



<http://cps-vo.org/>

***Developing Dependable and Secure Automotive Cyber-Physical Systems
from Components***

March 17-18, 2011

Troy, MI

presented by

Chris.vanBuskirk@vanderbilt.edu

Institute for Software Integrated Systems, Vanderbilt University

Cyber-Physical Systems

Virtual Organization

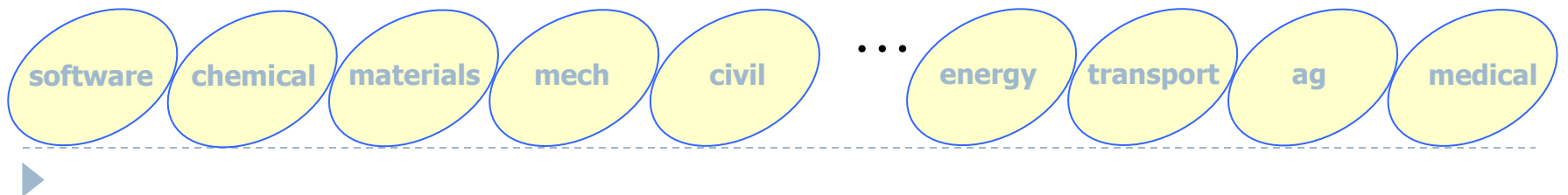
Outline

- ▶ Relevant CPS Challenges
- ▶ The Mission of CPS-VO
- ▶ The Virtual Organization's Web Portal
 - ▶ Current Status
 - ▶ Future Plans
- ▶ Conclusion
- ▶ Discussion



Some Relevant Challenges of CPS

- ▶ Lacking in fundamental theories.
 - ▶ e.g. complexity, adaptivity/robustness, verification/certification, compositionality, ...
- ▶ The conflict between abstractions and reality
 - ▶ e.g. first-class notions of Time, Space, Energy, Uncertainty, Tolerances, ...
- ▶ Very multi-disciplinary (*cultural divides*)



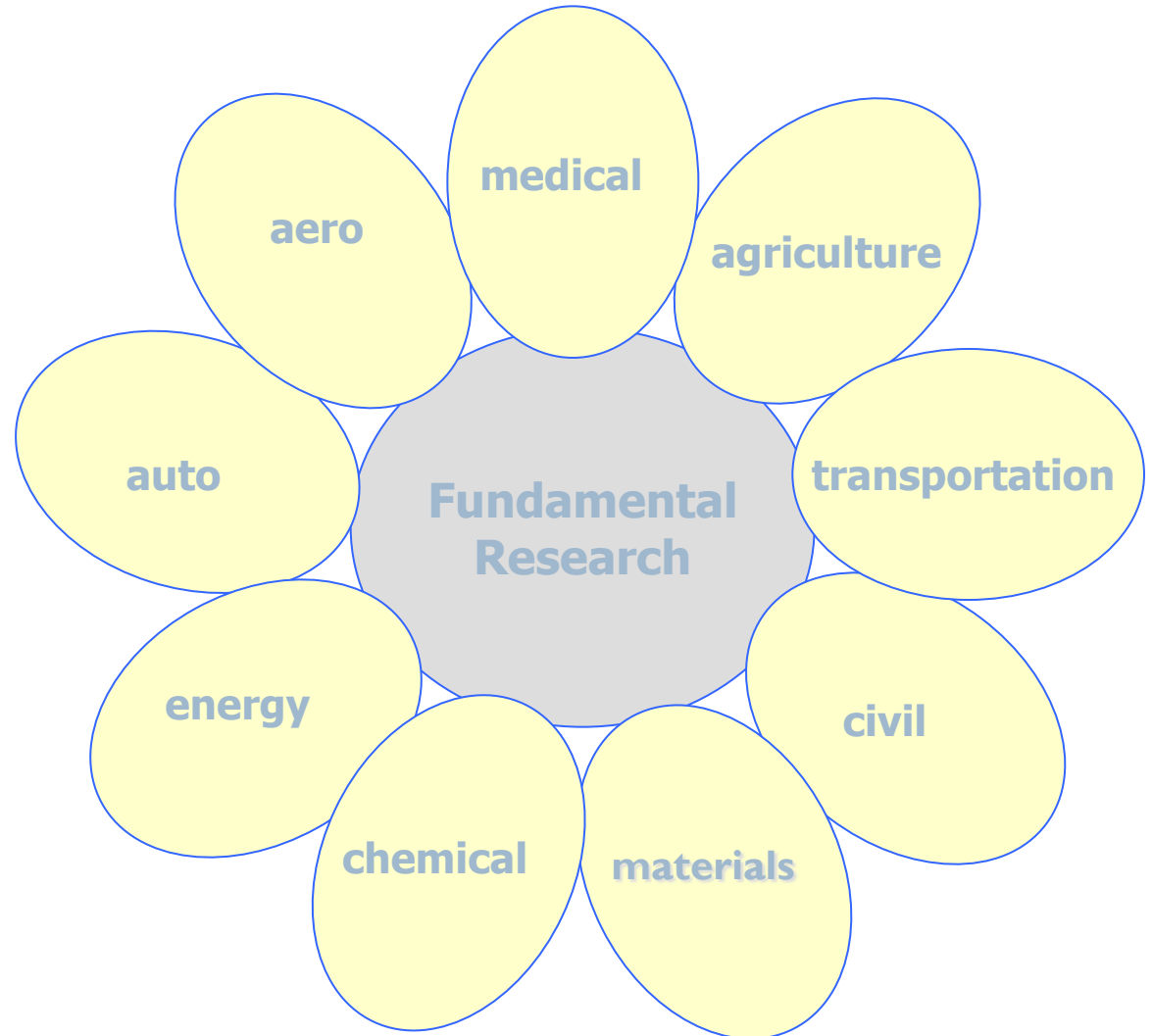
The Social Divides

- ▶ **not just, Cross-Discipline**
 - ▶ Embedded Systems, Software Engineering, Control Theory, Mechanical Engineering, ...
- ▶ **and, Cross-Domain**
 - ▶ i.e. Energy, Automotive, Aerospace, Medical, ...
- ▶ **but also, Cross-Sector**
 - ▶ Academia, Industrial, Small Business, Research Funding Agencies & Policy Makers, ...



Model for Expediting Progress*

- ▶ A new underlying discipline
- ▶ Abstracting from sectors to more general principles
- ▶ Apply these to problems in new sectors
- ▶ Build a new CPS community



* Jeannette M. Wing
Former Assistant Director, CISE, NSF



Outline

- ▶ CPS Challenges
- ▶ ***The Mission of CPS-VO***
- ▶ The Virtual Organization Website
 - ▶ Current Status
 - ▶ Upcoming Work
- ▶ Conclusion
- ▶ Discussion



Who is the VO?

Industrial Exec Board:

- ▶ Don Winter (Boeing) – *Chair*
- ▶ John Borghese (Rockwell Collins)
- ▶ Nady Boules (General Motors)
- ▶ Isaac Cohen (United Technologies)
- ▶ Richard Buskins (Lockheed Martin)
- ▶ Venkatesh K. Prasad (Ford)
- ▶ John Reid (Deere & Company)
- ▶ David Tennenhouse (New Venture Partners)

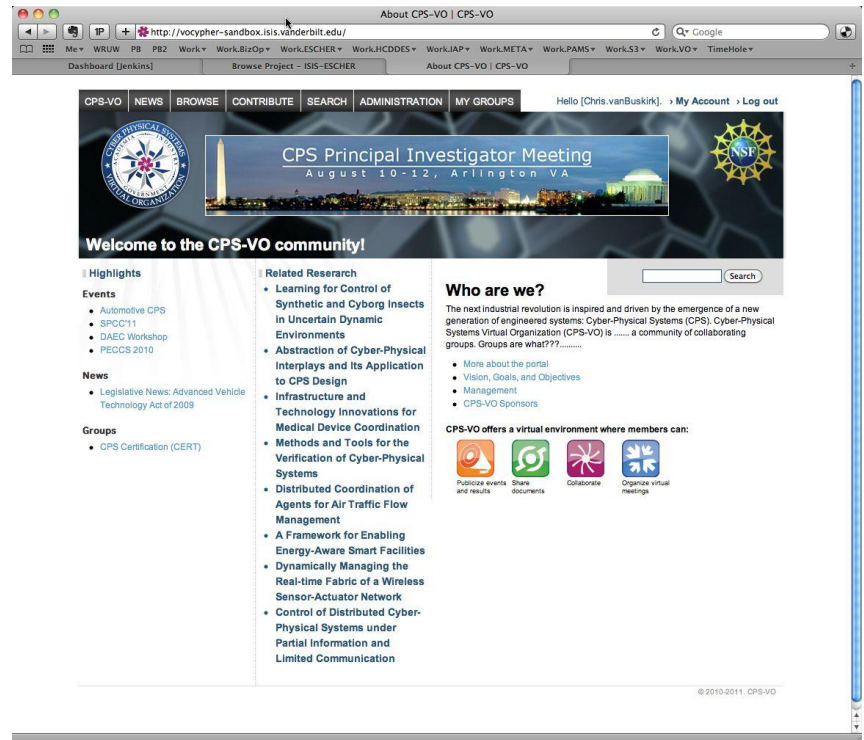
Academic Exec Board:

- ▶ George Pappas (U Penn) – *Chair*
- ▶ John Baras (U Maryland)
- ▶ Anjan Bose (WSU)
- ▶ Eric Feron (Georgia Institute of Technology)
- ▶ Karl Hedrick (UC Berkeley)
- ▶ Bruce Krogh (CMU)
- ▶ PR Kumar (UIUC)
- ▶ Edward Lee (UC Berkeley)
- ▶ Insup Lee (U Penn)
- ▶ Nancy Lynch (MIT)
- ▶ Dimitri Mavris (Georgia Institute of Technology)
- ▶ John Mitchell (Stanford)
- ▶ Raj Rajkumar (CMU)
- ▶ Jack Stankovic (U Virginia)
- ▶ Janos Sztipanovits (Vanderbilt, CPS-VO)
- ▶ Claire Tomlin (UC Berkeley)

-
- ▶ * At ISIS/Vanderbilt we are primarily supporting the web-based *Portal*, which serves as the electronic home of this virtual community.

