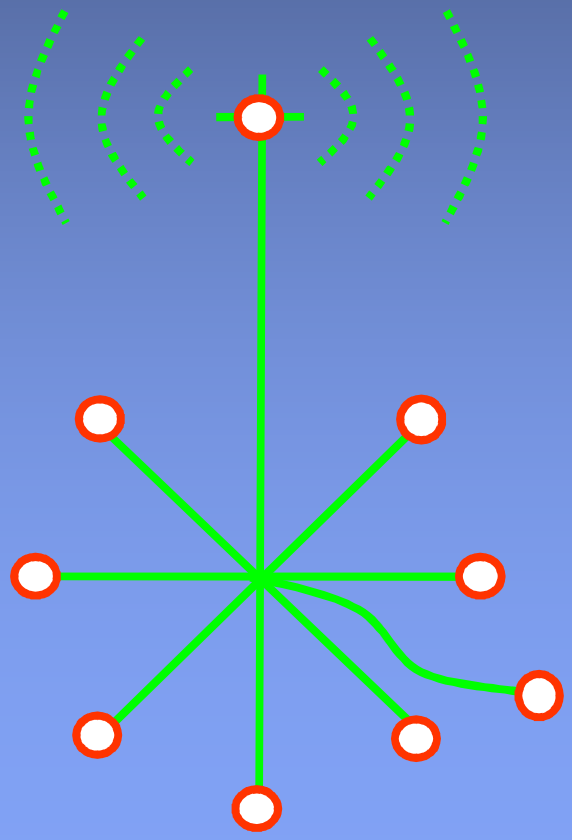
Retaw

PicoCast Solution

(PicoCast WPAN Solution ; TTA / ISO / IEC / IEEE Standard)



2011. 3

PicoCast Forum

www.picocast.org

PicoCast International Standard

ISO/IEC 29157 PHY/MAC

NP[1] → WD[2] → CD[3] → DIS/FDIS[4] → IS[5]

1) NP : New Working Item Proposal
2) WD : Working Draft
3) CD : Committee Draft
4) DIS/FDIS : Draft International Standard/Final Draft International Standard
5) IS : International Standard

IEEE 802.15.psc PHY/MAC

IG[1] → SG[2] → PAR[3] → 5C[3] → WG[4] → DDS[4] → Ballot[5] → ADS[6] → PS[7]

1) IG : Interesting Group (Reviewing Idea for Standard)
2) SG : Study Group (Finding Sponsor + Proposing PAR & 5C)
3) PAR + 5C : Project Authorization Request & 5 Criteria
4) WG : Working Group or Task Group (to develop Draft Standard)
5) Ballot : Ballot Draft Standard (WG Ballot + REVCOM Ballot + SA STD BD Ballot)
6) ADS : Approve Draft Standard (by IEEE SA BD)
7) PS : Publish Standard

IEC TC100/TA4 :PT xxxxx Application

Multi language interface protocol & system for single video

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Be fruitful and multiply; fill the earth and subdue it.

PicoCast in G20 Seoul Summit 2010

- 16Ch Multi Lingual
- 1300 Pressmen
- 140m x 70m Area
- 40 WiFi AP Interference

Certified in G20

Contents

- Personal Space Broadcasting & Communication (PSBC) Concept
- PSBC Requirements
- PicoCast Solution for PSBC
- Future PicoCast Vision
- Conclusion

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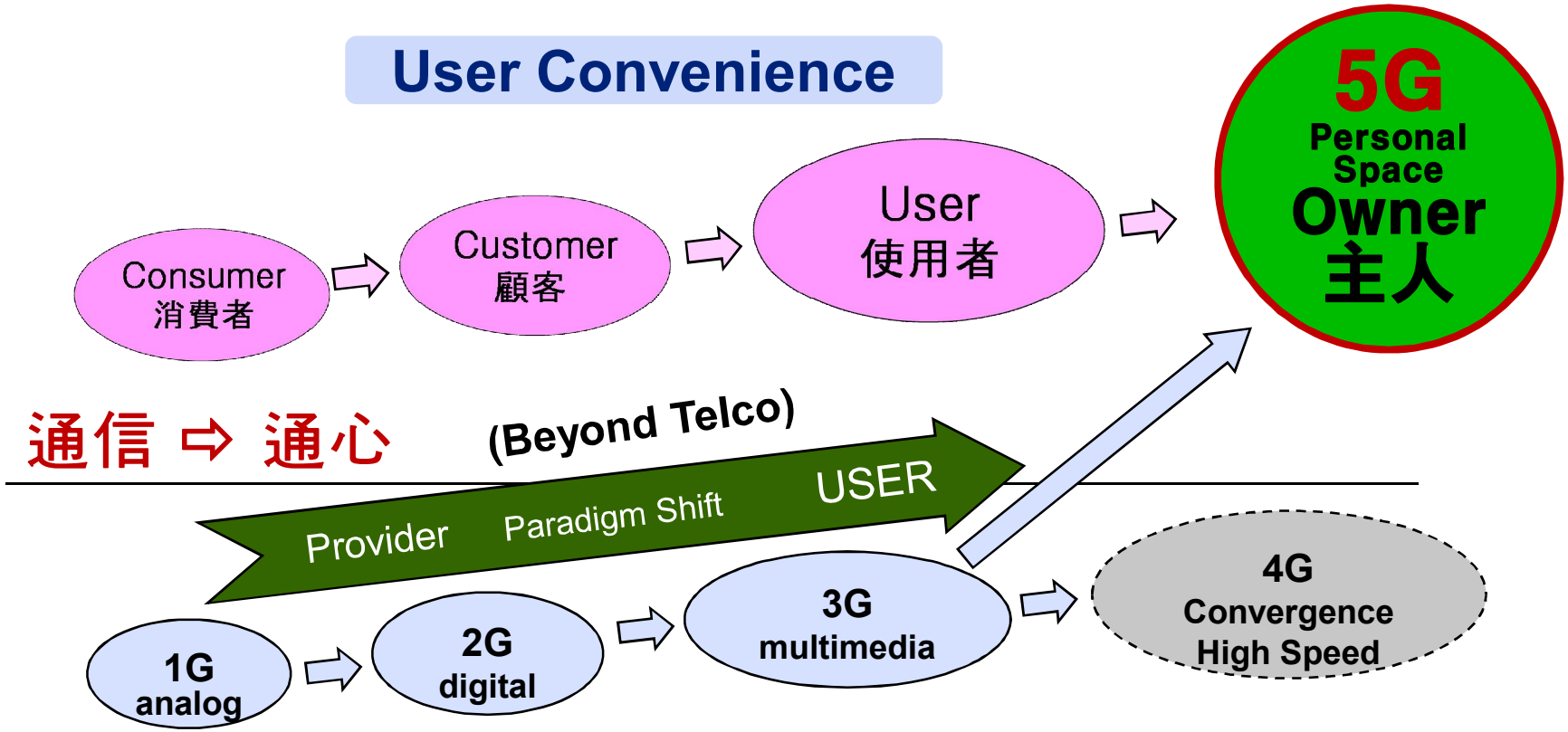
PSBC Concept

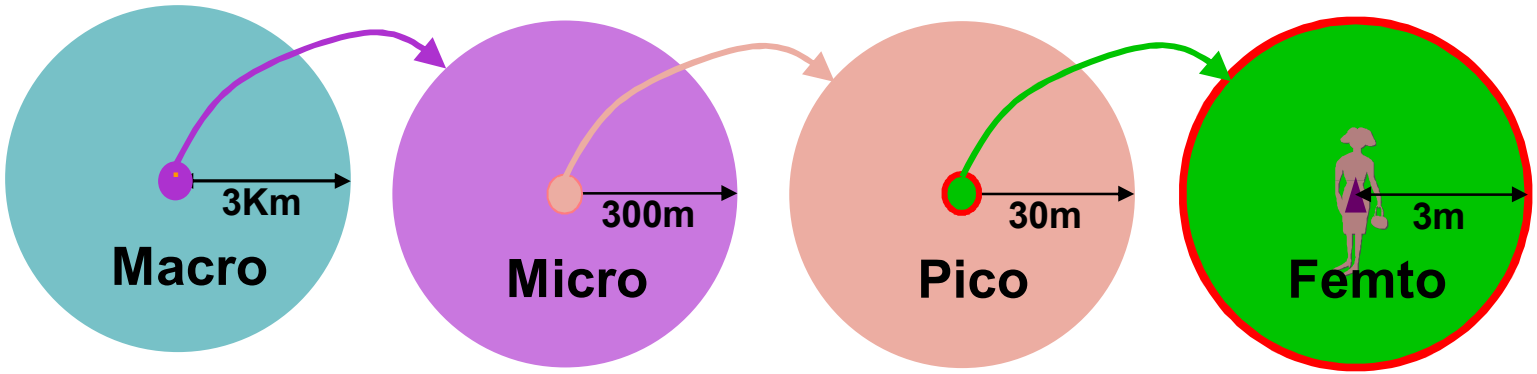
- PSBC; Personal Space Broadcasting & Communication-



Why WPAN ? - Capacity

How to increase mobile channel capacity ?

