Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: [Use Cases and Applications of Dependable Wireless M2M and BAN of Things]
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Abstract: [Body area networks(BAN) should be more dependable for major life critical applications such as medicine, disaster, dependable sensing and controlling cars, buildings, smart grids, and smart city by extending BAN from human body to bodies of cars, buildings, and so on. That is so-called BAN of things like Internet of Things. While keeping advantages of IEEE802.15.6, specifications of MAC and PHY may be revised to make it much more reliable, secure, fault tolerant, robust against undesired factors. This slides may offier opportunity to discuss on use cases and applications of this standard.]
Purpose: [The discussion on use cases and applications will lead definition and requirement of current ongoing research and development on dependable wireless networks.]

Use Cases and Applications of Dependable Wireless M2M and BAN of Things

15th July 2013 Geneva, Switzerland

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Recall of My Presentation in WNG Session in July 2012 and March 2013

- Doc. IEEE802.15-12-0370-00-wng0 : **Dependable Wireless M2M Network for Controlling - Applications for Cars, Energy, Medicine, Cities –**
- I proposed to start **either a new IG on Dependable M2M** or **a IEEE802.15 TG6 amendment of BAN** in July. I could get about 40 supporting votes for this action.
- **I asked Pat to postpone its opening** because I could not attend IR meeting in September due to my obligation for our government.
- **When I joined in Plenary in November**, I asked to open IG-DEP but could not come in January.
- **I started IG-DEP** at Tuesday Am1 session in this March, where I discussed with 12 attendees to **focus on amendment of TG15.6.**
- **To recall and promote this activity, I presented summary in March 2013**

Contents of IEEE802.15-13-0192-01-wng0 in March 2013

1. Recall of My Presentation in WNG Session in July 2012
2. Review of IEEE802.15.6 for Wireless BAN
3. Background for Amendment of IEEE802.15.6
4. Dependability of Wireless Networks
5. First Focus on Amendment of 15,6 for Dependable Medical BAN and Extend to BAN of Things
6. Possible Amendment of BAN
7. What to be documented
8. IEEE802.15.6 Deficiencies
9. Action Plan for TG6a(amendment of IEEE802.1.5.6)
10. Questions & comments