The Portal's Contribution

- ▶ **Publicity**
(e.g. events, research agendas, etc.)
- ▶ **Disseminate knowledge**
(e.g. research results, challenge problems, educational material, etc.)
- ▶ **Foster collaboration & community building**



Outline

- ▶ CPS Challenges
- ▶ The Mission of CPS-VO
- ▶ The Virtual Organization Website
 - ▶ **Current Status**
 - ▶ Upcoming Work
- ▶ Conclusion
- ▶ Discussion



Publicity: conferences / seminars

Events | CPS-VO

Dashboard [Jenkins] [FVO-240] Can't chang... Events | CPS-VO Document Browser | C... Science of Integration |...

CPS-VO NEWS **BROWSE** COLLABORATE SEARCH ADMINISTRATION MY GROUPS Hello [Chris.vanBuskirk]. > My Account > Log out

- Calendar
- Announcements
- Groups
- Repositories

Welcome to the CPS-VO community!

CPS-VO » EVENTS » Search

Week > Day > Table > List

« March 2011 »

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
PECCS 2010 all day	PECCS 2010 End: Mar 7 2011					PECCS 2010
	Design, Automation & Test In Europe all day	Design, Automation & Test In Europe all day	Design, Automation & Test In Europe all day	Design, Automation & Test In Europe all day	Design, Automation & Test In Europe End: Mar 18 2011	
				Automotive CPS End: Mar 18 2011	Automotive CPS End: Mar 18 2011	
	ISORC 2011 all day	ISORC 2011 all day	ISORC 2011 all day	ISORC 2011 End: Mar 31 2011		

© 2010-2011. CPS-VO

Open "http://cps-vo.org/event" in a new tab behind the current one

Automotive CPS | CPS-VO

Dashboard [Jenkins] [FVO-240] Can't change the nam... Automotive CPS | CPS-VO

CPS-VO NEWS BROWSE COLLABORATE SEARCH ADMINISTRATION MY GROUPS Hello [Chris.vanBuskirk]. > My Account > Log out

Automotive

CPS-VO » GROUPS » AUTOMOTIVE »

Automotive CPS

Submitted by Chris.vanBuskirk on Thu, 2010-08-26 00:00

Start: Mar 17 2011
End: Mar 18 2011
URL: <http://varma.ece.cmu.edu/Auto-CPS-2011/Registration.html>
Location: Troy, MI

Workshop for Developing Dependable Automotive Cyber-Physical Systems from Components

The goal of this workshop, a follow-on to previous workshops on Cyber-Physical Systems (CPS), is to continue to define and refine the technology needs and gaps for deeply-embedded software-intensive electronic control systems that interact deeply with the physical world in ways that have stringent reliability, availability, and safety requirements

Attachment	Kind	Size
Download Call for Position Papers	PDF document	88.17 KB
Download Call for Position Papers	Word document	62 KB

> Add new comment > Calendar > 2 attachments

Automotive Composition Theory automotive smart car US Car Workshop Automotive CPS Workshop industry Workshop

© 2010-2011. CPS-VO

Publicity: CFPs, BAAs, Jobs, ...

General Audience Forums | CPS-VO

Dashboard [Jenkins] [FVO-240] Can't chang... General Audience Foru... Document Browser | C... Science of Integration |...

CPS-VO NEWS **BROWSE** COLLABORATE SEARCH ADMINISTRATION MY GROUPS Hello [Chris.vanBuskirk] > My Account > Log out

- Calendar
- Announcements
- Groups
- Repositories

Welcome to the CPS-VO community

CPS-VO » FORUMS »

General Audience Forums

Post new Forum topic

Forum	Topics	Posts	Last post
Community Calls			
Calls for Papers	1	1	4 hours 20 min ago by admin
Calls for Proposal	0	0	n/a
Professional Development			
Clearinghouse for jobs, postdoc, etc. announcements.			
Position Announcements	2	2	4 weeks 2 days ago by admin

© 2010-2011. CPS-VO

Go to "http://cps-vo.org/forum/1004"

Faculty Openings at University of Miami | CPS-VO

http://cps-vo.org/node/773

Dashboard [Jenkins] [FVO-240] Can't change the na... General Audience Forums | CPS-VO Faculty Openings at University ...

CPS-VO NEWS BROWSE COLLABORATE SEARCH ADMINISTRATION MY GROUPS Hello [Chris.vanBuskirk] > My Account > Log out

Welcome to the CPS-VO community

CPS-VO » FORUMS » PROFESSIONAL DEVELOPMENT » POSITION ANNOUNCEMENTS »

Faculty Openings at University of Miami

Submitted by admin on Mon, 2011-02-14 17:41

Faculty Openings @ UConn's ECE Department

College of Engineering
Department of Electrical and Computer Engineering
University of Miami, Coral Gables, Florida

Faculty Openings at All Professorial Levels

The College of Engineering at the University of Miami (UM) invites applications and nominations for several tenure-track positions at all professorial levels and all departments. The College is seeking candidates with a strong record of scholarship with a focus on obtaining external funding, a demonstrated excellence in undergraduate and graduate teaching, interest in developing and implementing curricula that address multicultural issues, and a thoughtful commitment to university and professional service. For senior-level appointments, a proven record of extramural funding support is required. The College includes five academic departments, 650 undergraduates, 250 graduate students, and 80 dedicated faculty, who have garnered national and international awards including election to the National Academy of Engineering. Our current recruitment effort is focused on the areas of software engineering, embedded and real-time systems, cyber-security, and computer engineering. Knowledge of applications in health care informatics, game systems, and/or robotics and autonomous systems is a plus.

At UM, collaboration is a hallmark of the faculty's activities, including joint research with colleagues in the Miller School of Medicine, the Rosenstiel School of Marine and Atmospheric Science, the School of Architecture, the College of Arts and Sciences, the School of Business Administration, the Frost School of Music, the School of Communication, the School of Education, the School of Law and the School of Nursing and Health Sciences. A Ph.D. in engineering, science or a related discipline and one year work related experience is required prior to the appointment. Qualified applicants should mail (a) a letter of interest, (b) a resume and (c) at least three (3) letters of reference to:

Dr. Shihab Asfour, Associate Dean for Academics
College of Engineering
University of Miami
1251 Memorial Drive, McArthur Engineering Bldg., Room 247
Coral Gables, FL 33146
asfour@miami.edu

The University of Miami offers competitive salaries and a comprehensive benefits package including medical and dental benefits, tuition remission, paid holidays and much more. The University of Miami is an Equal Opportunity/Affirmative Action Employer.

Add new comment

Position Announcements

© 2010-2011. CPS-VO

Publicity: Research Projects

Science of Integration | CPS-VO

Dashboard [Je...] [FVO-240] Ca... Science of Int... Events | CPS-VO General Audie... Science of Int... Document Bro...

CPS-VO NEWS BROWSE COLLABORATE SEARCH MY GROUPS

Not a member? Click here to register! username password Log in

- Calendar
- Announcements
- Groups
- Repositories

Science of Integration

Home Members Forums Browser

CPS-VO » GROUPS » Science of Integration

Search

Our mission is to provide reports, presentations and a science-based predictable tool suite to the Cyber Physical Systems (CPS) community related to our work in developing a new Science of Integration for CPS. This new science re-examines the fundamentals of composition in heterogeneous systems, develops foundations and tools for system integration and validates the results in experiments using automotive and avionics System-on-Systems experimental platforms. Building on the rigorous foundations, our aim is to provide the latest theories and methods for achieving constructively and predictability in CPS integration. Our group includes an interdisciplinary group of researchers in: i) Model-Based Design and Software Engineering from Vanderbilt University (VU) and the University of Maryland (UMD); ii) Systems Science and Engineering from University of Notre Dame (ND) and UMD; iii) Control Theory and Engineering (ND, UMD, VU); iv) Computer Engineering and Networking (VU, UMD); and v) providing simulation-based and real-life electrical architecture testbeds, challenge problems, evaluation metrics, and development tools from General Motors Global R&D Center.

