

# History of Real Time Systems

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# Real Time Systems

Any information processing system which has to respond to externally generated input stimuli within a finite and specified period.

1967, IBM Systems Journal

By Joel D Aron

Federal Systems Division, Federal Systems  
Center, IBM

# Main Real-Time Applications

Digital control

Command and control

Tracking

Multimedia

Optimal control

Signal processing

Real-time databases

# Organizations

- The IEEE Computer Society Technical Committee on Real-Time Systems (TCRTS), founded in 1981
- EUROMICRO Technical Committee on Real-Time Systems, founded in 1988

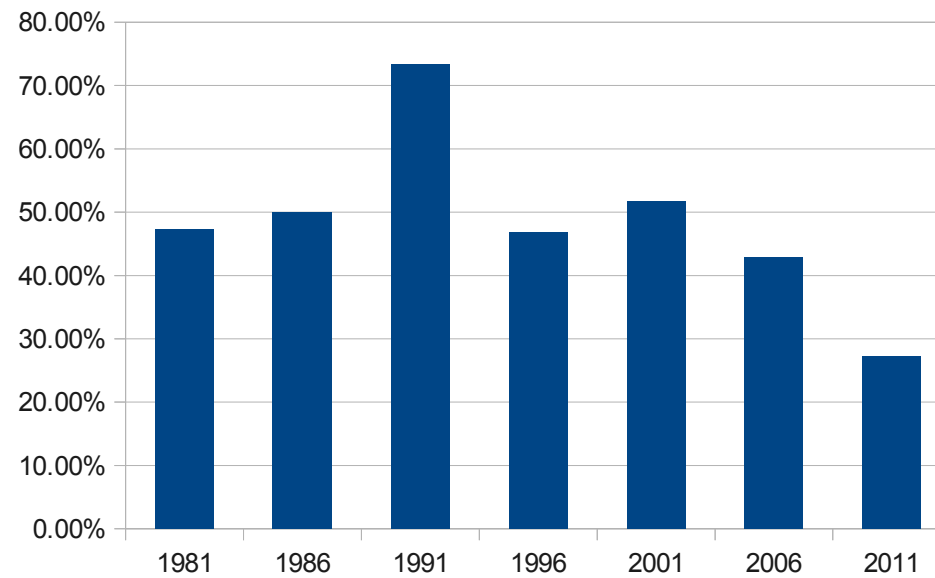
# Main Conferences

- IEEE Real-Time Systems Symposium (RTSS), Sponsored by TCRTS
- Euromicro Conference on Real-Time Systems (ECRTS), Sponsored by EUROMICRO TC on RTS
- IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), Sponsored by TCRTS
- IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSEA), Sponsored by TCRTS
- International Workshop on Real-Time Networks (RTN), Sponsored by EUROMICRO TC on RTS

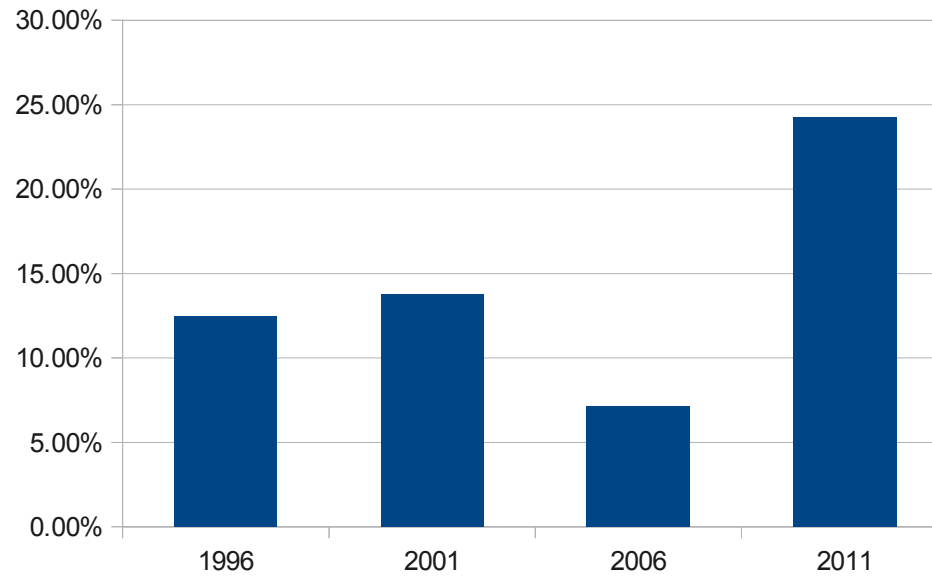
# RTSS

Year	Venue	Submission	Acceptance	Acceptance Rate
2011	Vienna	149	33	21%
2006	Rio de Janeiro	173	42	24%
2001	London		29	
1996	Washington, D.C.		32	
1991	San Antonio		15	
1986	New Orleans		30	
1981	Miami Beach		19	