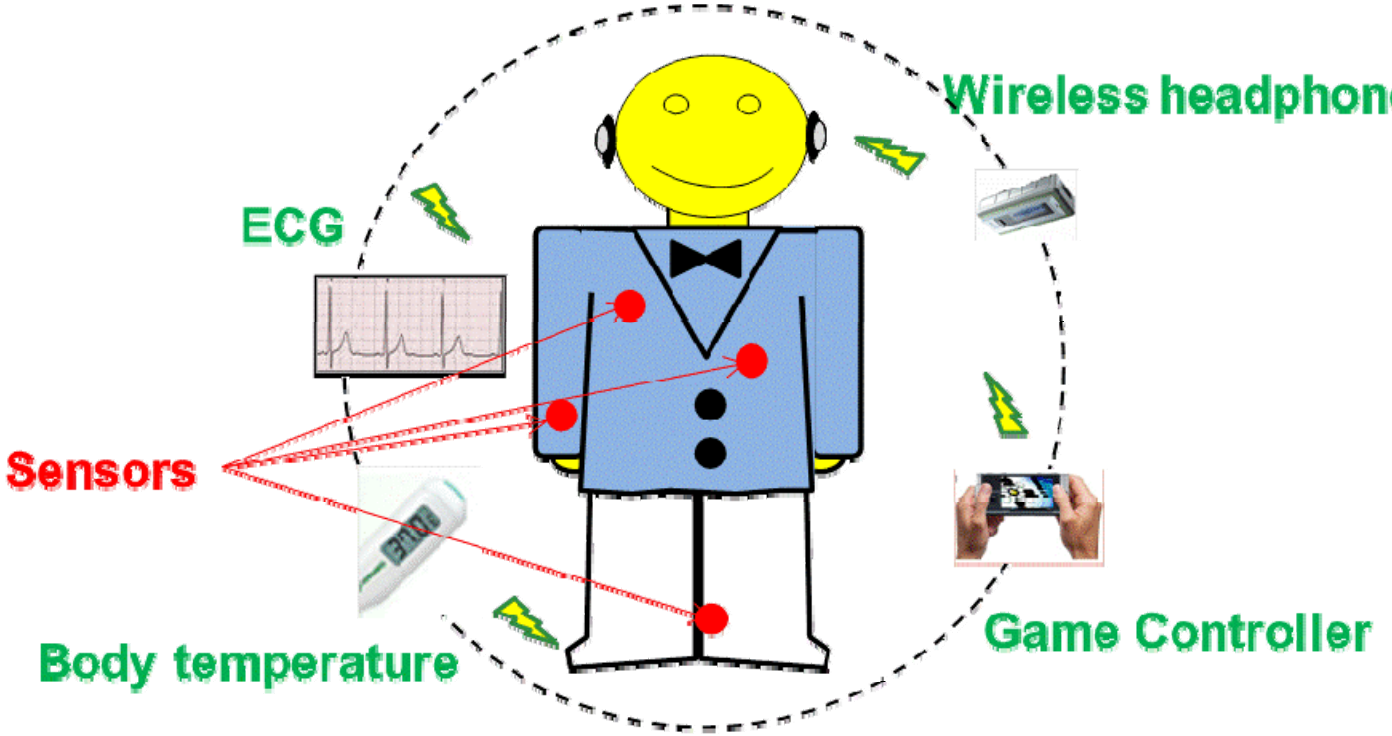
Reference documents

- Applications Summary Document of IEEE802.15.6 BAN
  - 15-08-0407-00-0006-tg6-applications-summary.doc
- TG6 Applications Matrix
  - 15-08-0406-00-0006-tg6-applications-matrix.xls
- IG-DEP kick-off documents
  - IEEE802.15-12-0370-00-wng0 in July 2012
  - IEEE802.15-13-0192-01-wng0 in March 2013

Background

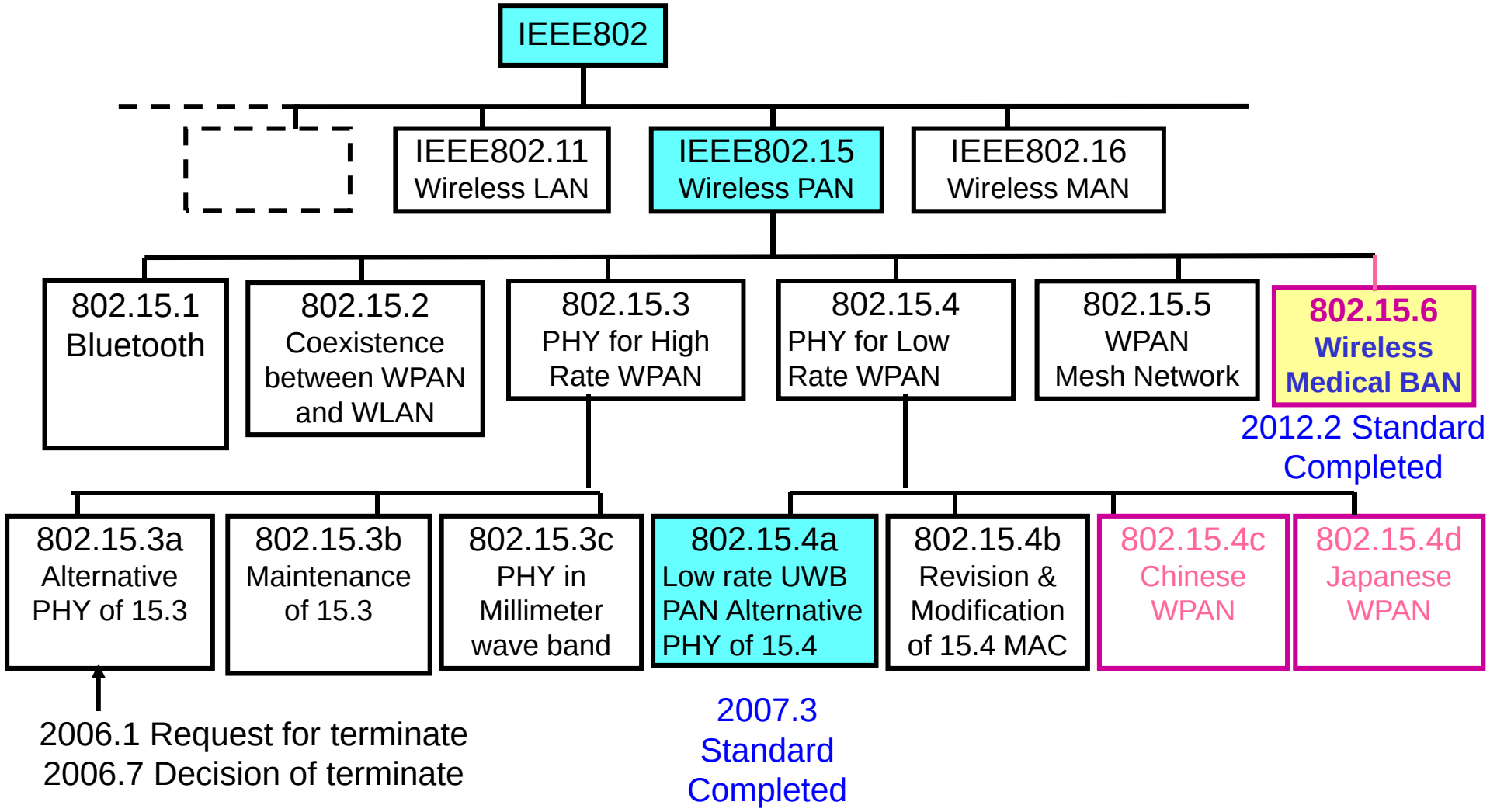
- IG-DEP started July 2012 but has not discuss on major use cases and applications yet although definition of Dependability has been discussed.
- Discussion on use cases and applications we should cover in IG-DEP may lead definition and requirement common with and different from IEEE802.15.6 BAN standard.
- Applications Matrix has been useful for developing a categorisation scheme and analysing technical requirements
  - However, insufficient by itself for proposal design and evaluation
- ITU-R has covered M2M in SG11 and others.