Go to "http://cps-vo.org/og"

Science of Integration

Home Members Forums Browser

CPS-VO » GROUPS » SCIENCE OF INTEGRATION » Members

EDIT TAXONOMY BROADCAST PAGES

Public information: First Name	Public information: Middle Name	Public information: Last Name	Management	Admin
Site		Administrator	Remove membership	Admin: Remove admin
Nicholas		Kottenstette		Manager: admin
Emeka	P	Eyeli	Remove membership	Admin: Create
Gabor		Karsai	Remove membership	Admin: Create
Graham		Hemingway	Remove membership	Admin: Create
Heath		LeBlanc	Remove membership	Admin: Create
Janos		Sczipanovts	Remove membership	Admin: Create
Joseph		Porter	Remove membership	Admin: Create
Shige		Wang	Remove membership	Admin: Create
Xenofon		Koutsoukos	Remove membership	Admin: Create
Zhenkai		Zhang	Remove membership	Admin: Create

Group toolbar

- Create File
- Create Forum topic
- Create Event
- Group forums
- Manage group forums
- 11 members
- Manager: nkottens

© 2010-2011. CPS-VO

Science of Integration | CPS-VO

Dashboard [Jenkins] [FVO-240] Can't change t... General Audience Forums... Science of Integration | C... Science of Integration | C...

CPS-VO NEWS BROWSE COLLABORATE SEARCH ADMINISTRATION MY GROUPS

Hello [Chris.vanBuskirk] » My Account » Log out

Science of Integration

Home Members Forums Browser

CPS-VO » GROUPS » SCIENCE OF INTEGRATION » Browser

EDIT TAXONOMY BROADCAST PAGES

Item	Size	Pages
Sol: Events	2.1 MB	4
2010	2.01 MB	3
Kickoff Meeting	2.01 MB	3
CPS-Integration-HModels.pdf	1.07 MB	[details]
Kickoff Agenda.pdf	109.5 KB	[details]
New Developments in Model-Integrated Development of High-Confidence S...	853.25 KB	[details]
2011	96.75 KB	1
February Meeting	96.75 KB	1
Agenda for "First" Monthly Meeting Science of Integration for CPS	96.75 KB	[details]
Sol: Topics	2.1 MB	4
Composition	0 bytes	0
Model-based Integration	2.1 MB	4
Component Modeling	0 bytes	0
Domain Specific Modeling Languages	0 bytes	0
Metamodeling	0 bytes	0
Modeling Language Composition	0 bytes	0
Agenda for "First" Monthly Meeting Science of Integration for CPS	96.75 KB	[details]
CPS-Integration-HModels.pdf	1.07 MB	[details]
Kickoff Agenda.pdf	109.5 KB	[details]
New Developments in Model-Integrated Development of High-Confidence S...	853.25 KB	[details]
Testing	0 bytes	0
Verification	0 bytes	0

Group toolbar

- Create File
- Create Forum topic
- Create Event
- Group forums
- Manage group forums
- 11 members
- Manager: nkottens

File upload

Choose File no file selected

Add File

Audience:

- 2010 National CPS PI Meeting
- 2011 National CPS PI Meeting
- Automotive
- CPS Certification (CERT)
- CPS PIs Group
- DARPA META Group
- Science of Security
- VO Admins

Create Folder:

Create

Disseminate Knowledge

Document Browser | CPS-VO

Me ▾ WRUW PB PB2 Work ▾ Work.BizOp ▾ Work.ESCHER ▾ Work.HCDDDES ▾ Work.IAP ▾ Work.META ▾ Work.PAMS ▾ Work.S3 ▾ Work.VO ▾

Dashboard [Jenkins] [FVO-240] Can't chang... Document Browser | C... Document Browser | C... Science of Integration |...

CPS-VO NEWS BROWSE COLLABORATE SEARCH ADMINISTRATION MY GROUPS Hello [Chris.vanBuskirk] ▾ My Account ▾ Log out

- Calendar
- Announcements
- Groups
- Repositories

Welcome to the CPS-VO community!

CPS-VO » REPOSITORIES ▾

Document Browser Search

Topics	308.76 MB	238
Keywords	224.71 MB	144
CPS Events	196.53 MB	149
2006	168.93 KB	2
2007	2.9 MB	9
National Industry Round-Table on CPS 2007	2.9 MB	9
Jones, D.: The Future Cyber-Physical Systems Challenges for Medical D...	286.42 KB	[details]
Ambrosio, R.: IBM Cyber-Physical (-Business) Systems Activities and In...	562.9 KB	[details]
Amici, A., Boules, N., Prasad, V.: USCAR Briefing to National Science...	389.94 KB	[details]
Borghese, J.: Thoughts on Cyber-Physical Systems	9.09 KB	[details]
Busch, D.: Industry Round-Table on Cyber-Physical Systems	35.25 KB	[details]
Hafen, G.: Cyber-Physical System Challenges	118.04 KB	[details]
McQuade, M.: Cyber-Physical Systems UTC Interests and Recommendations	344.16 KB	[details]
Tufano, P., Costa, A.: Cyber-Physical System NSF Industry Panel	282.96 KB	[details]
Winter, D.: Boeing Perspective on Cyber Physical Systems	934.85 KB	[details]
2008	7.98 MB	25
2008 NSF-IARPA SoS Workshop	2.57 MB	17
CPS Summit 2008	2.27 MB	2
NITRD Hearing, US-HR	694.31 KB	4
Christopher L. Greer Congressional Testimony, July 31, 2008	151.17 KB	[details]
Craig A. Stewart Congressional Testimony, July 31, 2008	164.05 KB	[details]
Daniel A. Reed Congressional Testimony, July 31, 2008	180.06 KB	[details]
Don C. Winter Congressional Testimony, July 31, 2008	199.03 KB	[details]
Planning Workshop of the CPS Steering Group 2008	2.4 MB	1

Go to "http://cps-vo.org/file_browser"

Don C. Winter Congressional Testimony, July 31, 2008 | CPS-VO

Me ▾ WRUW PB PB2 Work ▾ Work.BizOp ▾ Work.ESCHER ▾ Work.HCDDDES ▾ Work.IAP ▾ Work.META ▾ Work.PAMS ▾ Work.S3 ▾ Work.VO ▾

Dashboard [Jenkins] [FVO-240] Can't ... Document Brows... Document Brows... Science of Integr... Don C. Winter Co...

CPS-VO NEWS BROWSE COLLABORATE SEARCH ADMINISTRATION MY GROUPS Hello [Chris.vanBuskirk] ▾ My Account ▾ Log out

Welcome to the CPS-VO community!

CPS-VO »

File description Search

Don C. Winter Congressional Testimony, July 31, 2008

Submitted by admin on Thu, 2010-07-01 18:47

Statement of
Mr. Don C. Winter
Vice President, Engineering & Information Technology
Boeing Phantom Works

Before a hearing on:
Networking and Information Technology Research and
Development (NITRD) Program

Committee on Science and Technology
U.S. House of Representatives
July 31, 2008

Don C. Winter Congressional Testimony, July 31, 2008

99.03 KB | PDF document | 0 views | 0 downloads ▾ Download ▾ Add new comment

Download this file to your computer, Congressional Testimony

© 2010-2011. CPS-VO

Go to "http://cps-vo.org/file/253/download/1985"

Where Were We?: 1st ICCPS (Stockholm, SE)



Where Were We?: 1st Ntl. PI Meeting



Where Are We?: 2nd ICCPS (Chicago, IL)



Where Are We Going?



The Deciding Factor

▶ Q. What's missing?

▶ A. **YOU !!!**

▶ * Remember this slide. This will be on the test.

Outline

- ▶ CPS Challenges
- ▶ The Mission of CPS-VO
- ▶ The Virtual Organization Website
 - ▶ Current Status
 - ▶ **Ongoing / Upcoming Work**
- ▶ Conclusion
- ▶ Discussion



A Sneak Preview of Work In-Progress



Publish Website Documentation

- ▶ Users Manual
- ▶ Group Moderators Manual
- ▶ Group Administrators Policies and Procedures

The screenshot shows a web interface for a help page. At the top, there is a navigation bar with links: Home, Members, Calendar, Tag Cloud, Search, Help, Moderation, Forums, Edit, Outline, Taxonomy, Broadcast, Pages, and Browser. The main content area is titled "User's Manual" and contains a list of instructions for new users, such as "How to apply for a VO account" and "How to upload Files to a Group". To the right, there is a "HELP" sidebar with a search box and a "Search group" button. Below the main content, there are links for "Add child page", "Printer-friendly version", and "Add new comment".

Help

Home Members Calendar Tag Cloud Search Help Moderation
Forums Edit Outline Taxonomy Broadcast Pages Browser

User's Manual
Wed, 2010-07-28 10:29 — admin
A collection of instructions, which attempt to walk the new community member through some common VO activities.

