Session 7-GNC-7 Optimal and Adaptive Control of Flexible Structures

98-4137	An Analysis of the Expected Residual Vibration of Input Shaping Designs	354
	L. Pao and M. Lau.....	
98-4138	Robust Control Design for a Flexible Manipulator Using H_{∞}/μ Synthesis	365
	K. Abdel-Motagaly and T. Alberts.....	
98-4139	Electrostatic Control of a Membrane Using Adaptive Feedback Linearization	373
	D. Scharf, D. Hyland, and P. Washabaugh	
98-4140	Output Feedback Variable Structure Adaptive Control of a Flexible Spacecraft	383
	Y. Zeng, A. Arujo, and S. Singh	

WD—Withdrawn

XII

NA—Not Available

Session 17-GNC-8 Artificial Intelligence Applications Cambridge

98-4197	A Coevolutionary Minimax Solver and Its Application to Autopilot Design C.-S. Park and M.-J. Tahk	408
98-4198	Integrated Fuzzy/ H_∞ Control for Turbofan Engines C.-F. Lin and J. Ge	416
98-4199	Reduction of Sensors for Forebody VFC Using Fuzzy Logic Based Control J. Suzuki and J. Valasek.....	421
98-4200	Synthesis of Adaptive Fuzzy Logic Controllers with Control Rate and Amplitude Limits J. Prasad and T.-Y. Jiang.....	429
98-4201	An Improved Neural-Network Flight Mode Interpreter D. Smith, D. Ward, and T. Nguyen	438
98-4202	A Multi-Agent Control System Framework for Smart Structures V. Sahasrabudhe and A. Mehra.....	449
98-4203	Airborne Joint Intentions Network D. Rock and P. Erway.....	460

Session 18-GNC-9 Nonlinear Flight Control

98-4204	Nonlinear Control Using Forebody Tangential Blowing Y. Takahara and S. Rock	471
98-4205	High Angle of Attack Control Law Design and Analysis Using Non-linear Bifurcation Methods D. Littleboy and Y. Patel	482
98-4206	A Feedback Linearisation Based Nonlinear Controller Synthesis to Recover an Unstable Aircraft from Poststall Regime A. Saraf, G. Deodhare, and D. Ghose	493
98-4207	Precision Approach with Curved Flight Path and Accurate Time of Arrival A. Naghash and D. Enns.....	503
98-4208	Robust Nonlinear Dynamic Inversion Method for an Aircraft Motion Control M. Goman and E. Kolesnikov	511
98-4209	Output Feedback Variable Structure Adaptive Control of an Aeroelastic System Y. Zeng and S. Singh.....	522
98-4210	Nonlinear Integrated Steering and Control of Flight Vehicles D. Li and E. Poh	533
98-4211	Energy Approach to Flight Control A. Kurdjukov, G. Natchinkina, and A. Shevtchenko.....	543

Session 19-GNC-10 Missile Guidance II Charles River

98-4212	Nonlinear H_∞ Robust Guidance Law for Homing Missiles H.-Y. Chen and C.-D. Yang.....	554
98-4213	Optimal Mid-Course Guidance of Variable Flow Ducted Rocket Missiles T. Kuroda, S. Mihara, H. Matsuda, R. Hirokawa, and F. Imado	563
98-4214	An Approximate Target Adaptive Guidance for IR Homing P. Kim, B.-E. Jun, and H. Cho	WD
98-4215	Simple Guidance Law Against Highly Maneuvering Targets P. Gurfil, M. Jodorkovsky, and M. Guelman	570
98-4216	Three-Dimensional Zero-Lag LOS Guidance of BR/CLOS Missiles D.-R. Taur and J.-S. Chern.....	581

WD—Withdrawn

XIII

NA—Not Available

Explore Litigation Insights



Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.