

# INTEL EMBEDDED SYSTEMS COMPETITION 2016

More info about the final report and guidelines for our event

### In this webinar

- Final report template review
- JEMS ID
- Deadlines
- Venue
- Who needs to be there?
- Registration process
- Our event
  - Schedule
  - Venue map
  - Available resources



### In this webinar

- (Un)Confirm presence
- What to bring
- Presentation template review
- Poster template review
- Embedded School 2016 (ESSE)
- Links



### Final Report

- Deadline 30<sup>th</sup> October 11:59pm (Brasilia Time)
- In English (mandatory)
- Upload through JEMS (not email !!!!!!!!)
- PDF format

Link Here: <a href="https://jems.sbc.org.br/home.cgi?c=2522">https://jems.sbc.org.br/home.cgi?c=2522</a>



2016 SBESC - Intel Embedded System Competition

2016 SBESC - Intel Embedded System Design Contest

#### **Final Report**

Students:

Faculty:

University:

#### **Declaration of Originality**

We hereby declare that this report and the work reported herein was		
composed and originated entirely by ourselves. Information derived from		
the published and unpublished work of others has been acknowledged		
the text and a list of citations is given in the references section.		
Team Members Signature:		
Name (in Block Letters):		

Date:

#### PROJECT TITLE

#### ABSTRACT

HCCI (Homogenous Charge Compression Ignition) combustion has advantages in terms of efficiency and reduced emission. HCCI combustion can not only ensure both the high economic and dynamic quality of the engine, but also efficiently reduce the NOs and smoke emission. Moreover, one of the remarkable characteristics of HCCI combustion is that the ignition and combustion process are controlled by the chemical kinetics, so the HCCI ignition time can vary significantly with the changes of engine configuration parameters and operating conditions. In this work numerical scheme for the ignition and combustion process of DME homogeneous charge compression ignition is studied. The detailed reaction mechanism of DME proposed by American Lawrence Livermore National Laboratory (LLNL) and the HCT chemical kinetics code developed by LLNL are used to investigate the ignition and combustion processes of an HCCI engine fueled with DME. The new kinetic mechanism for DME consists of 79 species and 399 reactions. To consider the effect of wall heat transfer, a wall heat transfer model is added into the HCT code. By this method, the effects of the compression ratio, the fuel-air equivalence ratio, the intake charge heating, the engine speed, EGR and fuel additive on the HCCI ignition and combustion are studied. The results show that the HCCI combustion fueled with DME consists of a low temperature reaction heat release period and a high temperature reaction heat release period. It is also founded that increasing the compression ration, the equivalence ratio, the intake charge temperature and the content of H2O2, H2 or CO cause advanced ignition timing. Increasing the engine speed, adoption of cold EGR and the content of CH4 or CH3OH will delay the ignition timing.

Key words: HCCI, chemical kinetics, numerical simulation, DME, EGR

#### Content

Chapters and sections title



#### Chapter 1 Introduction

HCCI (Homogenous Charge Compression Ignition) combustion has advantages in terms of efficiency and reduced emission. HCCI combustion can not only ensure both the high economic and dynamic quality of the engine, but also efficiently reduce the NOs and smoke emission. Moreover, one of the remarkable characteristics of HCCI combustion is that the ignition and combustion process are controlled by the chemical kinetics, so the HCCI ignition time can vary significantly with the changes of engine configuration parameters and operating conditions. In this work numerical scheme for the ignition and combustion process of DME homogeneous charge compression ignition is studied. The detailed reaction mechanism of DME proposed by American Lawrence Livermore National Laboratory (LLNL) and the HCT chemical kinetics code developed by LLNL are used to investigate the ignition and combustion processes of an HCCI engine fueled with DME. The new kinetic mechanism for DME consists of 79 species and 399 reactions. To consider the effect of wall heat transfer, a wall heat transfer model is added into the HCT code. By this method, the effects of the compression ratio, the fuel-air equivalence ratio, the intake charge heating, the engine speed, EGR and fuel additive on the HCCI ignition and combustion are studied. The results show that the HCCI combustion fueled with DME consists of a low temperature reaction heat release period and a high temperature reaction heat release period. It is also founded that increasing the compression ratiop, the equivalence ratio, the intake charge temperature and the content of H2O2. H2 or CO cause advanced ignition timing. Increasing the engine speed, adoption of cold EGR and the content of CH<sub>2</sub>OH will delay the ignition timing.

#### 1.1 Introduction

HCCI (Homogenous Charge Compression Ignition) combustion has advantages in terms of efficiency and reduced emission. HCCI combustion can not only ensure both the high economic and dynamic quality of the engine, but also efficiently reduce the NOs and smoke emission.