- How to apply for a VO account
- How to join the 'CPS Pls' group
- How to upload Files to a Group
- How to create a Forum post
- How to upload Files to a Group & the Top-Level simultaneously

How to apply for a VO account >

Add child page
Printer-friendly version | Add new comment
Subscribe to: This post
Subscribe to: Posts of type Book page
Subscribe to: Posts by admin

New User's Manual
Wed, 2010-11-03 16:45 — admin

The How To documentation contains URL addresses that start with "~@ ~". To go to these places, add the path after this to the site root address in the URL, such as:

@ ~/user/login
becomes
http://cps-vo.org/user/login

- Add Content to Archive
- Add Event to Calendar
- Group Operations
- Publishing / Reviewing Content

Add Content to Archive >

Add child page
Printer-friendly version | Add new comment
Subscribe to: This post
Subscribe to: Posts of type Book page
Subscribe to: Posts by admin

HELP

- Create File
- Create Image
- Create Event
- Group forums
- Manage group forums
- 10 members
- Manager: brad_martin
- My membership

HELP

Search group

What are VO SIGs?

▶ Group Defined/Scoped

▶ Calendar

▶ Document repository

▶ Search engine

▶ Other Services

- ▶ e.g. discussion forums, wiki, subscriptions & notifications, email announcements, chat, ...

■ Administrative Staff

▶ Customizable membership/access/visibility policies

▶ Distributed site management

▶ *Hierarchical Groups (in progress)*

-
- ▶ * scalable, distributed site management

Applying to found a new CPS-VO Group

Thanks for your interest in starting a new CPS-VO special interest group. Please help us to understand your needs better by providing the following information. Your application will be promptly reviewed by the VO portal's management team.

- 1) A preferred name for your group
- 2) A mission statement
- 3) A list of group managers
Description: Managers have privileges and responsibility for activities such as configuring group services, adding/banning group members, ... basic administrative activities. The management team at the portal is glad to initially handle all admin duties on your behalf, but as your group ramps up, you will be expected to be responsible for managing your own activities and your group's portions of the website. Please identify the principals that will form this administrative team (possibly merely the group's founder, at this point).
- 4) A list of group moderators
Description: group moderators do not have general administrative capabilities, but do have full control over your group's content. Therefore, while a mod will not be expected to manage the groups members/services, they will perform an editorial function. Moderators are responsible for grooming the content of your group and ensuring that publicly viewable content is appropriate, correct, and complete to your group's own standards.
- 5) A definition of your group's access and visibility policies
 - Is the group to be listed in the site's directory of all groups (or will the existence of this private group be hidden from non-members)?
 - Is the group's content generally visible to non-members?
 - What is the policy on group membership?
 - o Open -- anyone may join
 - o Moderated -- new members may 'apply' for membership, but these applications must be approved by the group's management team
 - o Invitation Only -- group managers tightly control who is allowed to join the group
- 6) An optional description of how you envision using this group to facilitate collaboration of an online, electronic community. This may be helpful feedback for us to better predict which services and features might be most useful for the VO's operation as a whole.

Coming: Communities of Communities

Automotive | CPS-VO

http://vocypher-sandbox.isis.vanderbilt.edu/group/auto

Dashboard [Jenkins] [#VO-240] Can't change the nam... Automotive | CPS-VO

CPS-VO NEWS BROWSE CONTRIBUTE SEARCH ADMINISTRATION MY GROUPS Hello [Chris.vanBuskirk]. My Account Log out

Automotive

Home Members Forums Browser

CPS-VO » GROUPS »

Automotive TAXONOMY BROADCAST PAGES

This call for position papers invites you to submit a position paper for an NSF, NIST, and USCAR sponsored group on Developing Dependable and Secure Embedded Systems from Components. The goal of this group is to address emerging challenges relative to reliability, availability, safety, and security attributes of software-intensive electronic automotive control systems. An example of such a system would be a self-driving vehicle that must adapt in order to navigate safely and efficiently through traffic in the presence of intersections, pedestrians and other traffic. Another example would be an emergency vehicle with advanced engine and transmission controls integrated with stability control that is able to instantly respond to driver input and road conditions and keep the vehicle in the lane while traversing a curve in icy conditions.

Mar 9th: Electronic Meeting
Submitted by Chris.vanBuskirk on Wed, 2011-03-09 16:02

Automotive

March 8th: Auto Meeting
Submitted by Chris.vanBuskirk on Tue, 2011-03-08 15:59

Automotive

Group toolbar

- Create File
- Create Forum topic
- Create Event
- Create Meeting
- Group forums
- Manage group forums
- 23 members
- Manager: KNEW
- My membership

Subgroups

- Transportation
 - Aviation
 - Automotive
 - 2011 Automotive Workshop
 - Rail

Coming: Online Meeting Facilitation

The screenshot shows a web browser window displaying the 'Automotive | CPS-VO' group page. The browser's address bar shows the URL 'http://vocyper-sandbox.isis.vanderbilt.edu/group/auto'. The page features a navigation menu with options like 'CPS-VO', 'NEWS', 'BROWSE', 'CONTRIBUTE', 'SEARCH', 'ADMINISTRATION', and 'MY GROUPS'. A banner image at the top includes the logos for 'CYBER PHYSICAL SYSTEMS', 'VIRTUAL ORGANIZATION', and 'NSF'. Below the banner, there are navigation links for 'Home', 'Members', 'Forums', and 'Browser'. The main content area displays a call for position papers and a list of meetings. A red arrow points to the 'Mar 9th: Electronic Meeting' entry. The right sidebar contains a 'Group toolbar' with options like 'Create File', 'Create Forum topic', 'Create Event', 'Create Meeting', 'Group forums', 'Manage group forums', '23 members', 'Manager: KNEW', and 'My membership'. Below this is a 'Subgroups' section with a tree view showing 'Transportation' (Aviation, Automotive, Rail) and 'Automotive' (2011 Automotive Workshop, Rail).

Automotive | CPS-VO

http://vocyper-sandbox.isis.vanderbilt.edu/group/auto

Dashboard [Jenkins] [#VO-240] Can't change the nam... Automotive | CPS-VO

CPS-VO NEWS BROWSE CONTRIBUTE SEARCH ADMINISTRATION MY GROUPS Hello [Chris.vanBuskirk]. > My Account > Log out

Automotive

Home Members Forums Browser

CPS-VO » GROUPS »

Automotive TAXONOMY BROADCAST PAGES

This call for position papers invites you to submit a position paper for an NSF, NIST, and USCAR sponsored group on Developing Dependable and Secure Embedded Systems from Components. The goal of this group is to address emerging challenges relative to reliability, availability, safety, and security attributes of software-intensive electronic automotive control systems. An example of such a system would be a self-driving vehicle that must adapt in order to navigate safely and efficiently through traffic in the presence of intersections, pedestrians and other traffic. Another example would be an emergency vehicle with advanced engine and transmission controls integrated with stability control that is able to instantly respond to driver input and road conditions and keep the vehicle in the lane while traversing a curve in icy conditions.

Mar 9th: Electronic Meeting MEETING
Submitted by Chris.vanBuskirk on Wed, 2011-03-09 16:02

Automotive

March 8th: Auto Meeting MEETING
Submitted by Chris.vanBuskirk on Tue, 2011-03-08 15:59

Automotive

Group toolbar

- > Create File
- > Create Forum topic
- > Create Event
- > Create Meeting
- > Group forums
- > Manage group forums
- > 23 members
- Manager: > KNEW
- > My membership

Subgroups

- ▼ Transportation
 - o Aviation
 - ▼ Automotive
 - o 2011 Automotive Workshop
 - o Rail

Meetings: Real-Time Document Sharing

The screenshot shows a web browser window titled "BigBlueButton" with the URL "http://129.59.129.101/client/BigBlueButton.html#". The browser's address bar and search bar are visible. The main content area displays a presentation slide titled "Cyber-Physical Systems (what are?)". The slide contains the following text:

Cyber-Physical Systems (what are?)

- Are engineered systems that involving a tight conjoining between computational components and the physical world ...

Especially when many distributed entities—connected by a communications fabric—work

- together to exhibit complex and intelligent behaviors.

"Systems you can bet your life on."

On the left side of the browser, there is a "Users" panel with a table showing the current participants:

Role	Name	Status
admin	admin (you)	
	Chris.vanBuskirk	

Below the "Users" panel is a "Listeners" panel, which is currently empty. To the right of the presentation slide is a "Chat" window. The chat history shows:

Mar 9th: Electronic Meeting Test 11:25

Chris.... @Bill: I've uploaded my slides to the meeting, and I have a small demo that I can show, if we have time. 11:34

At the bottom of the browser window, there is a footer with the text: "(c) 2011, BigBlueButton build 3818-2011-01-18 - For more information see <http://www.bigbluebutton.org/>."

Meetings: Desktop Sharing

The screenshot displays a desktop sharing session. The main window is a web browser showing a CAD application interface for 'CyPhyML - CB15JB - RLC Lib/ElectricalComponents/10_Resistors/'. The interface includes a menu bar, a toolbar, and a central workspace with a schematic diagram of a resistor component. The diagram shows an 'Acoustic Power Port' connected to a 'ThermalPowerPort' through a resistor symbol 'R'. Below the diagram, there are three parameter boxes: 'PARAM VALUE = 2 RParam', 'PARAM VALUE = 15 Range: 0,1CU PowerRating', and 'PARAM VALUE = ThickFilm Composition'. The left sidebar contains a 'Users' table and a 'Listeners' section. The 'Users' table lists 'admin (you)' and 'Chris.vanBuskirk'. The 'Listeners' section is currently empty. The right sidebar shows a chat window with a message: 'I uploaded my slides to the meeting, and I have a small demo that we have time.' The bottom of the screen shows a Windows taskbar with several open applications, including 'BigBlueButton - Wind...', 'Z:\SVN\META\andoo...', 'Command Prompt', and 'CyPhyML - CB15JB - /...'. The system tray shows the time as 10:46 AM on 01-18-2011.