IEEE802.15.6 Review
Definition of Body Area Network



BAN provides short range, low power and highly reliable wireless communication for use in close proximity to or inside body. BAN should be compliant for FDA &FCC regulation for dependable services.

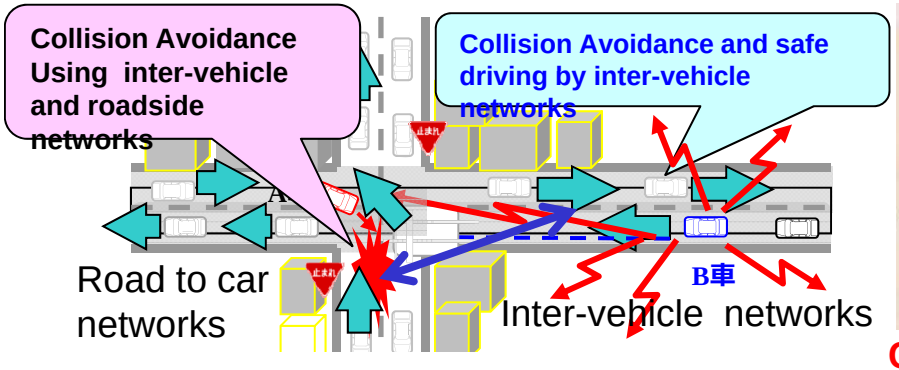
Wireless Network Standardization(IEEE802)



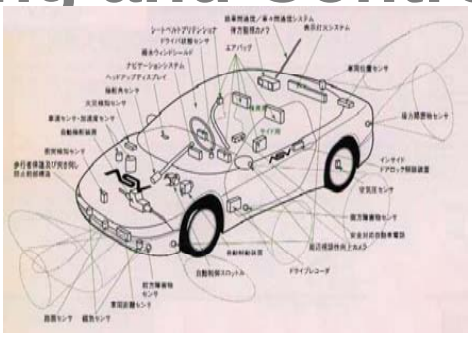
Dependablity in Wireless Networks

- **Meanings of Dependability:**
  - **In Wikipedia, "Dependability" is a value showing the reliability of a person to others because of his/her integrity, truthfulness, and trustfulness, traits that can encourage someone to depend on him/her. The wider use of this noun is in Systems engineering.**
  - **For us, "Dependability in network" means to guarantee lowest performance enough high in a sense of highly reliable, safe, secure, fault tolerant, robust services in any predictable and even unpredictable worse environments.**
- **Demand for Dependable Networks:**
  - Need for **Highly Reliable, Robust Communications for Controlling**
  - Transition from Human centric communications **to Machine-to-Machine (M2M) communications.**
  - Highly reliable, safe, secure and robust communications for **M2M Controlling** is necessary.
  - **Integrated wired & wireless networks** provide dependable, green and ecological networks adaptable for environment.