#### 1.1.1 Introduction

HCCI (Homogenous Charge Compression Ignition) combustion has advantages in terms of efficiency and reduced emission. HCCI combustion can not only ensure both the high economic and dynamic quality of the engine, but also efficiently reduce the NO<sub>4</sub> and smoke emission.:

i) introduction
2)Introduction

#### Chapter 2 Design and Implementation

#### 2.1Introduction

...

#### 2.1.1 Introduction

---

$$m = \sum_{k=1}^{K} m_k$$
 (2-1)

Table 2-1 Table

Hr(kcal/mol)	Sr(kcal/mol)	C <sub>F</sub> (kcal/mol)
100	100	100



#### Chapter 5 Conclusion

- Required sections
  - Cover (with JEMS ID)
  - Declaration of Originality
  - Abstract
  - Introduction
  - Design and Implementation
  - Conclusion
  - References
- The team may add more sections

#### References

- World Health Organization. Factors regulating the immune response upport of WHO Scientific Group [R]. Geneva: WHO, 1970.
- [2] CHRISTINE M. Plant obusinlogundant biology in the Genome Era[J/OL]. Science, 1998, 281: 331-332 [1998-09-23]. http://www.sciencemag.org/cgi/collection/anatmorp.



### Final Report - Templates



#### Final report examples/templates

#### Microsoft Word:

- Final Report

#### LaTeX:

- Example output PDF
- Document class with example sources ZIP (v1.01)

#### Useful Links

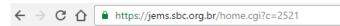
#### For the Galileo Gen 2:

- Galileo schematic: Link
- Galileo downloads: Link
- Galileo pin mapping, advanced details and interrupt modes: Link

#### Other links:

Yocto Project – Default Linux distro's build system: Link

#### **JEMS ID**



#### SBESC 2016 (SBESC 2016)

♠ A new version of JEMS is available at https://jems.sbc.org.br/jems2. It runs over the same infrastrubeta version. In case of suggestions, compliments or problems, please send a message to the JEMS.

You are logged in as and can edit your profile.

Paper registration closed for all tracks in this conference.

Track name	Submit from	Register by	Submit by
Main	Mar 17, 2016 (BRT)	20:00 - Aug 01, 2016 (BRT)	20:00 - Aug 01, 2016 (BRT)

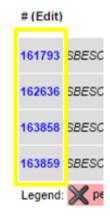
The conference has multiple symposia or sub-conferences where you can submit papers:

IV Competição Intel de Sistemas Embarcados (SBESC 2016 - IV Competição Intel de Sistemas Embar-

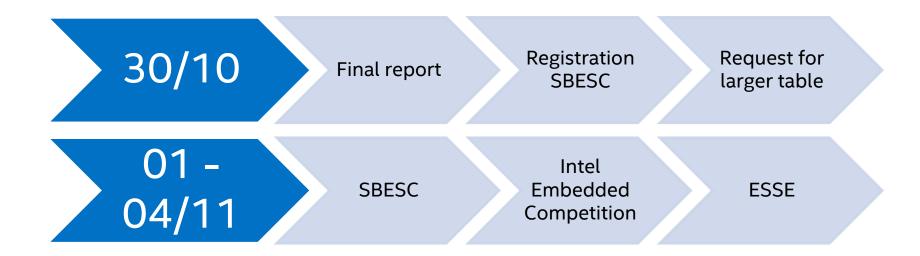
#### **Papers Authored**

# (Edit)	Conference / Track
161793	SBESC 2016 - IV Competição Intel de Sistemas Embarcados / IV Competição Intel de Sistemas Embarcados (UFOP)
162636	3BESC 2016 - IV Competição Intel de Sistemas Embarcados / IV Competição Intel de Sistemas Embarcados
163858	SBESC 2016 - IV Competição Intel de Sistemas Embarcados / IV Competição Intel de Sistemas Embarcados (UFRN)
163859	SBESC 2016 - IV Competição Intel de Sistemas Embarcados / IV Competição Intel de Sistemas Embarcados (UFPE)
Legend:	pending (no maniscript uploaded) a active (under review) withdrawn Prejected et accepted

Identifying your project's JEMS ID



### Upcoming deadlines



### Venue

Tropical Tambaú Hotel

Av. Almirante Tamandaré, 229 João Pessoa – Paraíba





<u>Site</u>

### Who needs to be there and when?!

- At least one STUDENT of the group
  - Professors are more than welcome to join their students but can't present for them

We recommend that all participants arrive at least on November, 1<sup>st</sup>



### Registration Process (SBESC)

- 1. Access the registration site
- 2. Complete your registration
- 3. Email us:
  - 1. SBC confirmation email
  - 2. Project JEMS ID
- 4. Wait for our confirmation

# Email: <a href="mailto:submissaocompeticaointel@gmail.com">submissaocompeticaointel@gmail.com</a>

#### Rules:

- Deadline: October, 30<sup>th</sup>
- We will pay the registration fee only for the official team (up to 3 students and 1 professor)

### Registration Process (SBESC)





Prezado(a) Paula,

Sua inscrição no VI Simpósio Brasileiro de Engenharia de Sistemas Computacionais (SBESC 2016) foi realizada com sucesso. Para garantir os valores de inscrição selecionados você deve efetivar o seu pagamento até a data de vencimento.