Role	Name	Status
admin (you)		
	Chris.vanBuskirk	

Users

Listeners

Chat:

- Electronic Meeting Test 11:25
- I uploaded my slides to the meeting, and I have a small demo that we have time. 11:34

Object Inspector:

CB15JB

Attribute	Value
Cardinality	
Description	
Unique Identifier	CB15JB2R03-MD
Volume (in m ³)	7.5e-08
Cost (in \$)	0.27132
Weight (in Kg)	0

Longer Term: Open Experimental Platforms

- ▶ Move from the document-centric paradigm of *File* sharing to more generalized, ubiquitous sharing of *Artifacts*. Including, for example:

- Challenge Problems
- Models
- Algorithms
- Simulators
- Tool Suites
- Processes
- Computational Experiments



Outline

- ▶ CPS Challenges
- ▶ The Mission of CPS-VO
- ▶ The Virtual Organization Website
 - ▶ Current Status
 - ▶ Upcoming Work
- ▶ **Conclusion**
- ▶ Discussion



Aaaand: This is where you come in...



Your Challenge

- ▶ “Do we want to give birth to some electronic communities of interest concerned with *CPS* issues in the various fields of transportation?”
 - ▶ → HINT: **this is *the point*** of this talk
- ▶ If interested, the community will need to begin a discussion about how to bootstrap itself.



For Example:

▶ What are these SIGs

▶ Strawman:

▶ Transportation

- Automotive
- Aviation
- Rail

▶ Who is interested

- ▶ In playing pivotal, leadership roles with the formation of these groups
- ▶ Providing support for building the groups' content
- ▶ Observing from afar, and possibly providing helpful feedback

▶ Many Other Issues

- ▶ What services are required/desired?
- ▶ What is the vocabulary of the individual SIGs?



Discussion? (& Thank You)





Welcome to the CPS-VO community!

Highlights

Events

- [Automotive CPS](#)
- [SPCC'11](#)
- [DAEC Workshop](#)
- [PECCS 2010](#)

News

- [Legislative News: Advanced Vehicle Technology Act of 2009](#)

Groups

- [CPS Certification \(CERT\)](#)

Related Research

- [Learning for Control of Synthetic and Cyborg Insects in Uncertain Dynamic Environments](#)
- [Abstraction of Cyber-Physical Interplays and Its Application to CPS Design](#)
- [Infrastructure and Technology Innovations for Medical Device Coordination](#)
- [Methods and Tools for the Verification of Cyber-Physical Systems](#)
- [Distributed Coordination of Agents for Air Traffic Flow Management](#)
- [A Framework for Enabling Energy-Aware Smart Facilities](#)
- [Dynamically Managing the Real-time Fabric of a Wireless Sensor-Actuator Network](#)
- [Control of Distributed Cyber-Physical Systems under Partial Information and Limited Communication](#)

Who are we?

The next industrial revolution is inspired and driven by the emergence of a new generation of engineered systems: Cyber-Physical Systems (CPS). Cyber-Physical Systems Virtual Organization (CPS-VO) is a community of collaborating groups. Groups are what???.....

- [More about the portal](#)
- [Vision, Goals, and Objectives](#)
- [Management](#)
- [CPS-VO Sponsors](#)

CPS-VO offers a virtual environment where members can:



Publicize events and results



Share documents



Collaborate



Organize virtual meetings

BACKUP SLIDES



CPS



Cyber-Physical Systems (what are?)

- ▶ Are engineered systems that involving a tight conjoining between computational components and the physical world ...

Especially when many distributed entities—connected by a communications fabric—work together to exhibit complex and intelligent behaviors.

“Systems you can bet your life on.”



Your Field 2.0 ?

Assistive Technologies for **Everyone**



Smart Cars



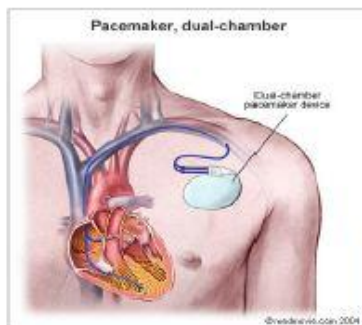
Cars drive themselves

Lampson's Grand Challenge:

Reduce highway traffic deaths to zero.

[Butler Lampson, Getting Computers to Understand, Microsoft, *J. ACM* 50, 1 (Jan. 2003), pp 70-72.]

Embedded Medical De



pacemaker

CPS Informational Meeting

3

Jeanette M. Wing

Sensors Everywhere



Hudson River Valley



Robots Everywhere



At work: Two ASIMOs working together in coordination to deliver refreshments

CPS Informational Meeting

5



At home: Paro, therapeutic robotic seal



At home/clinics: Nursebot, robotic assistance for the elderly



At home: iRobot Roomba vacuums your house

Jeanette M. Wing

VO Mission Statement

- ▶ The next industrial **revolution** is inspired and **driven by** the emergence of a new generation of engineered systems: Cyber-Physical Systems (CPS). Such systems use computation and communication **deeply embedded** in and interacting with physical processes to transform the behavior and capabilities of **physical systems**.
CPS is not about adding computing and communication equipment to conventional products where the computing and physical sides maintain their separate identities. In CPS, functionalities are emerging from the networked interaction between computing and physical systems. The range of CPS products spans from the minuscule (e.g. pacemakers) to the large-scale (e.g. cars, airplanes) and include systems that our life depends on (e.g. the national power-grid).
Complexity of their design demands new scientific foundation - a new CPS Systems Science - that requires the synthesis of knowledge across many science and engineering disciplines including computing, networking, control, security, human interaction, learning theory, as well as mechanical, chemical, biomedical, and other engineering disciplines.
The objective of the National Science Foundation established CPS Virtual Organization (CPS-VO) **is to actively support the formation of a multidisciplinary community and** to facilitate broadly based **collaboration on CPS**.

“CPS will transform how we interact with the physical world just like the Internet transformed how we interact with one another.”



PROJECT GOALS / SERVICES



High-Level Goals

- ▶ **Community Building**
- ▶ **Collaboration Support**
- ▶ **Technology Transfer & Translational Research**
- ▶ **International Collaboration**



CPS-VO Strategic Thrusts

- ▶ **Continuous Community Building Efforts**
 - ▶ Bring people together; recruit new members (e.g. travel to related industry and academic gatherings in order to publicize VOCYPHER)
- ▶ **Domain-Specific Knowledge Repository**
 - ▶ Document archival/registration service
 - ▶ Design, implement & evolve standard *ontologies* and less formal *folksonomies* for the CPS community (&sub-communities)
 - ▶ Domain-aware, semantically enabled *search* services
 - ▶ Directory Services, Matchmaking, Bookmarking Services, Personalized Alerts
 - ▶ Semantically driven, data mining services and content aggregators
- ▶ **Electronic Communications**
 - ▶ discussion forums, mailing lists, file sharing, wikis, instant messaging, blogs/podcasts, event calendars
 - ▶ virtual meetings and electronic transcripts for related seminars/conferences
 - ▶ dynamic community formation (a.k.a. Special Interest Groups)
- ▶ **Electronic Collaboration**
 - ▶ CPS-related Challenge Problems
 - ▶ Online Experimentation (e.g. Emulab-inspired Cyber-Physical Computation/Simulation Infrastructure)
 - ▶ Publish/Review Results
 - ▶ * builds upon *SPRUCE* experiences and technologies (as well as *C2Wind Tunnel*)
- ▶ **Education and Dissemination**
 - ▶ Download CPS-specific Technologies and Tool Suites
 - ▶ Seminars, Workshops, Tutorials & Electronic Coursework
 - ▶ Professional Development (e.g. postdoc announcements)



IMPLEMENTATION TECHNOLOGY



Portal Requirements

▶ User Management

- ▶ Authentication
- ▶ User Profiles
- ▶ Directory Services

▶ Communications

- ▶ Events Calendar
- ▶ News Stories
- ▶ Instant Messaging
- ▶ Blogs & Podcasts
- ▶ RSS/Atom Feeds
- ▶ Misc. *“Social Networking”*

▶ Collaboration

- ▶ Communities of Interest
- ▶ Group Permissions Mgmt
 - ▶ Features Availability
 - ▶ Content Visibility
- ▶ Group Moderation
- ▶ Mailing Lists
- ▶ Forums
- ▶ Wikis
- ▶ File Sharing



Key Features of Drupal CMS

- ▶ Open source, with massive installation base and developer community
- ▶ Custom Type Systems
- ▶ Taxonomies
- ▶ Revision Control
- ▶ Workflow Management
- ▶ Role-Based Permission Schemes
- ▶ Well designed architecture and APIs



520,138 people in 228 countries* speaking 182 languages power Drupal.