- Find new frequencies that haven't been developed?; no more available
- Find new signal processing techniques ?; only few times increasable
- The only way to achieve few thousand times capacity ; reduce cell size

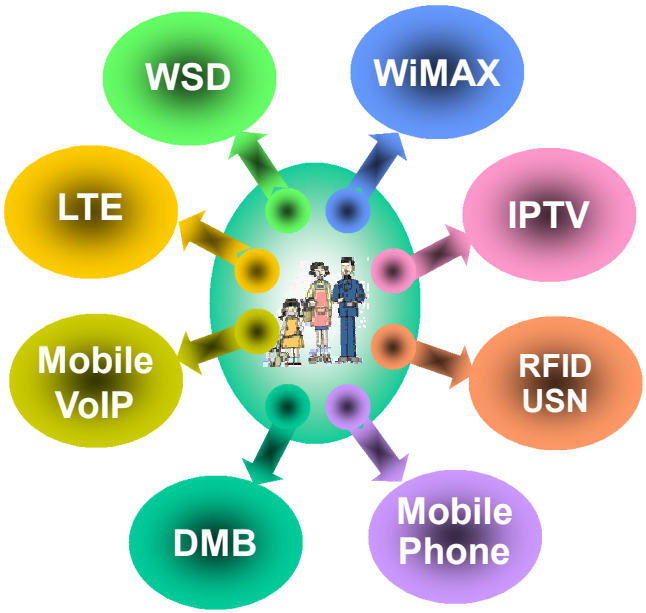


	Macro	Micro	Pico	Femto
Capacity	1	100	10,000	Low Power Personal Space Mobility
Tx Power	1	1/1,000	1/1,000,000	

Paradigm Shift – User-Oriented Terminal

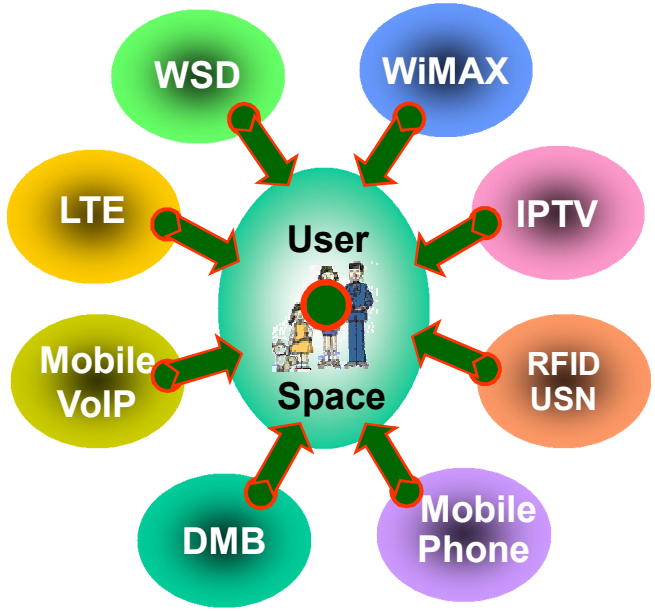
ISO/IEC 29157 IEEE802.15.psc

Provider-Oriented



User terminals should meet provider specifications

User-Oriented



Users select among services broadcasted by providers

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Be fruitful and multiply; fill the earth and subdue it.

Personal Space– 1 ; Hands-free

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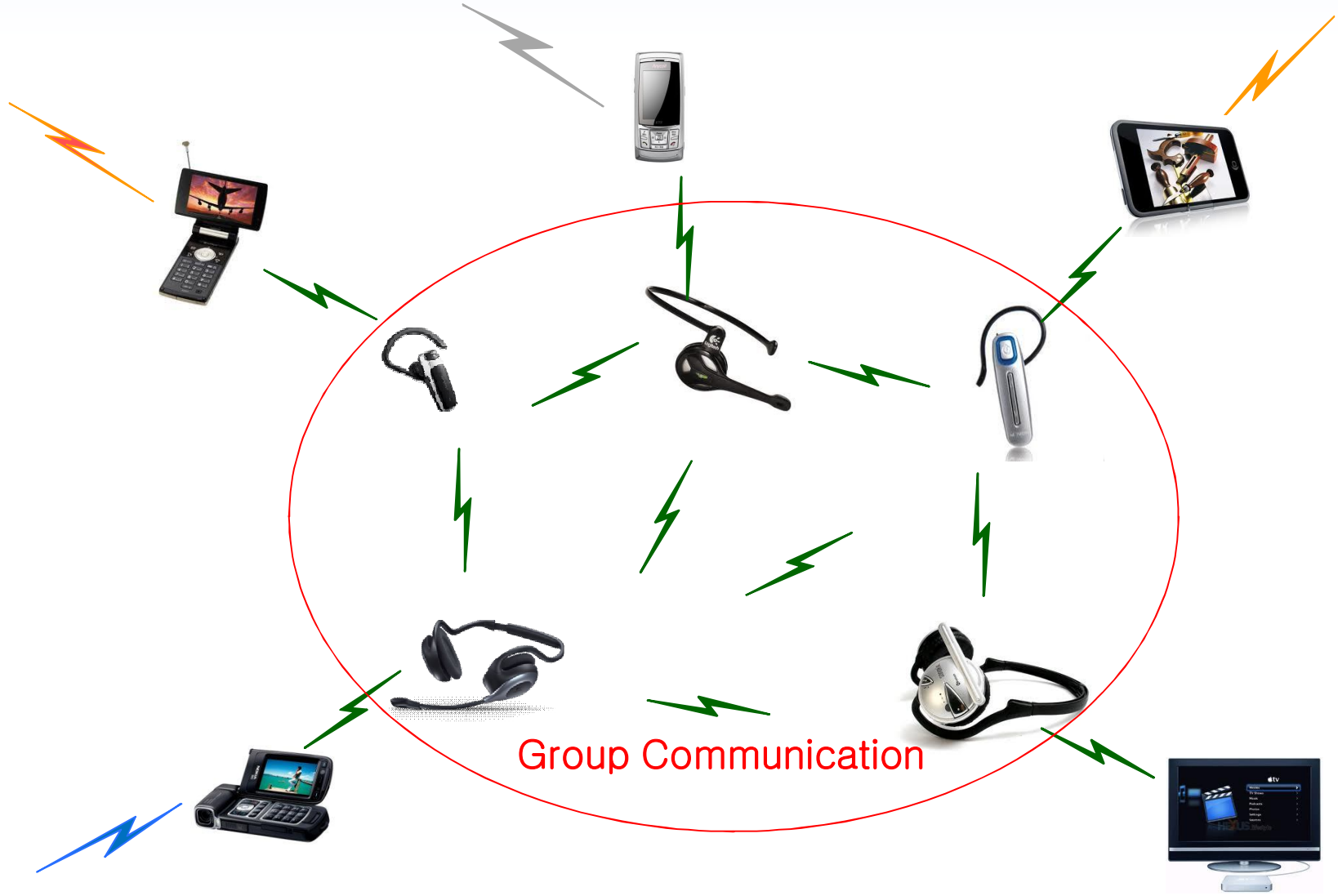
H

Be fruitful and multiply; fill the earth and subdue it.

Personal Space– 2 ; Personal Broadcasting

Personal Space– 3 ; Group Communication



Personal Space– 4 ; Chatting Group Game

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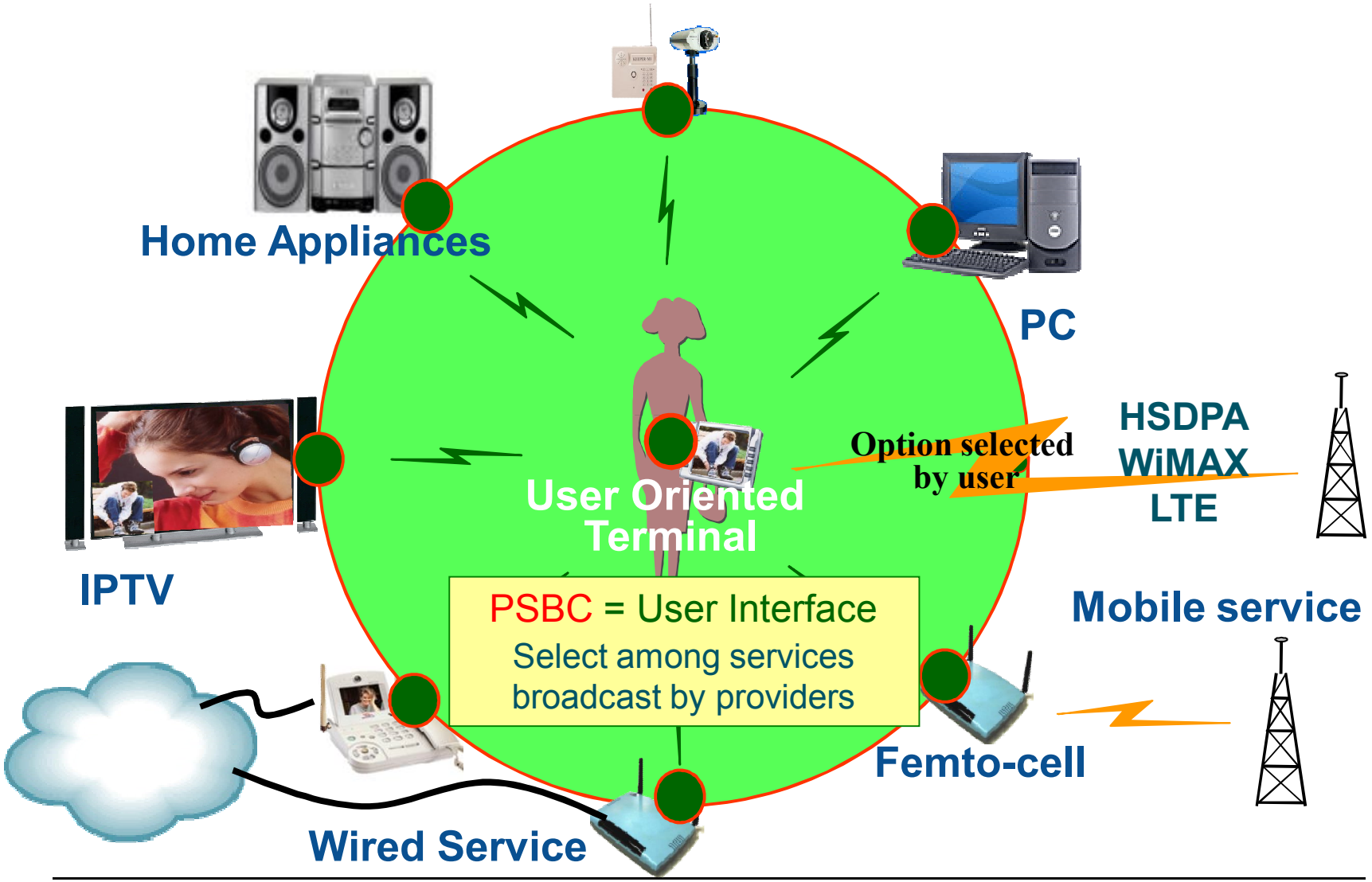
H

Be fruitful and multiply; fill the earth and subdue it.