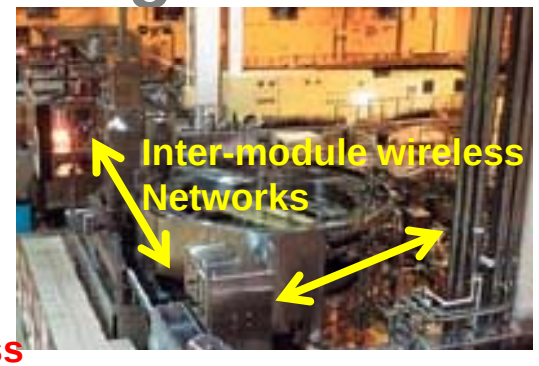
Demands for Highly Dependable BAN of Things, M2M for Sensing and Controlling



Car Navigation & Collision Avoidance Radar



Car LAN & Wireless Harness



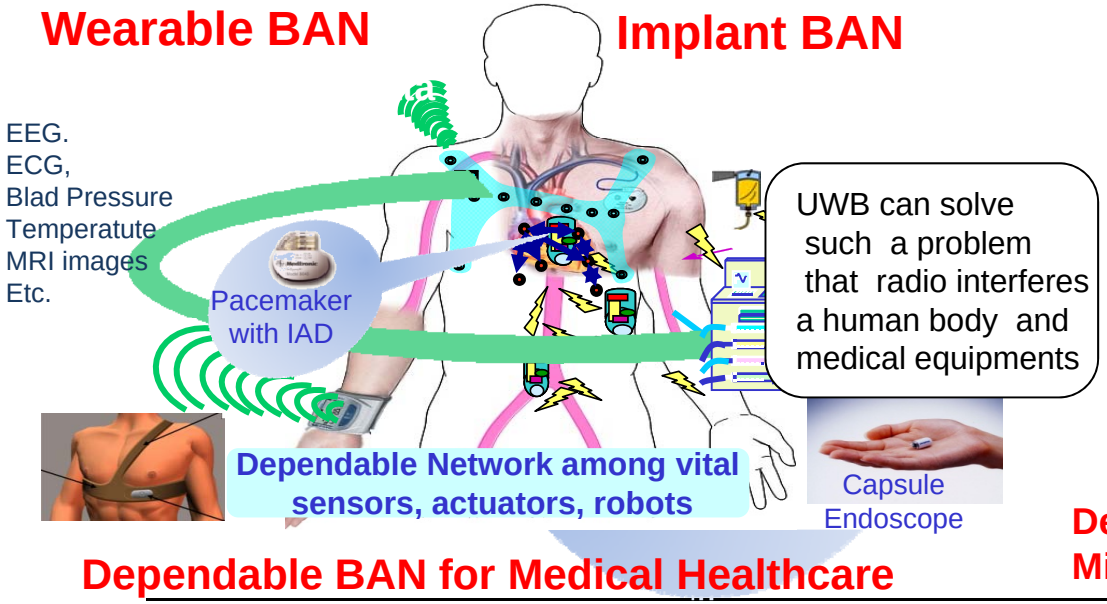
Factory Automation (FA)

Dependable Wireless Networks for Transportation

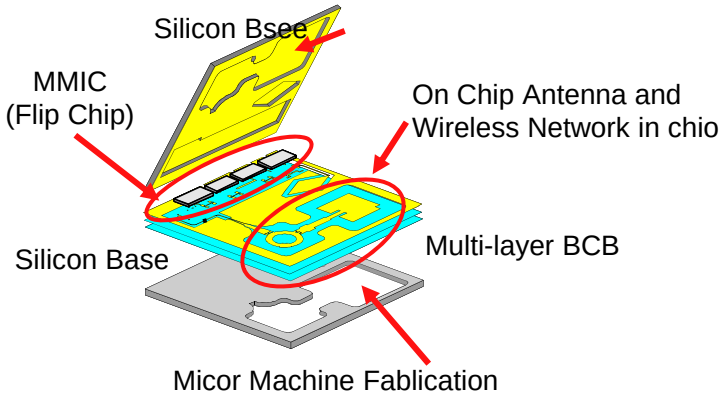
Dependable Wireless Sensing Controlling for Manufacturing (CIM)