Example Sites Using Drupal

- ▶ AOL Corporate
- ▶ Yahoo! Research
- ▶ Sony Music
- ▶ Warner Brothers
- ▶ The Economist
- ▶ United Nations
- ▶ European Union
- ▶ NATO

- ▶ The White House



Develop with Drupal

7,354 Modules

897 Themes

3,830 Active devs

This week

1,747 Code commits

6,072 Issue comments

e.g. Drupal Modules

- ▶ CCK
 - ▶ User Profiles
 - ▶ Organic Groups
 - ▶ Discussion Forums
 - ▶ File Browser
 - ▶ Messaging (e.g. email)
 - ▶ Content Notifications
 - ▶ Faceted Search
 - ▶ Workflow
 - ▶ Triggers and Actions
 - ▶ Captcha
 - ▶ WYSIWYG Editor
 - ▶ Webdav
 - ▶ Delicious Bookmarking
 - ▶ Antivirus
 - ▶ Biblio
 - ▶ Chat
 - ▶ Blog
 - ▶ Bitcache (*distrib content*)
 - ▶ Client-Side Encryption
-



COMMUNITY EVENTS



Y1: Primary Community Events

- ▶ **1st International Conference on CPS**
Apr 2010, Stockholm, Sweden
 - ▶ CPS Community Forum: US-EU Institutional Panel
 - ▶ Emerging Applications in CPS Workshop
 - ▶ US-EU Panel on Industrial Challenges in CPS

- ▶ **1st National CPS PIs Meeting**
Aug 2010, Arlington, VA
 - ▶ Supported the Education Workshop
(Chair: Ed Lee @ UC Berkeley)

- ▶ **2nd International Conference on CPS**
Apr 2011, Chicago, IL
 - ▶ CPS Community Forum (*planning stages*)



o **The CPS Community Forum: US-EU Institutional Panel**

In the scope of the first International Conference on CPS (ICCPS), one of the streams of the CPSWeek 2010, an EU-US Institutional Panel discussion was held to discuss strategies and approaches as well as cooperation opportunities in the area of CPS/Embedded Systems and Control. The different approaches to the theme, as well as the different priorities, were highlighted while trying to reinforce the existing informal cooperation between the EU and the US.

US:

- a. *"NSF Perspective: Research Collaboration in CPS"* - Ty Znati, CISE Division Director, NSF
- b. *"CPS – The First Year"* - Helen Gill, Program Director, NSF
- c. *"CPS Research & Development at the Science & Technology Directorate, US DHS"* -Nabil Adam, Fellow, Science & Technology Directorate, Dept. Homeland Security

EU:

- a. *"Future perspectives"* - Jose Cotta, Head of Unit, DG INFSO, EC
- b. *"Ongoing Research and articulation with other initiatives"* - Jorge Pereira, DG INFSO, EC

▼ ● CPS Events	137.03 MB	133
▶ ● 2006	168.93 KB	2
▶ ● 2007	2.9 MB	9
▶ ● 2008	7.3 MB	24
▶ ● 2009	7.35 MB	16
▼ ● 2010	119.23 MB	81
▼ ● ICCPS 2010	14.57 MB	9
▶ ● Workshop on Secure Control Systems	4.15 MB	2
▶ ● Industry Panel	2.84 MB	2
▼ ● CPS Community Forum: US-EU Institutional Panel	7.57 MB	5
▶ Adam, Nabil: CPS Community Forum: US-EU Institutional Panel	79 KB	[details]
▶ Cotta, J.: Future perspectives	906.34 KB	[details]
▶ Gill, H.: CPS: The First Year	1.14 MB	[details]
▶ Pereira, J.: Ongoing Research and articulation ...	976.69 KB	[details]
▶ Znati, T.: Research Directions Collaboration in...	2.8 MB	[details]
▶ ● National CPS PI Meeting 2010	104.66 MB	72
▶ ● 2011	84.41 KB	1

Y1: Additional Community Events

- ▶ 2010 European Summer School on Embedded Systems
- ▶ MODELS 2010
- ▶ ES Week 2010 (incl. 'Education' Workshop)
- ▶ DAEC Workshop @ RTSS 2010

VOCABULARIES



Semantic Repository

- ▶ Official home of the CPS community's historical **artifacts**
- ▶ Explicit **meta-data** characterizing CPS related documents and community events
- ▶ An integrated CPS-specific **search** engine



What is a *Semantic Repository*?

- ▶ Document archival/registration service
- ▶ Design, implement & evolve standard *ontologies* and less formal *folksonomies* for the CPS community (& sub-communities)
- ▶ Domain-aware, semantically enabled *search* services
- ▶ Directory Services, Matchmaking, Bookmarking Services, Personalized Alerts
- ▶ Semantically driven, data mining services and content aggregators



Meta-Data

Cyber-Enabled Efficient Energy Management of Structures (CEEMS)

View Edit Properties Outline Revisions Workflow

Sun, 2010-08-08 15:47 — chris.vanbuskirk

Project Overviews | William Hoff (CSM) | Tyrone Vincent (CSM) | Tina Kouri (CSM) | Siddarth Suryanarayanan (CSU) | Robert Braun (CSN) | Raido Huberg (CSM) | Peng Shao (CSM) | Marcelo Simoes (CSM) | Kevin Moore (CSM) | Dinesh Mehta (CSM) | Chang Liu (CSM) | Bryan Euser (CSM) | Brady Nunnn CSM) | Bao Nguyen (CSM) | Andrew Schmidt (CSM) | Energy Efficient Buildings | Abstract | National CPS PI Meeting 2010 | academy

This project focuses on modern buildings as a natural expression of a cyber-physical system, with many features that are typical of such systems. This project focuses on modern buildings as a natural expression of a cyber-physical system, with many features that are typical of such systems. Modern buildings exhibit a tight integration of sensing, computation, and actuation within multiple physical domains. Improving the energy efficiency of building structures and complexes represents a significant opportunity for lowering national energy consumption and emissions.

Cyber-Enabled Efficient Energy Management of Structures (CEEMS)

Groups: 2010 National CPS PI Meeting

Add new comment | Download | 139.08 KB | Unrecognized file type | 4 views | 21 downloads | Subscribe to: This post | Subscribe to: Posts of type File | Subscribe to: Posts by chris.vanbuskirk

Cyber-Enabled Efficient Energy Management of Structures (CEEMS)

View Edit Properties Outline Revisions Workflow

A file *Cyber-Enabled Efficient Energy Management of Structures (CEEMS)* has already been uploaded. If you upload another file the current file data will be replaced.

File:

Choose File no file selected

The maximum upload size is 20 MB.

Title: *

Cyber-Enabled Efficient Energy Management of Structures (CEEMS)

Vocabularies

NSF-CPS PI Mtg: Topics: *

Project Overviews

Topics:

- CPS Domains
- Defense
- Aerospace
- Energy
- Energy Efficient Buildings
- Smart Grid
- Critical Infrastructure
- SCADA Systems
- Health Care

Select one or more terms from the available list.

Document Type:

Abstract

Select exactly one term from the presented choices.

CPS Events:

- None -
- 2005
- HCMDS Workshop 2005
- RTSS Symposium 2005
- Robotics and CPS
- 2006
- Beyond SCADA 2006
- HCSSP-CPS 2006
- National Aviation Software Workshop 2006

NSF-CPS PI Mtg: Contributors(s):

Andrew Schmidt (CSM), Bao Nguyen (CSM), Brady Nunnn CSM), Bryan Euser (CSM), Chang Liu (CSM), Dinesh

A comma-separated list of terms describing this content. Example: funny, bungee jumping, "Company, Inc.".

Keywords:

Comma separated list of keywords (e.g. "aerospace, conference")


Document Source:

academy

Taxonomies



CPS-VO BETA
Cyber-Physical Systems Virtual Organization



[HOME](#) [CALENDAR](#) [ARCHIVES](#)

Home » [Administer](#) » [Content management](#) » [Taxonomy](#) » [Terms in Topics](#)

News & Publications
[New & Noteworthy](#)
[Federal Agency](#)
[Industry](#)
[Legislative](#)
[About CPS-VO](#)
[Sponsors](#)

Links


Browse
[Archives](#)
[Calendar](#)
[Groups](#)

Communicate
[New Event](#)
[Create File](#)
[Contact VO Staff](#)

Collaborate
[My Groups](#)

Search
[Tagcloud](#)
[Find Group](#)
[Taxonomic Search](#)

Administer
[Recent Posts](#)
[Recent Comments](#)
[Taxonomies](#)
[User Mgmt](#)
[Workflow](#)
Account Mgmt
[My Account](#)
[Log out](#)

 **WHO'S ONLINE**
There are currently *1 user*
and *3 guests* online.

Online users
• admin

Terms in Topics

Topics is a single hierarchy vocabulary. You may organize the terms in the *Topics* vocabulary by using the handles on the left side of the table. To change the name or description of a term, click the *edit* link next to the term. [more help...]