Para mais informações sobre o programa da conferência, acesso ao evento, transporte e acomodações, por favor, acesse o site web do evento http://www.sbc.org.br/sbesc.

Atenciosamente,

Comissão Organizadora

Sociedade Brasileira de Computação

VI Simpósio Brasileiro de Engenharia de Sistemas Computacionais (SBESC 2016)







Segue confirmação de inscrição como aluno congressista para isenção da taxa da mesma, conforme regras estabelecidas

ID JEMS:

Titulo do projeto:

Att



### Embedded Competition – Schedule

Day 1

- Meeting with the organization
- •Embedded Systems School 2016

Day 1 – November, 1st

Day 2

•Compulsory presentation to the judges

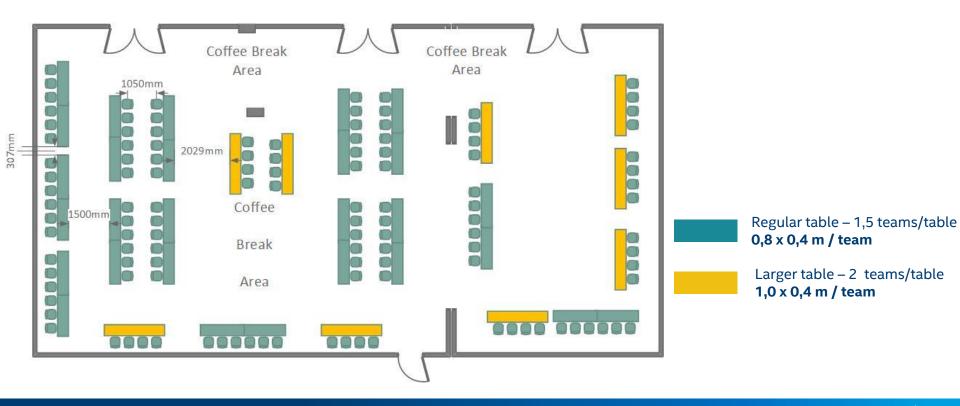
Day 2 – November, 2<sup>nd</sup>

Day 3

- Prototype presentation to public and judges
- Awards Ceremony

Day 3 – November, 3<sup>rd</sup>

### Embedded Competition – Venue Map



### Embedded Competition – Available Resources

- 1 power outlet (220 V)
- Wi-Fi (don't rely on it...always have a backup plan!)
- 2 chairs / team
- 1 banner stand

#### **Attention!**

If your group needs a larger table, please send a request to our email followed by your project JEMS ID.

### What to bring

- Prototype and additional HW (if necessary)
- PowerPoint presentation
- Power extension and adaptors

### Unconfirm presence

We know that unexpected situations happens...

Please contact us if you will no longer attend the event.



### Presentation – template review

- The use of the following template is mandatory
- 12 minutes (including time to Q&A with the judges)
- In English (no exceptions)

### Intel Embedded Systems Competition 2016

University:

Organization

Promotion

Sponsorship

















### Instructions

This slide is for orientation purposes only. You may delete it from your presentation.

- The Title Slide and Final Slide have to be presented
- Must be written in English
- Please pay attention to the required content
- You may not exceed the maximum slides for each section.
- Edit 'Project title' on each slide footer with your project's name

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- ▶ The Title Slide and Final Slide have to be presented
- Must be written in English
- Please pay attention to the required content.
- You may not exceed the maximum slides for each section.
- Edit 'Project title' on each slide footer with your project's name

### Required content

This slide is for orientation purposes only. You may delete it from your presentation.

- ▶ What is the project? (1 slide)
- Motivation (1 slide)
- Project Technologies (3 slides)
  - Hardware and why
  - Operating System and why
  - Programming languages and why
- Biggest technical issue and workaround (2 slides)
- Why the project is innovative? (1 slide)
- ▶ Free slide (1 slide) \*\*The team may use this slide as they wish\*\*

# What is the project

▶ Please explain here what is your project

### Motivation

▶ Please explain what was motivation for your project

# Project technologies (1)

- Explain the following and why it was chosen:
  - ▶ Hardware
  - Operating System
  - Programming languages

# Project technologies (2)

- Explain the following and why it was chosen:
  - ▶ Hardware
  - Operating System
  - ▶ Programming languages

# Project technologies (3)

- Explain the following and why it was chosen:
  - ▶ Hardware
  - Operating System
  - ▶ Programming languages

## Biggest technical issue

Please explain what was the biggest technical issue faced by your team.