Personal Space– 5 ; PSBC

Personal Space– 6 ; PicoCast

Power Shift – PSBC(PicoCast) Service



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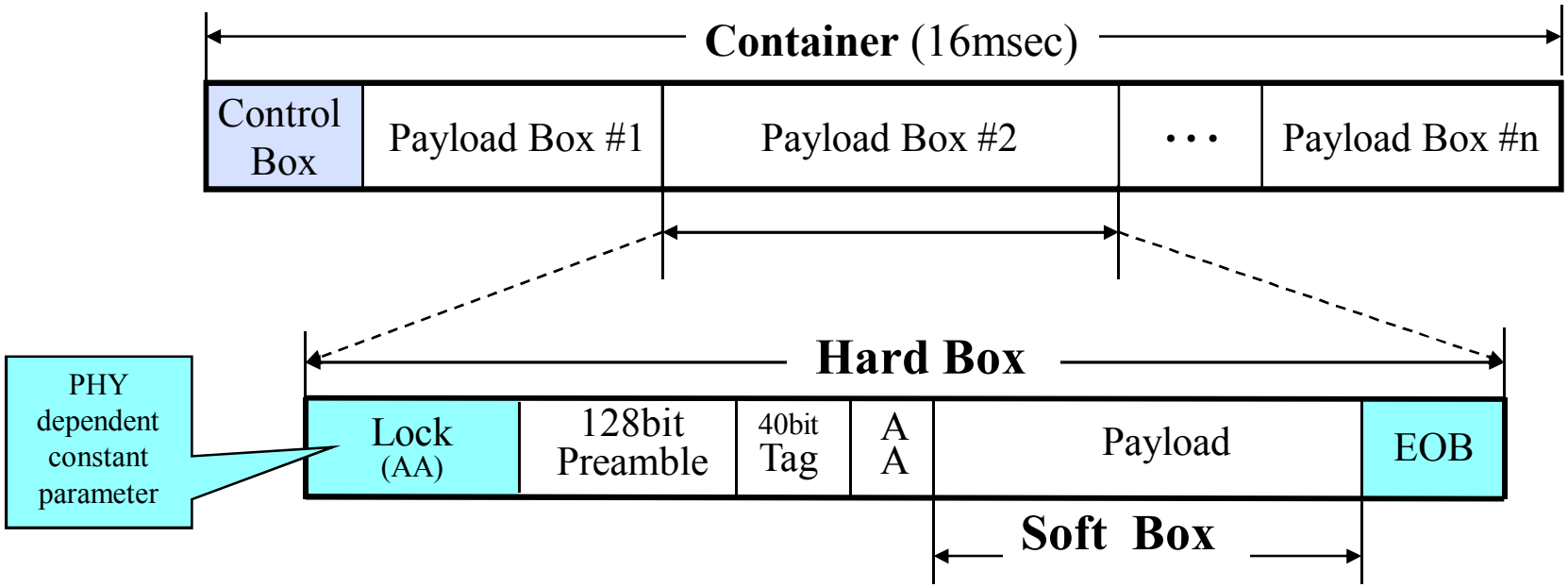
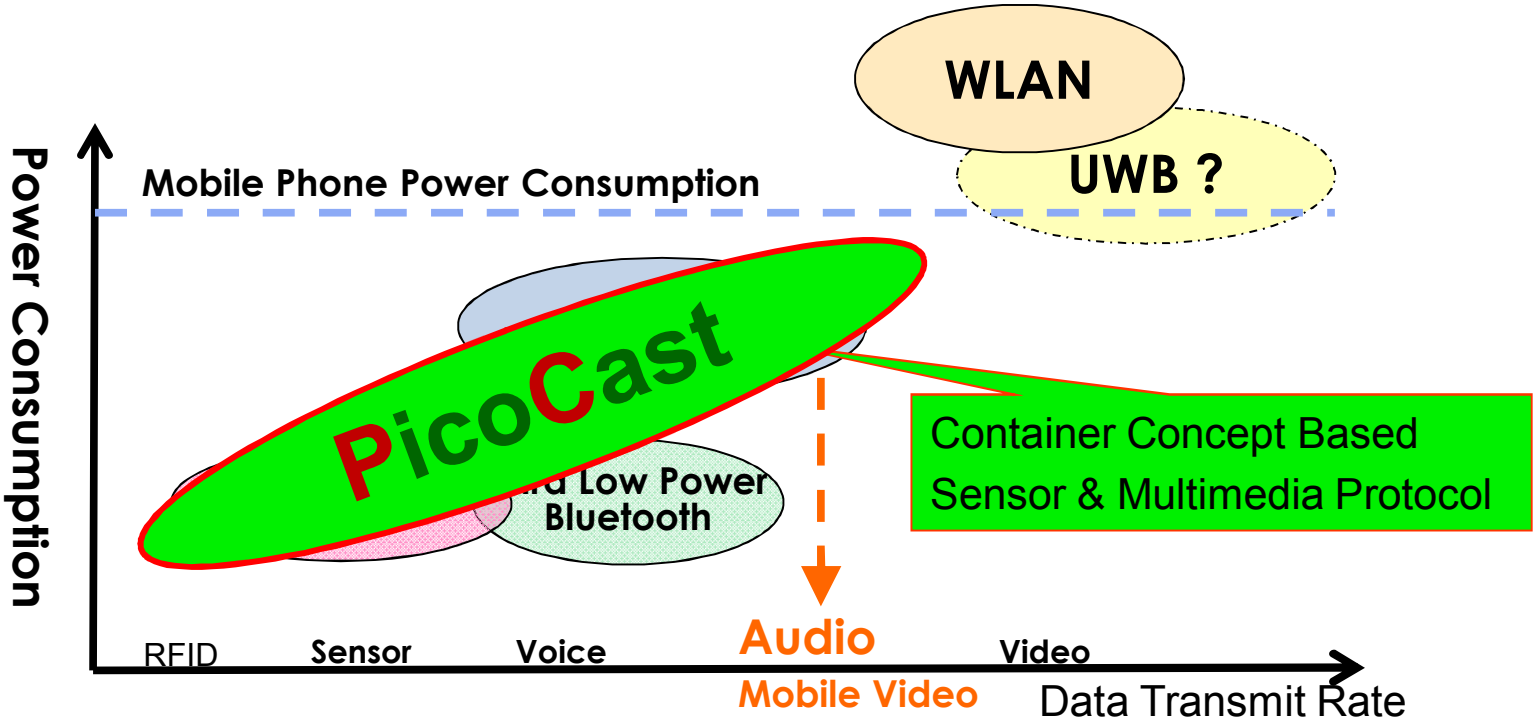
PSBC Requirements

- ISO/IEC 29157 & IEEE802.15.psc -



PSBC Requirements –Single solution for multiple services

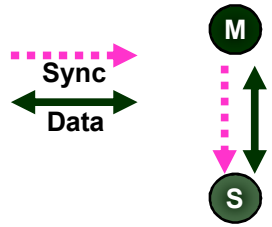


PSC needs a single solution for multiple Services

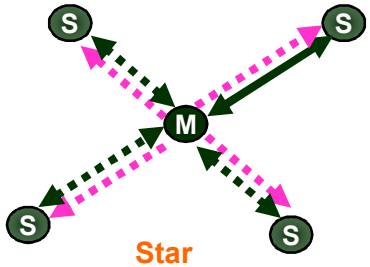
Low power consumption & Medium speed multimedia

PSBC Requirements – Protocols

Possible by Existing Solutions

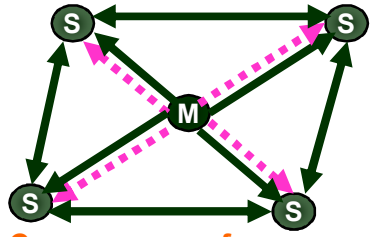


Master(Coordinator) / Slave

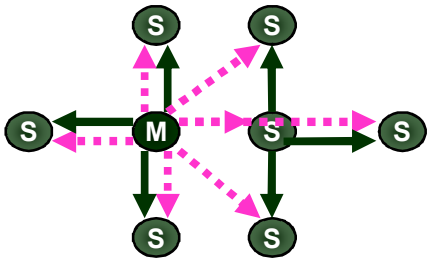


Star

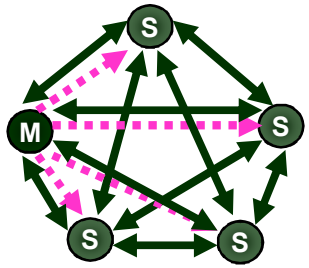
PicoCast 1.0 (ISO/IEC 29157)