Name	Operations
+ CPS Domains	edit
+ Defense	edit
+ Aerospace	edit
+ Energy	edit
+ Energy Efficient Buildings	edit
+ Smart Grid	edit
+ Critical Infrastructure	edit
+ SCADA Systems	edit
+ Health Care	edit
+ Medical Devices	edit
+ Manufacturing	edit
+ Robotics	edit
+ Transportation	edit
+ Automotive	edit
+ Avionics	edit
+ CPS Technologies	edit
+ Embedded Software	edit
+ Research Program Overview	edit
+ Science Policy	edit
+ Education	edit
+ Foundations	edit
+ Composition Theory	edit
+ Science of System Integration	edit

Taxonomic Browsing

Document Browser | CPS-VO - Windows Internet Explorer

http://cps-vo.org/file_browser

Document Browser | CPS-VO

HOME | CALENDAR | ARCHIVES

Home » Repositories » Document Browser

Document Browser

News & Publications
[New & Noteworthy](#)
[Federal Agency](#)
[Industry](#)
[Legislative](#)
About CPS-VO
[Sponsors](#)
Links


Browse
[Archives](#)
[Calendar](#)
[Groups](#)
Communicate
(login required)
Search
[Tagcloud](#)
[Find Group](#)
[Taxonomic Search](#)
Account Mgmt
[My Account](#)
[Log in](#)

▼ Topics

▼ CPS Domains	89.16 MB	73
▶ Defense	6.19 MB	6
▶ Energy	20.88 MB	11
▶ Critical Infrastructure	267.51 KB	2
▶ Health Care	45.88 MB	20
▶ Manufacturing	3.2 MB	3
▶ Robotics	3.71 MB	13
▶ Transportation	9.03 MB	17
▶ Borghese, J.: Thoughts on Cyber-Physical Systems	9.09 KB	[details]
▶ CPS Technologies	351.46 KB	5
▶ Research Program Overview	23.07 MB	10
▶ Science Policy	8.62 MB	7
▼ Education	944.88 KB	4
▶ Lee, E. A.: Teaching Embedded Systems at Berkeley	560.82 KB	[details]
▶ Lee, I.: Innovations in CPS Education	93.79 KB	[details]
▶ Pappas, G.: Cyber-physical systems Educational C...	121.36 KB	[details]

Home | Calendar | Archives

Taxonomic Search


CPS-VO BETA
Cyber-Physical Systems Virtual Organization

Search

HOME
CALENDAR
ARCHIVES

Home » Taxonomic Search

News & Publications

[New & Noteworthy](#)

[Federal Agency](#)

[Industry](#)

[Legislative](#)

[About CPS-VO](#)

[Sponsors](#)

Links

Taxonomic Search

Keyword search

With all of the words

Search

Guided search

Click a term to initiate a search.

Topics		Document Source	
Foundations (109)	CPS Technologies (16)	academy (86)	industry (6)
CPS Domains (1)		government (30)	
Education (17)	Subcategories: (13)		
	Health Care (22)	Defense (7)	
	Transportation (19)	Critical Infrastructure (3)	
Keywords	Robotics (14)	Manufacturing (3)	
conference (10)	Energy (11)		
CPS (8)		Content type	
CFP (6)		File (218)	Page (36)
security (6)		Event (69)	Story (5)
CPS Security (5)	Cyber Insurance (2)	Author	
secure control systems (4)	more...	Anonymous (4)	Katie Dey (81)
		admin (93)	kwebb (3)
Document Type		chris.vanbuskirk (78)	mate (34)
Presentation (78)	Executive Summary (2)	gabor (1)	sushilkbirla (1)
Abstract (35)	Call for Proposal (1)	Helen Gill (1)	more...
Report (10)	Draft (1)	janos.sztiiparovits (4)	
Position Paper (6)	Minutes (1)		
Congressional Testimony (4)	more...	Date authored	
Memo (4)		2009 (1)	2010 (327)
CPS Events			
2010 (98)	2007 (9)		
2008 (27)	2011 (7)		
2009 (19)	2006 (5)		
Event Types			
Workshop (32)	Congressional Hearing (1)		
Conference (23)	PI Meeting (1)		
Symposium (5)	Roundtable (1)		
Summer School (3)			

Browse

[Archives](#)

[Calendar](#)

[Groups](#)

Communicate

[New Event](#)

[Create File](#)

[Contact VO Staff](#)

Collaborate

[My Groups](#)

Search

[Tagcloud](#)

[Find Group](#)

[Taxonomic Search](#)

Administer

[Recent Posts](#)

[Recent Comments](#)

[Taxonomies](#)


[User Mgmt](#)

[Workflow](#)

Account Mgmt

[My Account](#)

[Log out](#)

 **WHO'S ONLINE**

There are currently **1 user** and **3 guests** online.

Online users

Taxonomic Search: Education

Results

Results 1 - 10 of 17

Georgia Tech Summer School on CPS: 2011

Thu, 2010-11-04 07:57 — admin

Start: Jun 27 2011

End: Jun 29 2011

URL:

<http://www.ece.gatech.edu/research/labs/esl/Activities/CPS-2011/index.html>

Location:

Georgia Tech Atlanta campus

The third Georgia Tech Summer School on Cyber-Physical Systems (CPS) will be held at the Georgia Tech Atlanta campus on Monday-Wednesday, June 27-29, 2011.

[Add new comment](#) | [Calendar](#) | [Subscribe to: This post](#) | [Subscribe to: Posts of type Event](#) | [Subscribe to: Posts by admin](#)

Legislative News: Strengthening American Competitiveness in the 21st Century Global Economy

Wed, 2010-05-19 16:28 — admin

Legislative News:





[About Us](#) | [Subcommittees](#) | [Our Legislation](#) | [Tracking R&D Funding](#) | [Pre](#)

CURRENT SEARCH

[x] Topics: Education

GUIDED SEARCH

Click a term to refine your current search.

Topics: all » Education

Keywords

summer school (2)
competitiveness (1)
CPS (1)
CPS Community (1)
embedded systems (1)
industry (1)

Document Type

Presentation (4)
[Textbook \(1\)](#)

CPS Events

2010 (5)
2009 (4)
2011 (3)

Event Types

Summer School (3)
Workshop (3)
Conference (2)

Document Source

academy (3)
government (1)

Content type

Event (8)
File (6)
Story (2)
Page (1)



CPS-VO BETA

Cyber-Physical Systems Virtual Organization

 Search

- HOME
- CALENDAR
- ARCHIVES

Home » CPS textbook is released

- News & Publications
- [Federal Agency](#)
 - [Industry](#)
 - [Legislative](#)
 - [New & Noteworthy](#)
- About CPS-VO
- [Sponsors](#)
- Links

- Browse
- [Archives](#)
 - [Calendar](#)
 - [Groups](#)
- Communicate
- [Post Event](#)
 - [Upload File](#)
 - [Contact Support](#)
- Collaborate
- [My Groups](#)
- Search
- [Tagcloud](#)
 - [Find Group](#)
 - [Taxonomic Search](#)

- Account Mgmt
- [My Account](#)
 - [Log out](#)

CPS textbook is released

- View
- Revisions

Fri, 2010-10-08 07:38 — chris.vanbuskirk

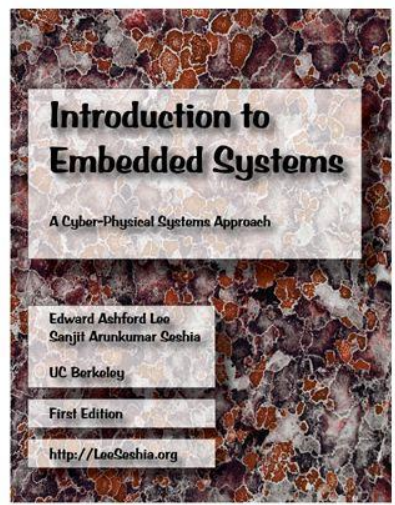
Education | Textbook | academy

URL:
<http://leeseshia.org/>
Dateline: 6th Oct 2010

Introduction to Embedded Systems - A Cyber-Physical Systems Approach by

[Edward Ashford Lee](#)
[Sanjit A. Seshia](#)

This book strives to identify and introduce the durable intellectual ideas of embedded systems as a technology and as a subject of study. The emphasis is on modeling, design, and analysis of cyber-physical systems, which integrate computing, networking, and physical processes.



SPECIAL INTEREST GROUPS



Portal Requirements

▶ User Management

- ▶ Authentication / Pedigree
- ▶ User Profiles
- ▶ Directory Services

▶ Communications

- ▶ Events Calendar
- ▶ News Stories
- ▶ Instant Messaging
- ▶ Blogs & Podcasts
- ▶ RSS/Atom Feeds
- ▶ Misc. “*Social Networking*”

▶ Collaboration

- ▶ Communities of Interest
- ▶ Group Permissions Mgmt
 - ▶ Features Availability
 - ▶ Content Visibility
- ▶ Group Moderation
- ▶ Mailing Lists
- ▶ Forums
- ▶ Wikis
- ▶ File Sharing



'Groups' Architecture

- ▶ Goal: Easily construct 'mini-websites'
- ▶ Templates for group types (e.g. SIGs, Conference Planning, Conference Proceedings, Research Centers, ...)
- ▶ Customizable membership/access policies
- ▶ Distributed site management
- ▶ Group Defined/Scoped
 - ▶ Administrative Staff
 - ▶ Document repositories
 - ▶ Calendar
 - ▶ Taxonomies/terminology & search engine
 - ▶ Other Services
 - ▶ e.g. forums, chat, subscriptions & notifications, email announcements, ...
- ▶ *Hierarchical Groups (in progress)*

-
- ▶ * scalable, distributed site management

Y1: Initial Special Interest Groups Seeded

- ▶ National PI Meeting Planning/Archival
- ▶ NSF CPS Principal Investigators
- ▶ The Science of Security
- ▶ The Automotive Group
- ▶ Science of Integration



The screenshot displays the website for the Cyber-Physical Systems Virtual Organization (CPS-VO) BETA. The main header features the CPS-VO logo and the text "Cyber-Physical Systems Virtual Organization". Below the header, there are navigation tabs for "HOME", "CALENDAR", and "ARCHIVES". The current page is titled "Home » Groups » Science of Security".