### Workaround

► How did your group overcome this issue

# Why the project is innovative?

Explain reasons you believe your project is innovative

### Free Slide

▶ Free slide (1 slide) \*\*The team may use this slide as they wish, if you want\*\*

### Intel® Embedded Systems Competition 2016

# Thank you for your attention!

# Questions?

Organization

Promotion

Sponsorship

















### Poster – template review

- Size: 0,9 x 1,2 m
- Opportunity to highlight what is great and different about your project
- Tips:
  - Short texts
  - Images
  - Block diagrams

### Poster – template review

- Suggested topics:
  - Introduction
  - Objectives
  - Methods
  - Results
  - Conclusions

### Poster Examples

**ASBESC** 

Project Title Team members University



#### Objectives

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
- Sed fermentum, risus id hendrerit auctor, risus lorem scelerisque libero, in scelerisque ipsum mauris eu est.

#### Introduction

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
- Sed fermentum, risus id hendrerit auctor, risus lorem scelerisque libero, in scelerisque ipsum mauris eu est.



#### Methods

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
- Sed fermentum, risus id hendrerit auctor, risus lorem scelerisque libero, in scelerisque ipsum mauris eu est.



#### **Results and Conclusions**

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
- Sed fermentum, risus id hendrerit auctor, risus lorem scelerisque libero, in scelerisque ipsum mauris eu est.

#### Project Title

Team members University University logo

#### Objectives

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
- Sed fermentum, risus id hendrerit auctor, risus lorem scelerisque libero, in scelerisque ipsum mauris eu est.

#### Introduction

- · Lorem ipsum dolor sit amet, consectetur adipiscing elit
- Sed fermentum, risus id hendrerit auctor, risus lorem scelerisque libero, in scelerisque ipsum mauris eu est.





#### Methods

- · Lorem ipsum dolor sit amet, consectetur adipiscing elit
- Sed fermentum, risus id hendrerit auctor, risus lorem scelerisque libero, in scelerisque ipsum mauris eu est.

#### Results and Conclusions

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
- Sed fermentum, risus id hendrerit auctor, risus lorem scelerisque libero, in scelerisque ipsum mauris eu est.







### Are you receiving our newsletters?



- If not, please send an email to <u>submissaocompeticaointel@gmail.com</u> with the following:
  - Subject: [Mailing-List] Add me!
  - Project's JEMS ID
  - Email
  - University
  - All important news are send through our mailing system

#### Intel® Embedded Systems Competition 2016

#### Progresso do projeto #IntelCupBR16

Olá Pessoal.

Com a proposta de estarmos mais envolvidos com a equipe e o desenvolvimento do projeto, gostaríamos que <u>postassem fotos ou vídeos</u> do grupo trabalhando, soldando e montando os protótipos.

O envio das fotos pode ser feito para o email educacao@intel.com

Pedimos às equipes que submeterem algum conteúdo, que nos informe o ID JEMS do projeto.

Compartilhe conosco a experiência de montar o seu projeto. :)

Lembrando que dúvidas técnicas sobre os projetos e comunicações devem ser feitas ainda pelo <u>submissaocompeticaointel@gmail.com</u>



### Embedded School 2016 (ESSE)

- November 1st 2016
- Co-event with SBESC and Intel Embedded Competition
- Schedule To Be Announced

Courses	Instructor(s)
Engenharia Guiada por Modelos no (co-)Projeto de Sistemas Embarcados de Tempo-Real	Marco Aurélio Wehrmeister (UTFPR)
Redes de Sensores sem Fio Industriais e o Protocolo WirelessHART	Ivan Muller, Jean Michel Winter, Carlos Eduardo Pereira, João Cesar Netto (UFRGS)
Arquiteturas Heterogêneas CPU/FPGA	José Augusto M. Nacif, Ricardo Ferreira, Fredy Alves, Lucas Bragança (UFV)

More info <a href="http://sbesc.lisha.ufsc.br/sbesc2016/Embedded+Systems+School">http://sbesc.lisha.ufsc.br/sbesc2016/Embedded+Systems+School</a>

### Links

 Our website <u>http://sbesc.lisha.ufsc.br/sbesc2016/Intel+Embedded+Systems+Competition</u>
n

 Q&A http://sbesc.lisha.ufsc.br/sbesc2016/Questions+And+Answers

### Embedded Systems Competition

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João Pessoa - PB