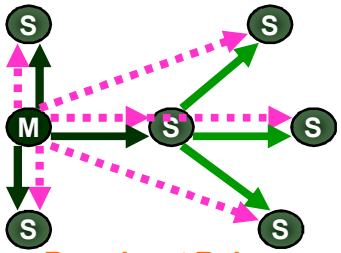
Convergence of
Broadcasting & Communication



Multicast



Group Multi Channel

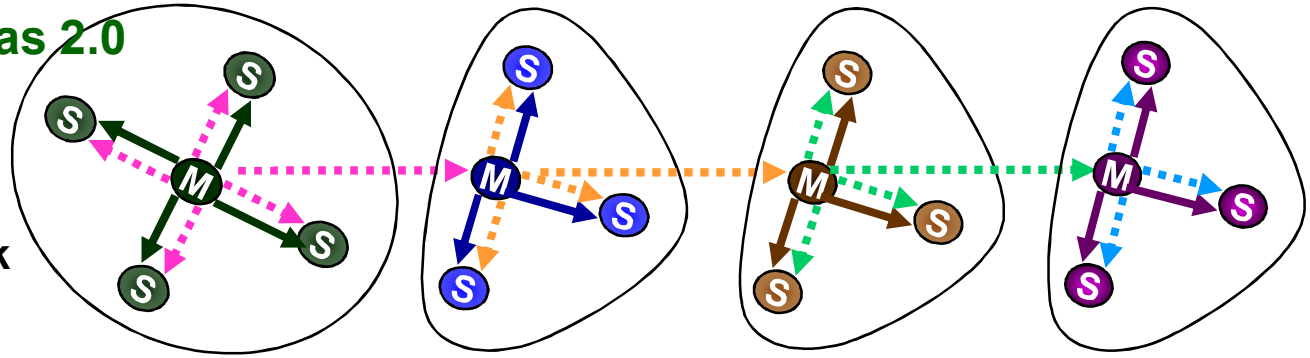


Broadcast Relay
with Single Master

Upgraded PicoCas 2.0

Sync Relay

- Ad-hoc
- Sensor Network
- Hand-over

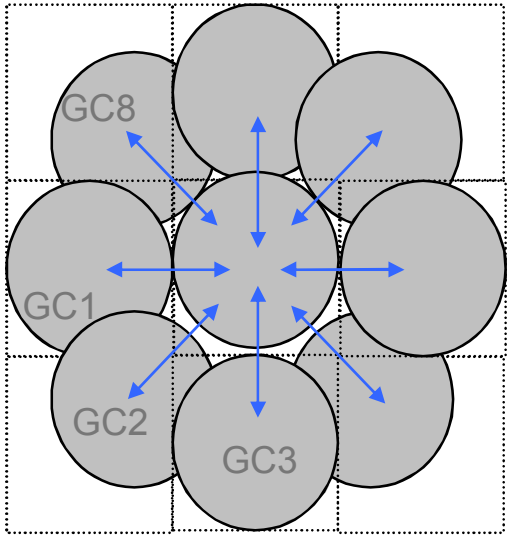


Distinct Points from Other Requirements

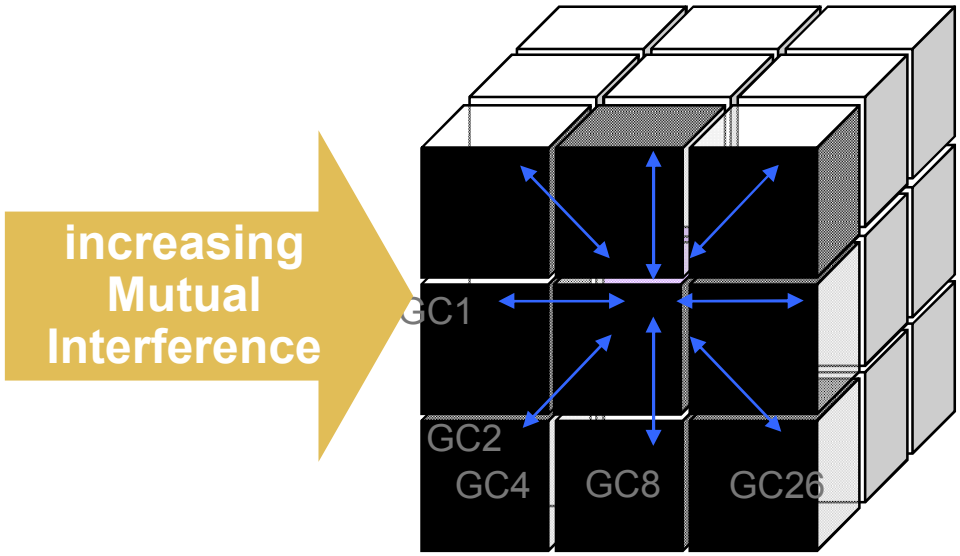
Types		WiFi	DECT	ZigBee (RF4CE)	Bluetooth (Wibree)	WBAN	?	PSC PicoCast
Major Area		Wireless Internet	Codeless Phone	Sensor	1M (3M)	Body Application	?	Personal Interface
Common	Range	~ 100m	~ 200m	~ 100m	~ 100m	10m	?	~ 30m (~100m)
	Latency	~ 100msec	~ 20m	~ 200m	~ 100m			St < 16msec Mono < 6msec
	Speed (bps)	54M	96K	250K	1M (3M)	?	?	4M (16M)
	Security						?	PHY support 64bits + 16bits
	Sync Preamble	64bits	?	64bits	64bits	?	?	128bits, 127 Kinds
Broadcasting	# of concurrent Tx	-	-	-	-	-	-	16
	# of receiver	-	-	-	-	-	-	No limit
	Sync Relay	X	X	X	X	X	?	O
	Quality	-	-	-	-	-	?	Wired Quality
VoIP	Arial Channel Capacity	-	-	-	-	-	?	128ch
	Soft Hand-over	X	X	X	X	X	?	O
	Internet Radio convergence	X	X	X	X	X	?	O