The page content includes a sidebar with various links such as "News & Publications", "Browse", "Collaborate", "Search", and "Account Mgmt". The main content area is titled "Science of Security" and contains a sub-header "Home | Members | Calendar | Tag Cloud | Search | Help | Forums". Below this, there is a date and time stamp "Wed, 2010-10-13 10:11" and a user name "brad_martin".

The main content area features a large image with the text "Science of Security" and a paragraph of text: "Virtually every computing system today is at risk from some form of cyber attack. The problem continues to grow in scope, in part because there does not exist today a foundational science of security. While the community is certainly making improvements in the security of many systems, progress is often ad-hoc, muddled, and difficult to measure with respect to actual progress being made. A broad-spectrum science of security is desperately needed at this time and would involve a systematic gathering of knowledge, new theoretical approaches, observational research, experimental research, and more. Certain subfields of security have a strong scientific basis (e.g., cryptography, formal methods), but there is no comprehensive scientific basis for constructing systems that are trustworthy by design. The lack of a disciplined and rigorous scientific basis profoundly limits our ability to design, deploy, and trust most large-scale and cyber-physical systems (CPS). Therefore, it is the goal of the CPS-VO Science of Security Group to provide a vehicle for community awareness, collaboration, and information towards the maturing of the scientific basis for security."

Below the main content area, there are two additional sections: "The Science Of Security: A Formal Perspective" and "A Roadmap for Cybersecurity Research". Each section includes a date and time stamp, a user name, and a list of links for "Add new comment", "Download", "PowerPoint presentation", "0 views", "2 downloads", "Subscribe to: This post", "Subscribe to: Posts of type File", and "Subscribe to: Posts by Katie Day".

The right sidebar contains a section titled "SCIENCE OF SECURITY" with a list of links: "Create File", "Create Event", "Group forums", "10 members", "Manager: brad_martin", and "My membership". Below this is another "SCIENCE OF SECURITY" section with a search box and a "Search group" button.

MATCHMAKING



In Progress: Community Directory

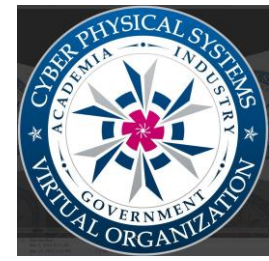
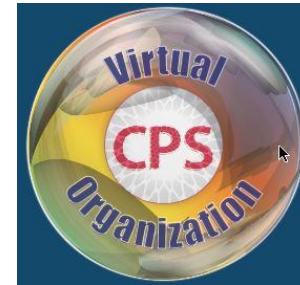
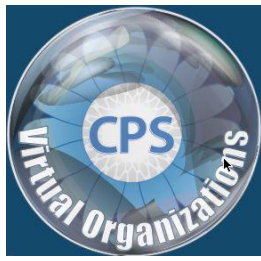
- ▶ Register all NSF CPS Principal Investigators
- ▶ Document individual members' interests and expertise (i.e. formal meta-data)
- ▶ Adequately catalog current NSF CPS Program research projects

- ▶ Implement *social networking* type features
 - ▶ e.g. “matchmaking” for subject matter experts,
 - ▶ “bookmarking” services,
 - ▶ ...



USER INTERFACE





User [sztipam] · Log out

Virtual Organization

- Vision, Goal, and Objectives
- About the Portal
- Management
- Contact
- FAQ

Aero Group Theme

HOME ABOUT NEWS CALENDAR ARCHIVES GROUPS

SPONSORED BY NSF

News & Publications

- New & Noteworthy
- Federal Agency
- Industry
- Legislative

About CPS-VO

- Sponsors

Browse

- Archives
- Calendar
- Groups

Communicate

- (login required)

Search

- Tagcloud
- Taxonomic search

Home · About CPS-VO

The next industrial revolution is inspired and driven by the emergence of a new generation of engineered systems: Cyber-Physical Systems (CPS). Such systems use computation and communication *seamlessly embedded in and interaction with* physical processes to transform the behavior and capabilities of physical systems. communication equipment to conventional products where the computing and physics in CPS, functionalities are emerging from the networked interaction between computing products spans from the minuscule (e.g. pacemakers) to the large-scale (e.g. cars, air depends on (e.g. the national power-grid). Complexity of their design demands new Science - that requires the synthesis of knowledge across many science and engineering disciplines. The objective of the National Science Foundation established actively support the formation of a multidisciplinary community and to facilitate broadly

Copyright © 2005 – 2010 CPS-VO. Sponsored by NSF.

Help

Home Members Calendar Tag Cloud Search Help Moderation
 Forums Edit Outline Taxonomy Broadcast Pages Browser

User's Manual

Wed, 2010-07-28 10:29 — admin

A collection of instructions, which attempt to walk the new community member through some common VO activities.

- How to apply for a VO account
- How to join the 'CPS Plus' group
- How to upload Files to a Group
- How to create a Forum post
- How to upload Files to a Group & the Top-Level simultaneously

How to apply for a VO account -

Add child page

Printer-friendly version Add new comment Subscribe to: This post (Subscribe to: Posts of type Book page Subscribe to: Posts by admin)

Law User's Manual

Wed, 2010-11-03 16:45 — admin

The How To documentation contains URL addresses that start with "@". To go to these places, add the path after this to the site root address in the URL, such as:

@-User/Join becomes <http://cps-vo.org/user/join>

- Add Content to Archive
- Add Event to Calendar
- Group Operations
- Publishing / Reviewing Content

Add Content to Archive -

Add child page

Printer-friendly version Add new comment Subscribe to: This post

HELP

- Create File
- Create Image
- Create Event
- Group forums
- Manage group forums
- 10 members
- Manager: brad_martin
- My membership

HELP

Search group

User [sztipam] · Log out

Virtual Organization

- Vision, Goal, and Objectives
- About the Portal
- Management
- Contact
- FAQ

META

HOME ABOUT NEWS CALENDAR ARCHIVES GROUPS

News & Publications

- New & Noteworthy
- Federal Agency
- Industry
- Legislative

About CPS-VO

- Sponsors

Browse

- Archives
- Calendar
- Groups

Communicate

- (login required)

Search

- Tagcloud
- Taxonomic search

Home · Groups · META

The ultimate goal of the META program is to make a dramatic improvement on the existing systems engineering, integration, and testing process for defense systems. META is not predicated on one particular alternative approach, metric, technique, or tool. Broadly speaking, however, it aims to develop model-based design methods for cyber-physical systems far more complex and heterogeneous than those to which such methods are applied today; to combine these methods with a rigorous deployment of hierarchical abstractions throughout the system architecture; to optimize system design with respect to an observable, quantitative measure of complexity for the entire cyber-physical systems; and to apply probabilistic formal methods to the system verification problem, thereby dramatically reducing the need for expensive real-world testing and design iteration.

Program Manager: [Mr. Paul Eremenko](#)

Copyright © 2005 – 2010 CPS-VO. Sponsored by NSF.

EDUCATION



Phase II Concentrations

- ▶ **Continuous Community Building Efforts**
 - ▶ Bring people together; recruit new members (e.g. travel to related industry and academic gatherings in order to publicize VOCYPHER)
- ▶ **Domain-Specific Knowledge Repository**
 - ▶ Document archival/registration service
 - ▶ Design, implement & evolve standard *ontologies* and less formal *folksonomies* for the CPS community (&sub-communities)
 - ▶ Domain-aware, semantically enabled *search* services
 - ▶ Directory Services, Matchmaking, Bookmarking Services, Personalized Alerts
 - ▶ Semantically driven, data mining services and content aggregators
- ▶ **Electronic Communications**
 - ▶ discussion forums, mailing lists, file sharing, wikis, instant messaging, blogs/podcasts, event calendars
 - ▶ virtual meetings and electronic transcripts for related seminars/conferences
 - ▶ dynamic community formation (a.k.a. Special Interest Groups)
- ▶ **Electronic Collaboration**
 - ▶ CPS-related Challenge Problems
 - ▶ Online Experimentation (e.g. Emulab-inspired Cyber-Physical Computation/Simulation Infrastructure)
 - ▶ Publish/Review Results
 - ▶ * builds upon *SPRUCE* experiences and technologies (as well as *C2Wind Tunnel*)
- ▶ **Education and Dissemination**
 - ▶ Download CPS-specific Technologies and Tool Suites
 - ▶ Seminars, Workshops, Tutorials & Electronic Coursework
 - ▶ Professional Development (e.g. postdoc announcements)