Wearable BAN

Implant BAN



Dependable BAN for Medical Healthcare

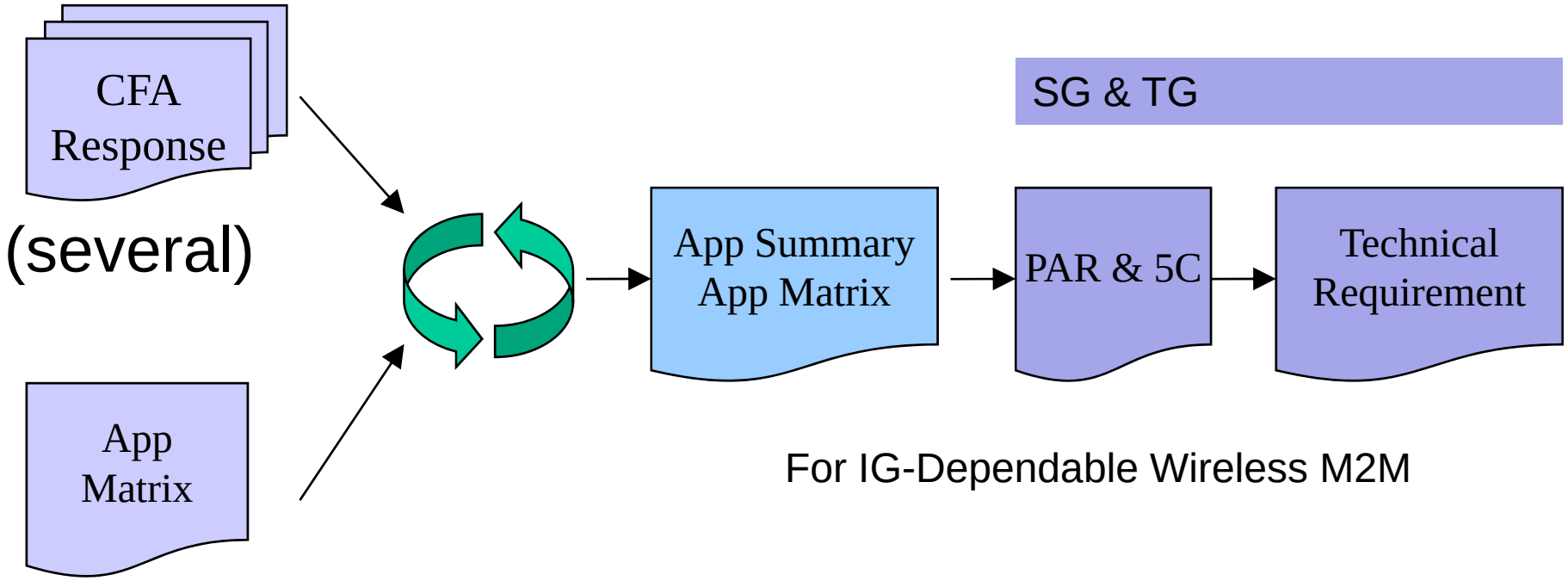


Dependable Wireless System Clock in Micro Circuit & Network in Devices

Document purpose

- To collate identified 802.15 IG-DEP applications into a single design document which will be distributed with the call for proposals.
- To provide a single point of reference (and application reference numbers) which can be used as a common point of reference when evaluating and comparing call for proposal responses.
- To identify omitted or erroneous application information requiring for further discussion.
- Refine the applications matrix categorization scheme through use.

Development process



Amendment of 802.15.6

New use cases of dependable M2M

Document structure

- Table of contents
- Use Cases & Applications, categorised
  - Parameters
  - Free text description
  - CFA slide extracts
- Acknowledgements

Going forward

- The Applications summary document is now the primary applications document
  - Apps matrix now obsolete, all info from the matrix is contained in the new doc
- Seeking to endorse the document at Sep 08 meeting, for distribution with CFP
- Comments and feedback on the Summary document are requested, close mid August

Contributions

- Not all applications may be comprehensively described but major applications must be covered.
- If you can offer further details, either updated parameters or free text, please contribute
- Send content contributions to Dr. Jussi Haapola <jussi.haapola@cwc-nippon.co.jp> and Ryuji Kohno <kohno@ynu.ac.jp>

Discussion