PSBC Requirements – 3D Cell Planning

- 2-D



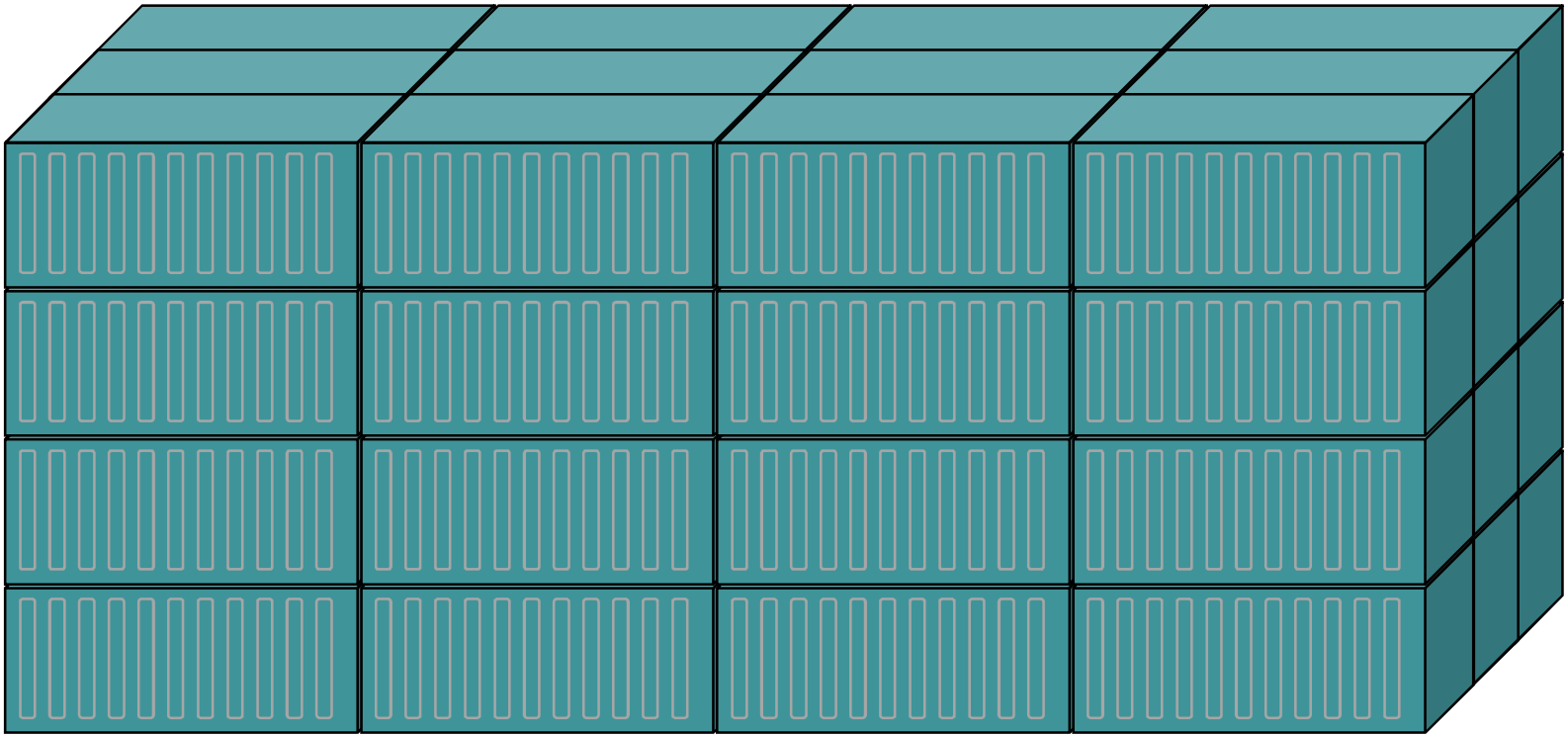
- 3-D



Self Organizing Cell Planning is inevitable

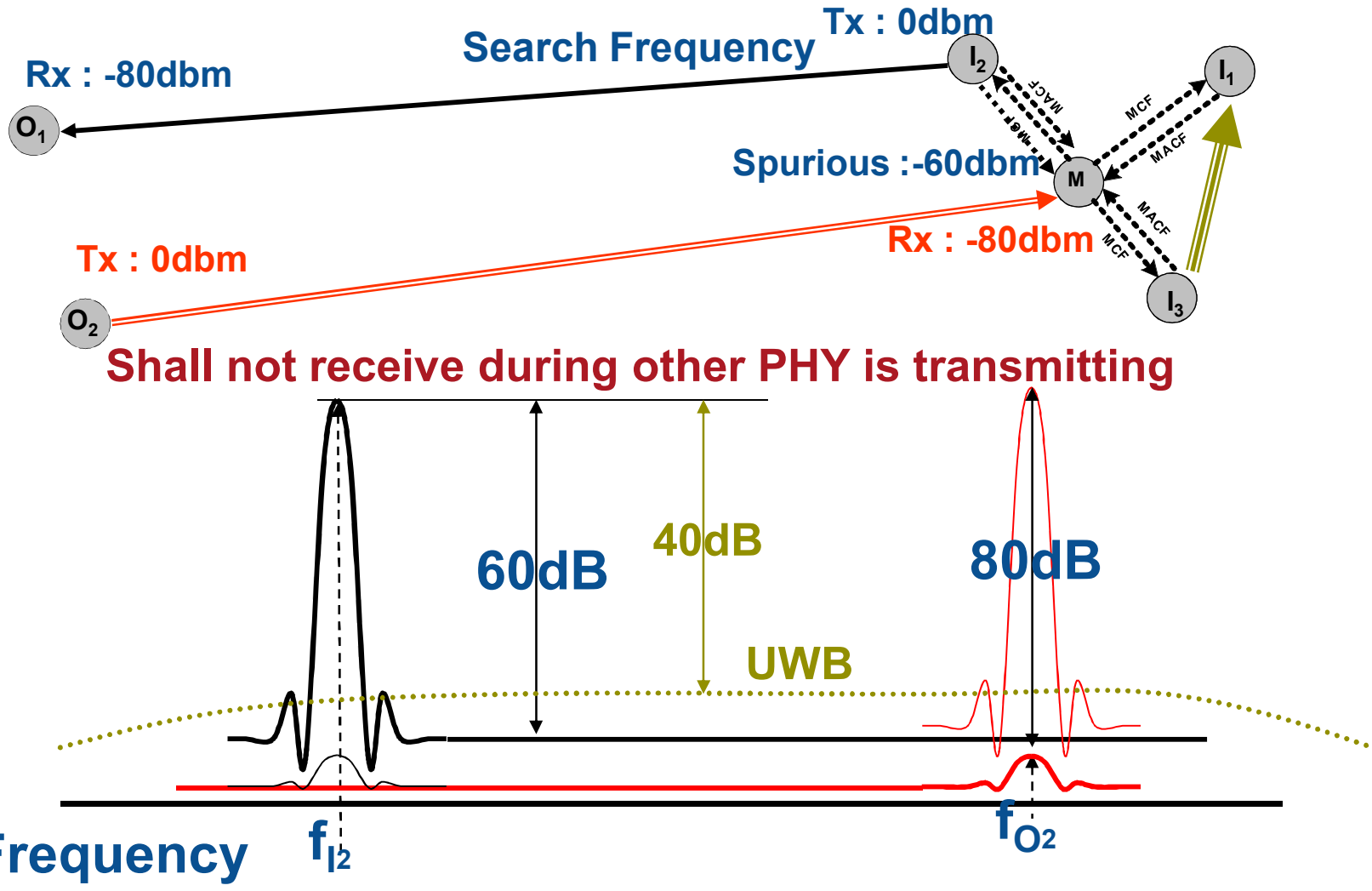
Container Concept is Required to avoid mutual interference in dense environment