# Design & Verification

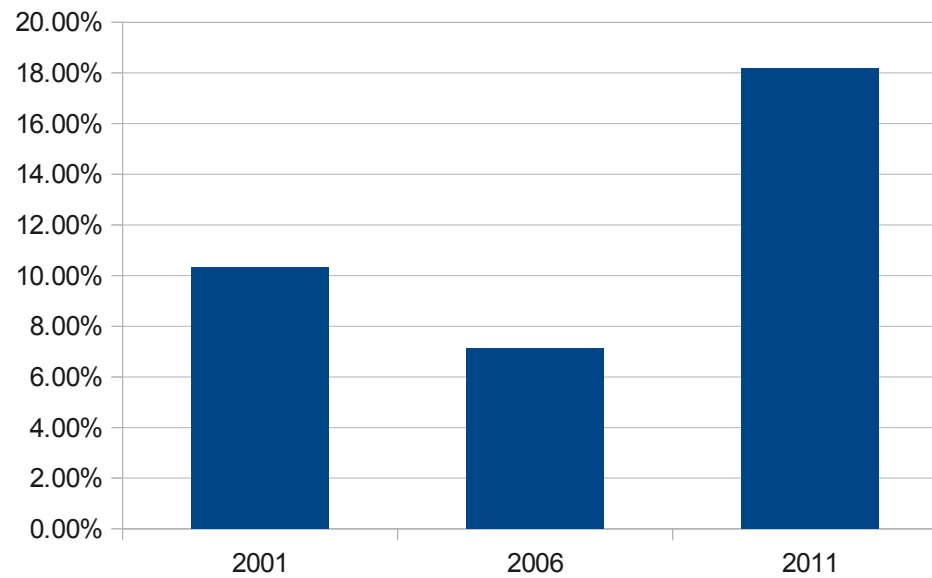


# WSN Algorithms, System Issues and Improvements

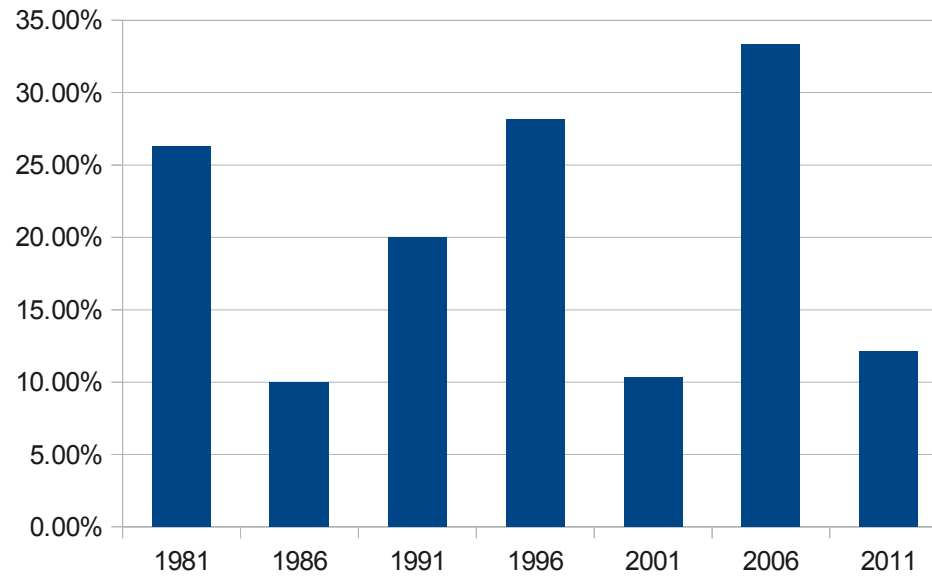




# Multicore and Multiprocessor Platforms



# Scheduling and Response Time Analysis



# Results from Google Scholar

Area	1980s	2000s
Design & Verification	15,400	32,500
WSN Algorithms, System Issues and Improvements	44	8,360
Multicore and Multiprocessor Platforms	5	6,380
Scheduling and Response Time Analysis	17,900	17,500

# ACM/IEEE International Conference on Cyber-Physical Systems

- 2005-2009  
14 workshops related to cyber-physical systems

- 2010 First ICCPS

Sponsored by

ACM Special Interest Group on Embedded  
Systems (SIGBED)

IEEE Technical Committee on Real-Time  
Systems (TCRTS)

# ICCPS

Year	Venue	Papers
2010	Stockholm	20
2011	Chicago	21
2012	Beijing	19

# ICCCPS 2012

Session	Chair	Papers (Invited)
Medical Devices	Karl-Erik Årzén	3 (1)
Air and Space	Ted Baker	2 (2)
Best Paper Nominees	Xue Liu	3
Scheduling and Coordination	Kang Shin	3
Smart Energy	Ella Atkins	3 (2)
Modeling and Verification	Xenofon Koutsoukos	3
Smart Grid Security	Sungsoo Lim	2

# Conclusion

- Rising interest in WSN, multicore and multiprocessor
- Design & verification is always important
- Scheduling: too many assumptions make it hard to use theory in practice.

Thank you.