PSBC Requirements –Container Structure

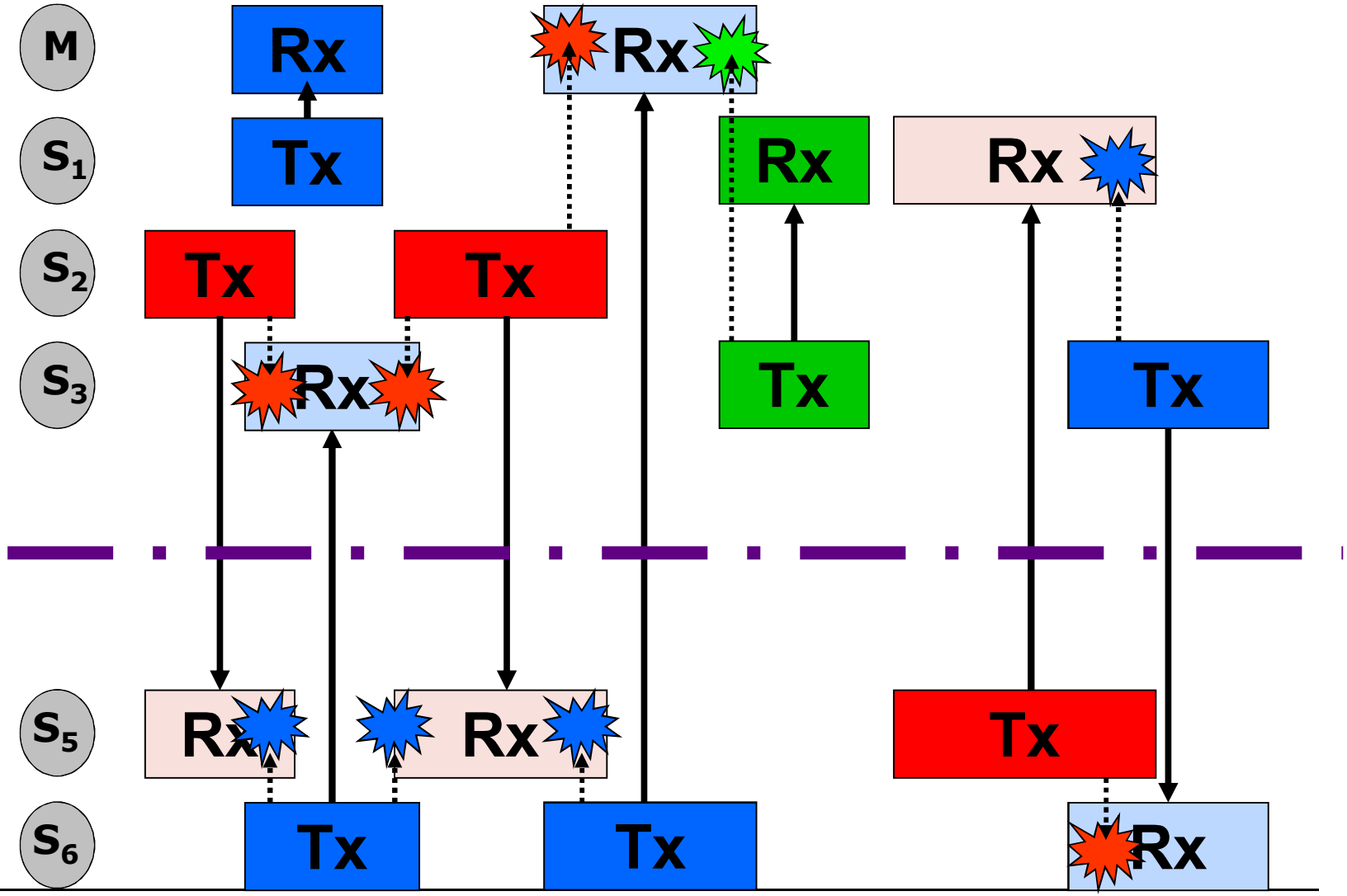


Higher synchronization performance is required ; 128bits preamble

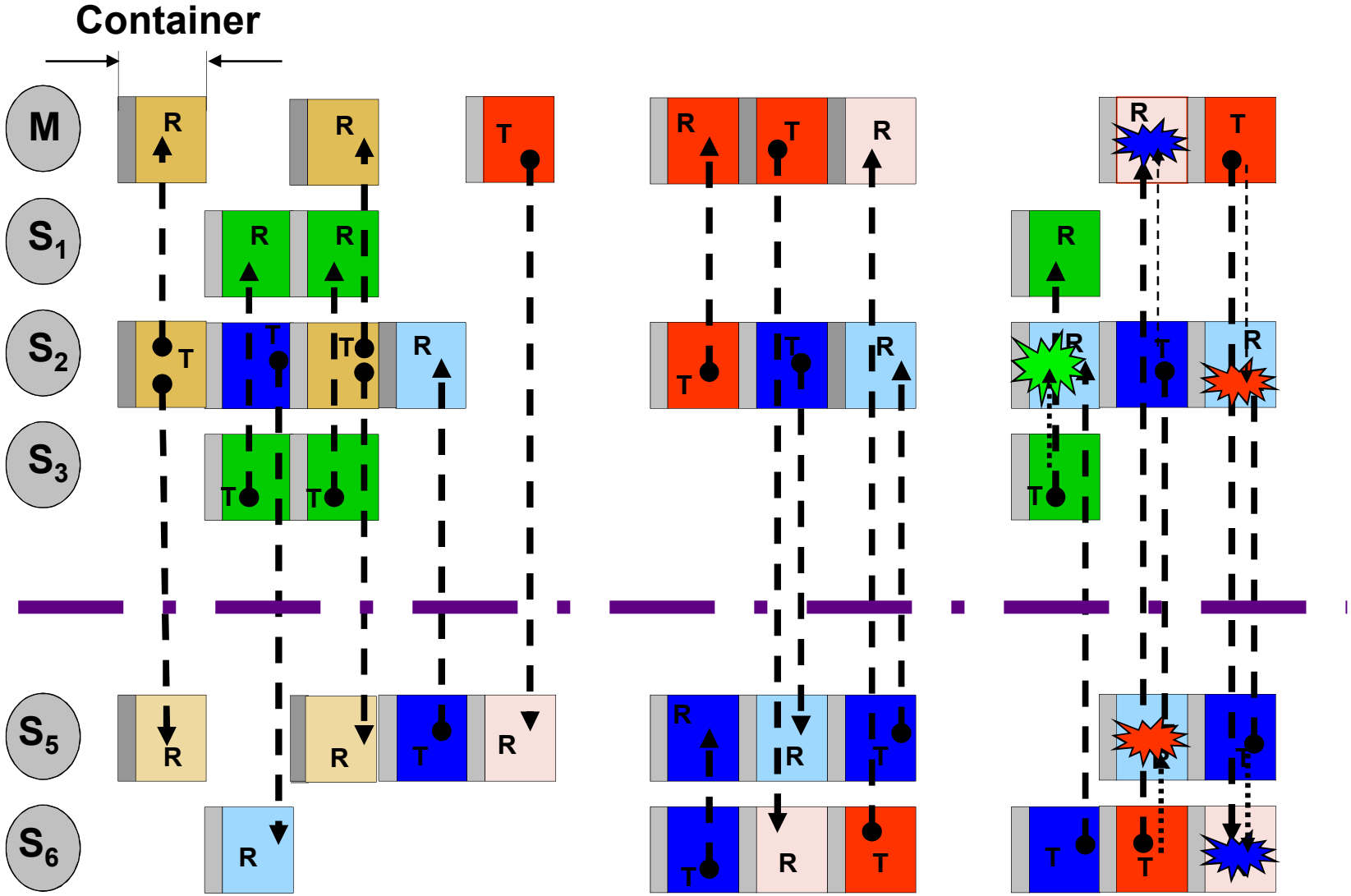
PSBC Requirements – Evade from mutual interference



Mutual Interference of existing solution



PSBC Requirements – Container Structured Protocol



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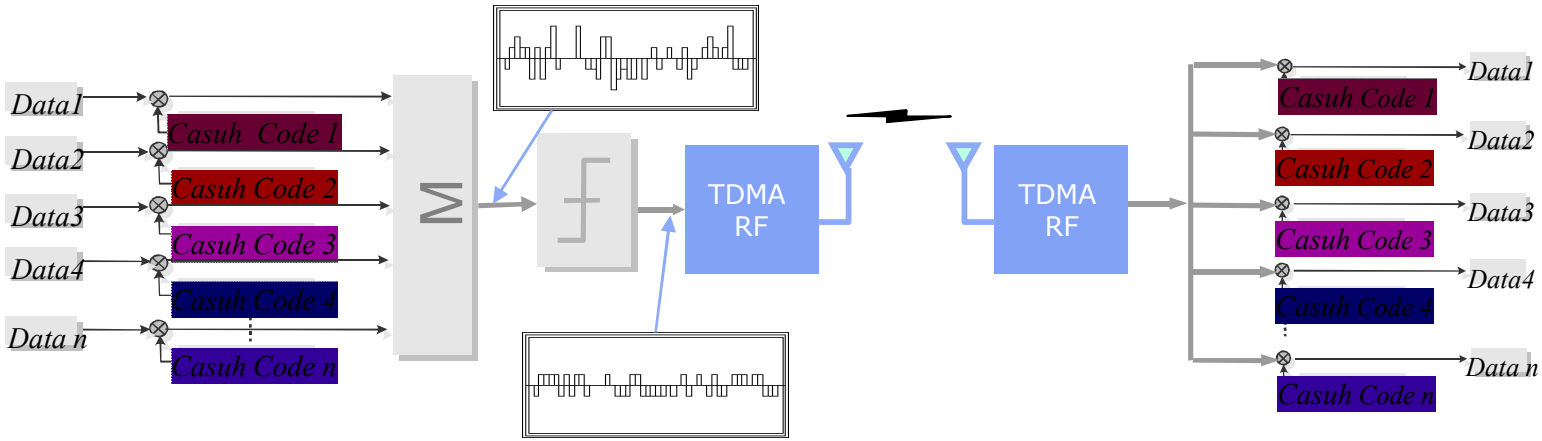
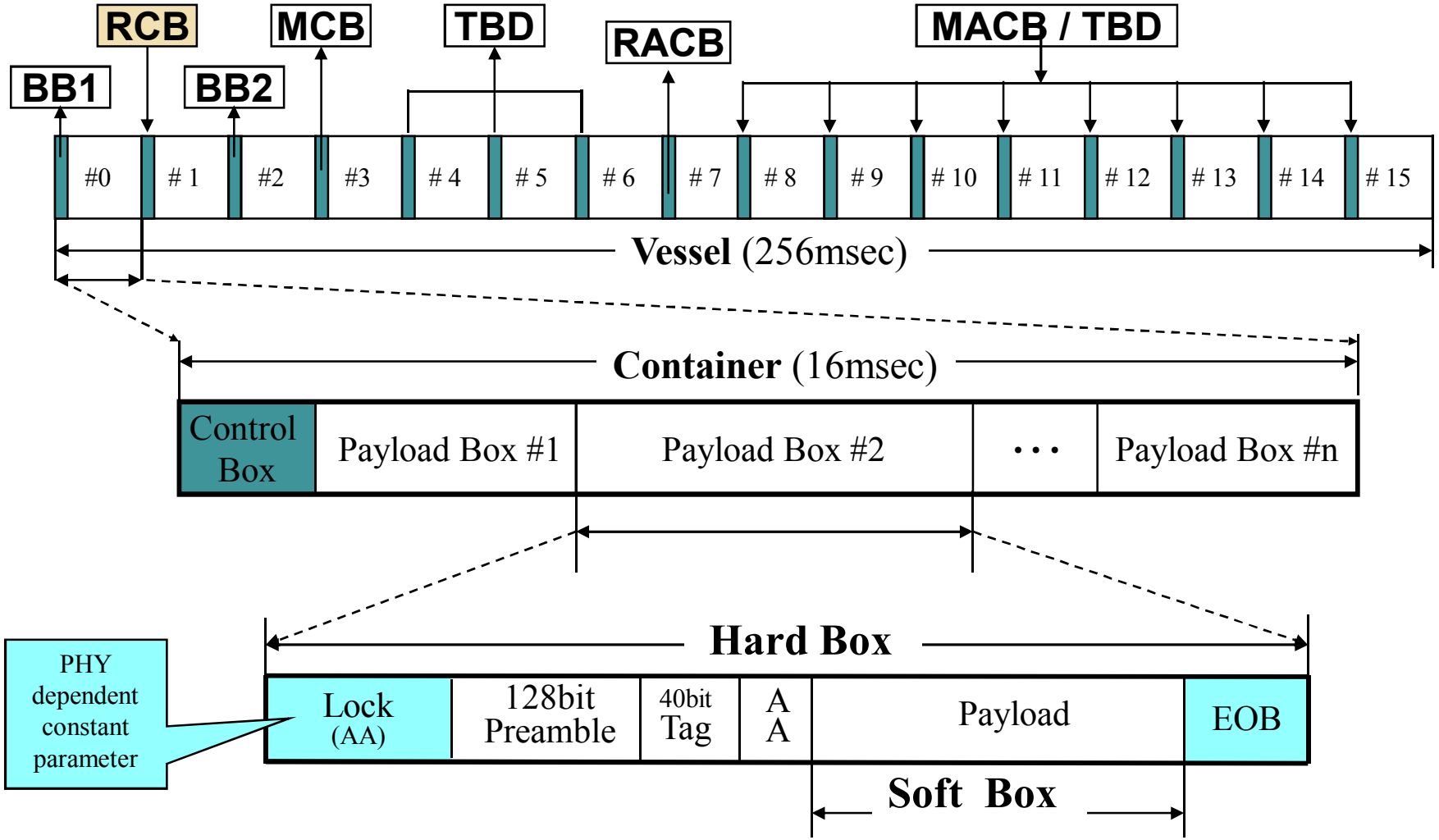
PicoCast Solution for PSBC

- PicoCast Protocol -



'Ubiquitous and Essential Technology Like WATER'

Synchronized Container Structure



Comparison of Low Power Wireless Solutions

Types	WiFi	DECT	ZigBee (RF4CE)	Bluetooth (Wibree)	PSBC (PicoCast)
Speed (bps)	54M	96K	250K	1M (3M)	1M (16M)
Broadcasting (Local Ad.)	△	△	△	X	O
Hands Free	X	△	X	O	O
Mobile VoIP	O	O	X	X	O
2-way Remote	X	X	△	△	O
Conference	△	X	X	X	O
Microphone	X	X	X	X	O
Stereo Ear-set	X	X	X	O	O
TV, Game Headset	X	X	X	X	O
Mobile Video	O	X	X	△	O
5.1ch Speaker	O	X	X	X	O
Sensor	X	X	O	△	O
Container	**X**	**X**	**X**	**X**	**O**

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Be fruitful and multiply; fill the earth and subdue it.

PicoCast ? – Different Points to Other Solutions

1. **2-Way Personal Broadcasting ;**
   - Unlimited number of receivers (open or closed)
   - Multi channel selection (2,3,4 ch)
2. **Low delay for Lip Synchronization ;**
   - Mono ; <7msec, Stereo ; <20msec)
3. **Convergence Service Function (Container Concept);**
   - Same system structure for radio, phone, sensor & etc.
   - Listening music and talking at the same time
   - Using wireless microphone for singing and remote controlling
4. **Abundant VoIP Channel Capacity**
   - Ch No. / 1AP : 32Ch (PicoCast 1.0), 128Ch(PicoCast 2.0)
   - Ch No. for full Band ; 128Ch (PicoCast 1.0), 512Ch(PicoCast 2.0)
5. **High Level Security**
   - Using Binary CDMA based code
   - Group code ; 64 bits, Protect code ; 16bits, Scan code ; 7bit

PicoCast ? – Successful Products with 5th SIP Chip

Wireless speaker & Microphone

Wireless Microphone & Receiver

2-way Education System

Wireless Conference System

Karaoke System

Tour Guide System

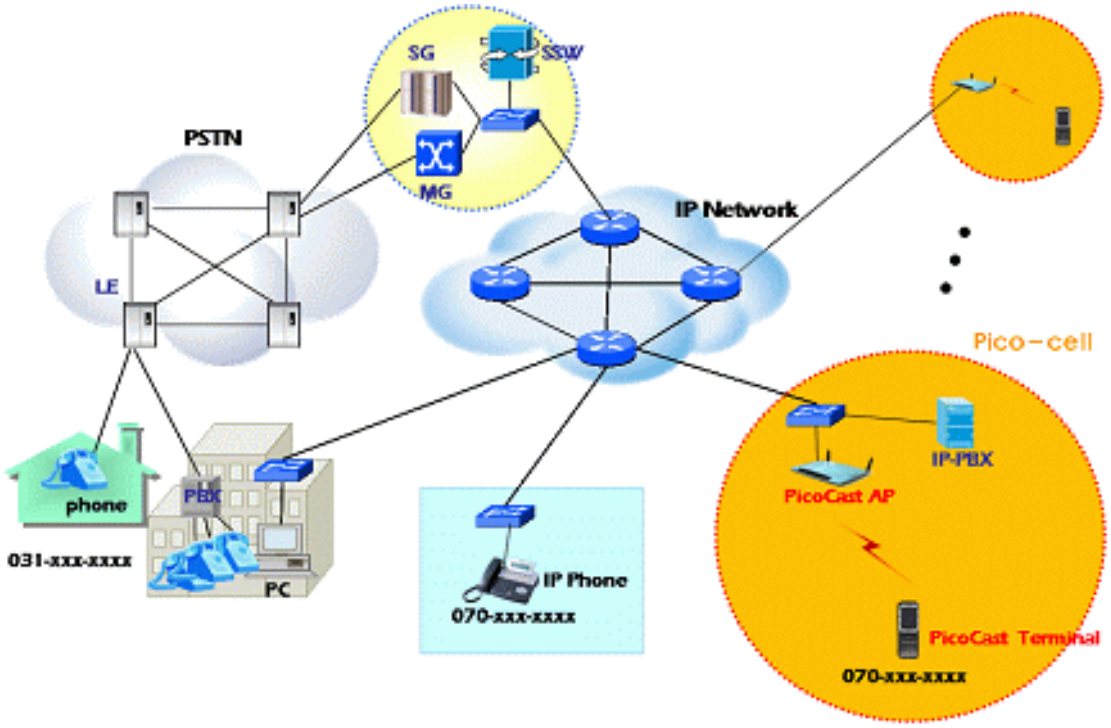
Wireless Keyphone System

Home Karaoke System

Portable Conference Master

Wireless (Mobile) VoIP:
Mobile VoIP, Wireless PBX

Channel capacity
Concurrent active channels
Soft handover
Privacy
Repeater - Cell extender



Group games

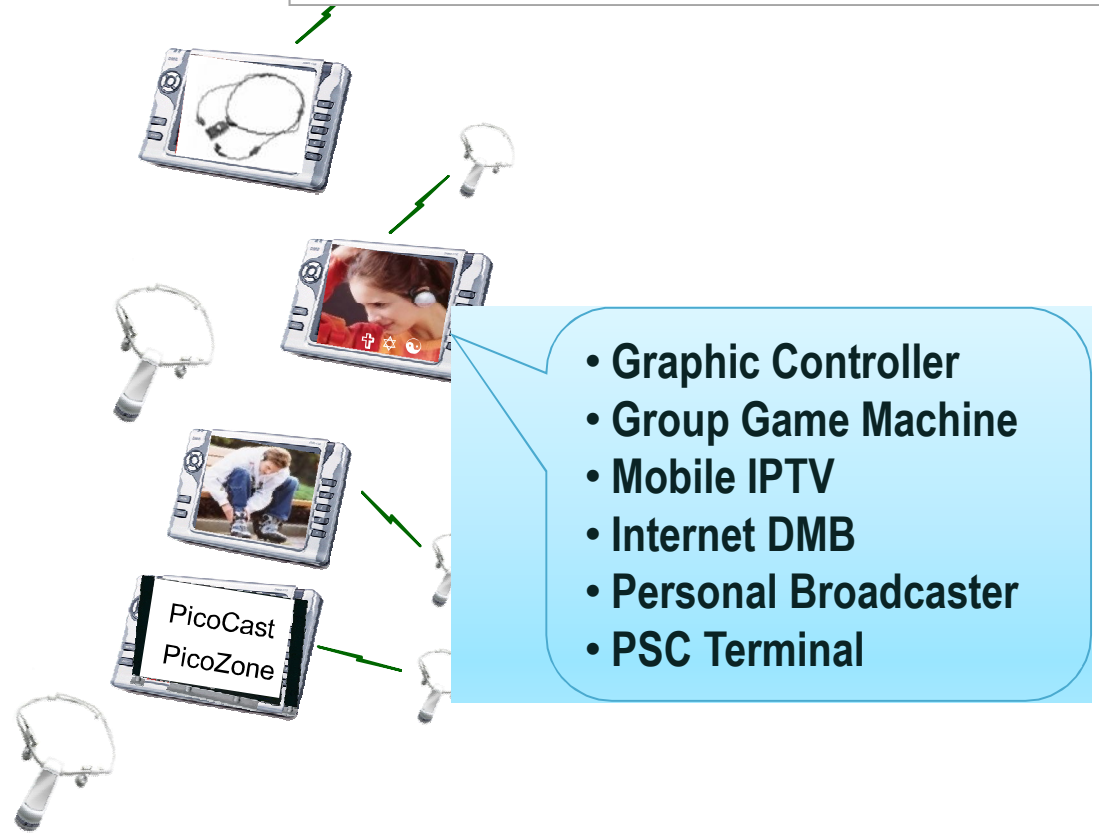
Latency: < 16ms
Wired Voice quality
Channel capacity
Concurrent active channels

Sure, it is.
Let's enjoy
Group Game…

Thanks, Grandpa.
"Smarterphone"
is also a
Chatting Game
Machine

Personal media: CD quality music, video, remote controller

Latency: < 16ms
Data rate: < 4M bps
Convergence: audio, video, control
Channel capacity
Concurrent active channels



- Graphic Controller
- Group Game Machine
- Mobile IPTV
- Internet DMB
- Personal Broadcaster
- PSC Terminal

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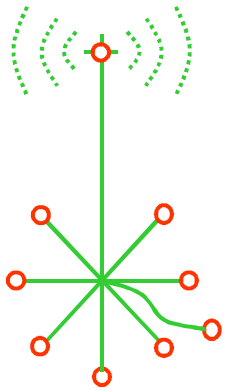
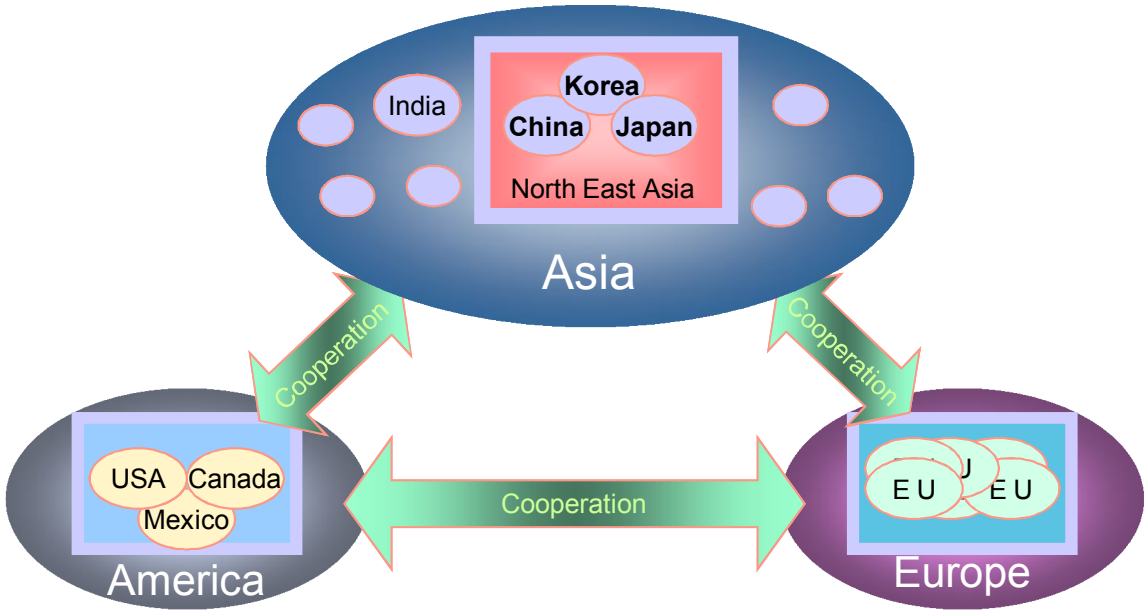
PicoCast Vision

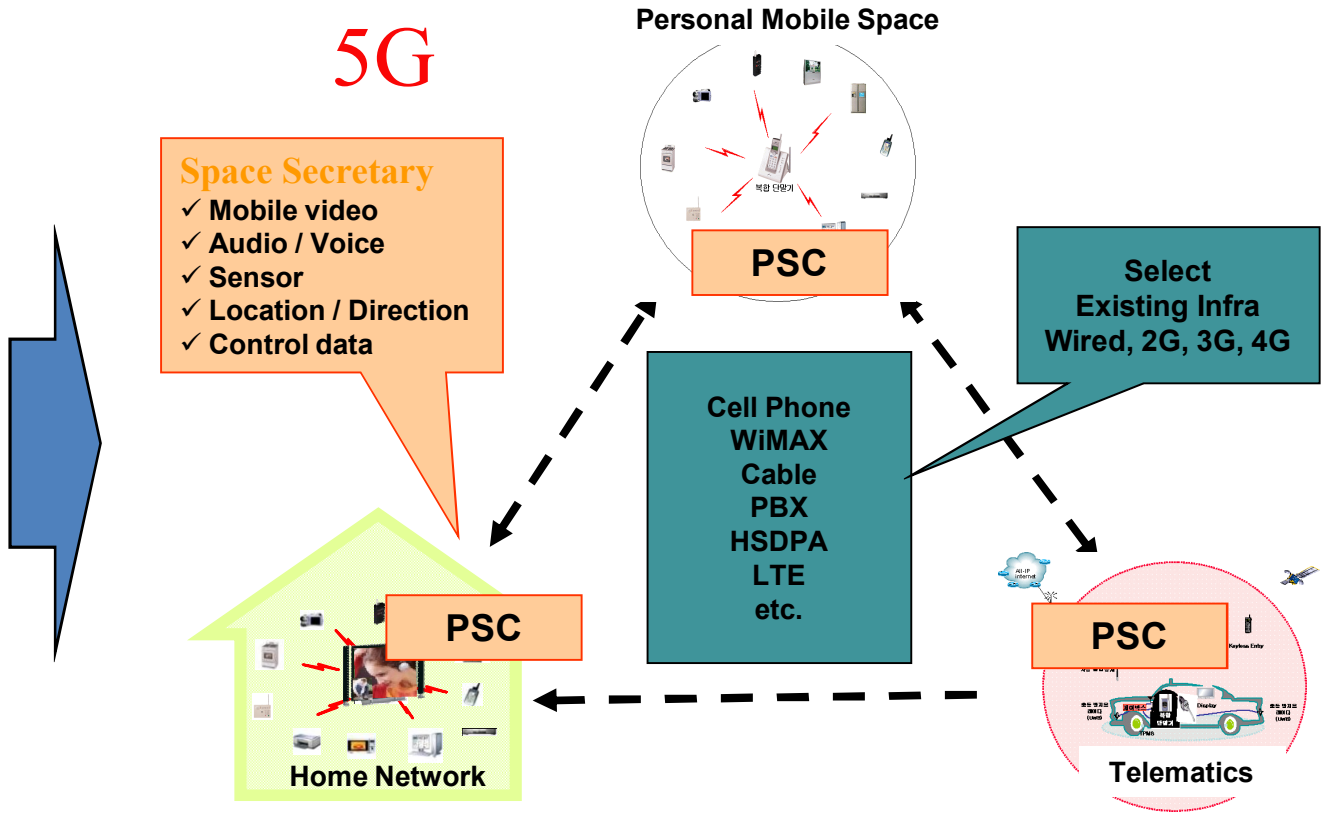




Korea is known as an incubator of new technology

We envision that, in the future, the user will be the center of the services and the Personal Space Communications will be the common interface to the environments the user moves into..

- Broadcasting /w interactive comm.
- Wireless (Mobile) VoIP:
- Group games
- Personal media
- Wireless audio
- Personal sensor network



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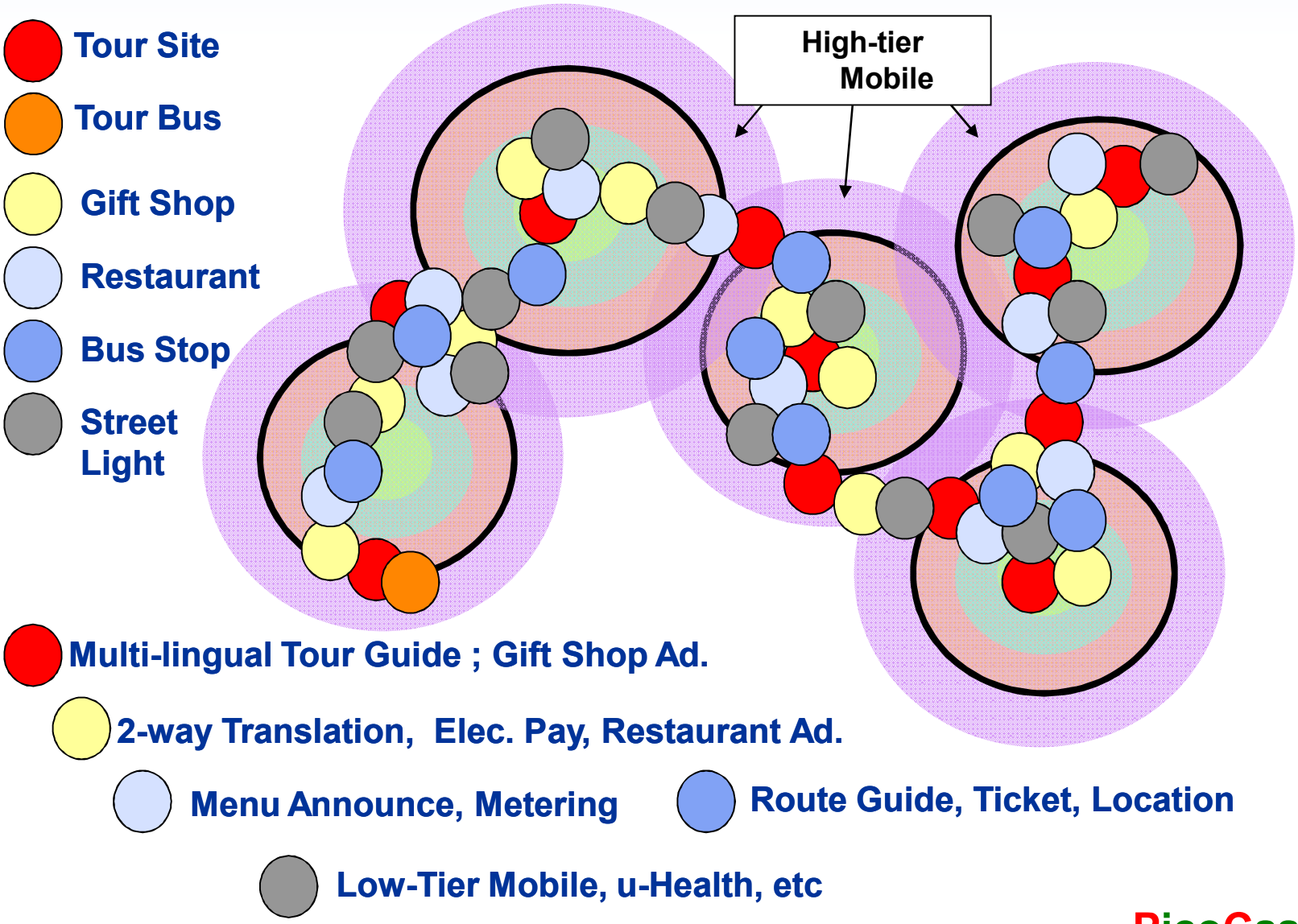
Personal Story Telling Tour (PSTT)



Conclusions

- What is the PSBC(Personal Space Broadcasting & Communication) ?
  - Facilities surrounding users can be automatically configured to user preference.
  - The user interface environment within user space follows when a person moves.
  - It provides broadcast, multicast, communication & sensor convergence service.
  - User terminal can select a service among services broadcast by providers.
  - It could be leading & killer application of Ubiquitous services.
- What are the PSBC Requirements ?
  - Service convergence with single solution; Especially broadcasting is necessary.
  - 3-D frequency planning to avoid mutual interference in dense environment.
  - Enough capacity to support ubiquitous wireless traffic; 1000 times increase
  - Soft handover between AP only by protocol without additional device.
- Why PicoCast solution is suitable for PSBC ?
  - Dual support for both low power sensor and high speed multimedia.
  - Container concept to reject mutual interference and converge various services.
  - Abundant channel capacity based on avoidance of mutual interference.
  - Both of major international standard; ISO/IEC 29157(finalized) & IEEE.802.15.psc
- PicoCast Protocol can be used for 5G mobile communication, too.
  - PSC personal space & mobile femto-cell have almost the same structure.
  - In the future, the cell size of 5G will become pico-cell because of capacity.
  - 5G network merely a connection of user oriented mobile spaces (PSBC).
  - White space devise requirements would be satisfied with PicoCast protocol.

Thank You !!!

Q & A

Seung Moon Ryu

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retaw@picocast.org