

Outputs from the Research and Technology Group (RTG) IST-104 “Cognitive Radio in NATO II”

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“Cognitive in NATO II” in a nutshell

- Jan. 2012 - Dec. 2015
- Countries: BEL, CAN, ESP, FRA, GER, NOR, POL, TUR
- Technical Team Leader: Christophe LE MARTRET
- Jan. 2008 - Dec. 2011 : IST-077 RTG-035 “CR in NATO”

Contributors

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RTG objectives

- Propose and study the “baby” / first steps for implementing CR-like features in NATO communication systems.
- Approach : focus on **Spectrum Management**.

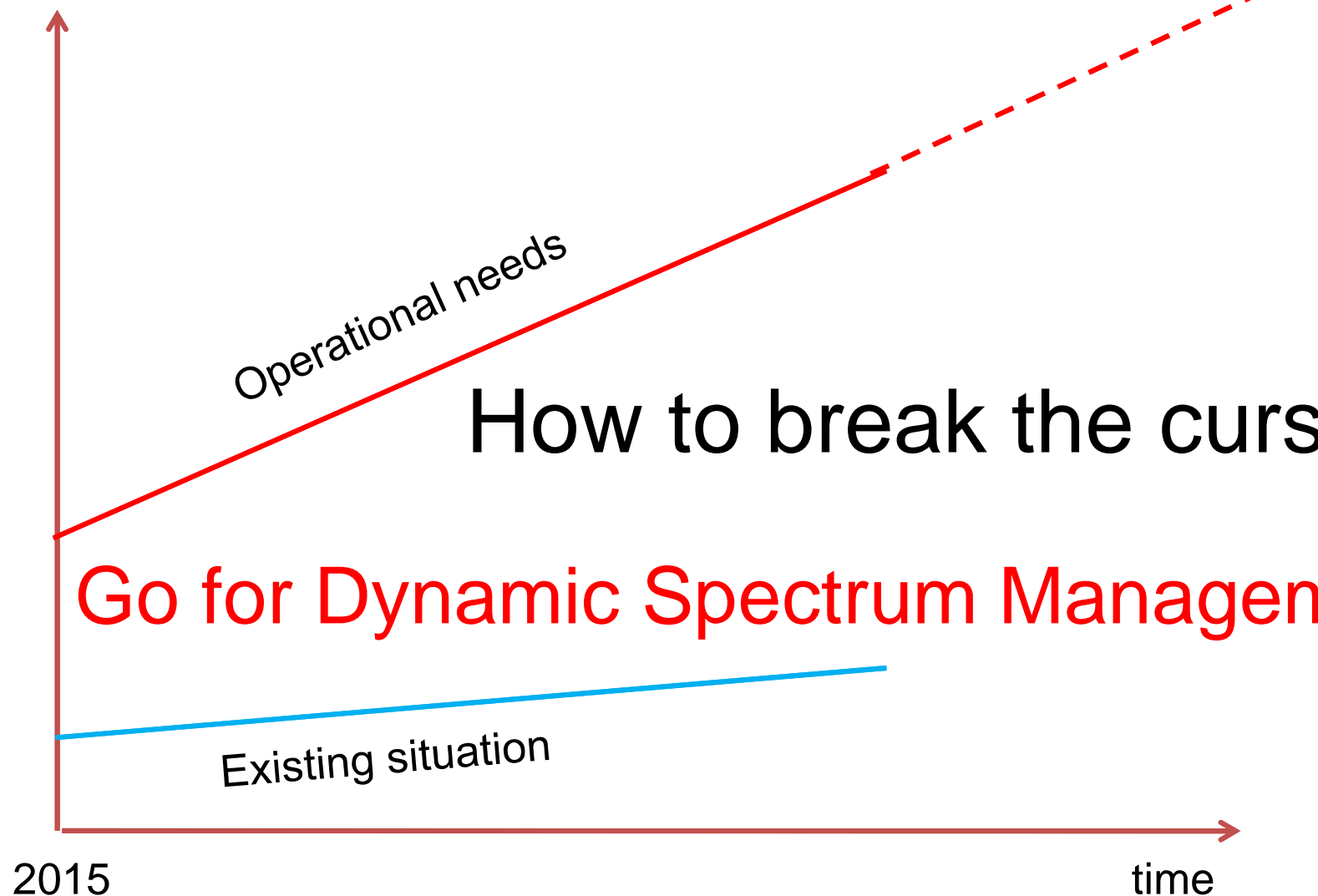
Is there any piece of spectrum left for my system?



TV-hill during ISAF operation

Facts

Required bandwidth



How to break the curse?

Go for Dynamic Spectrum Management!

Change of paradigm

- Current spectrum management procedures
 - Spectrum management is **pre-planned** (deconflicted)
 - Not reactive, waste of bandwidth
 - Transmitters = **fixed parameters**: BW, modul., power...
 - SDR will allow to adapt these parameters over time
- **Spectrum management needs to evolve!**

Project achievements

- Step 1
 - Optimization of existing procedures keeping **deconflicted allotment** principle between nations (exclusive use)
 - As it is of today, but quicker and smarter.
 - Leading to “baby” steps, short term implementation.
- Step 2
 - Allowing **sharing spectrum** between nations (shared use)
 - Change of paradigm, will necessitate time to be proven on the field and accepted as regular procedure.

Baby steps (exclusive use)

- Goal: quick improvement of existing procedures, while keeping the « exclusive use » model in between nations
- Still with no risk of harmful interference between nations
- Set of realistic proposals to be implemented in short time
- Quick improvement of spectrum usage -> more operational capabilities.

Further steps (shared use)

- Allows different nations to share/access the same spectrum at the same place
- Sharing models
 - Open access (equal rights)
 - Hierarchical access (priority-based)
 - Policy-based sharing access (preferred)
 - Access is guided by policies (rules)

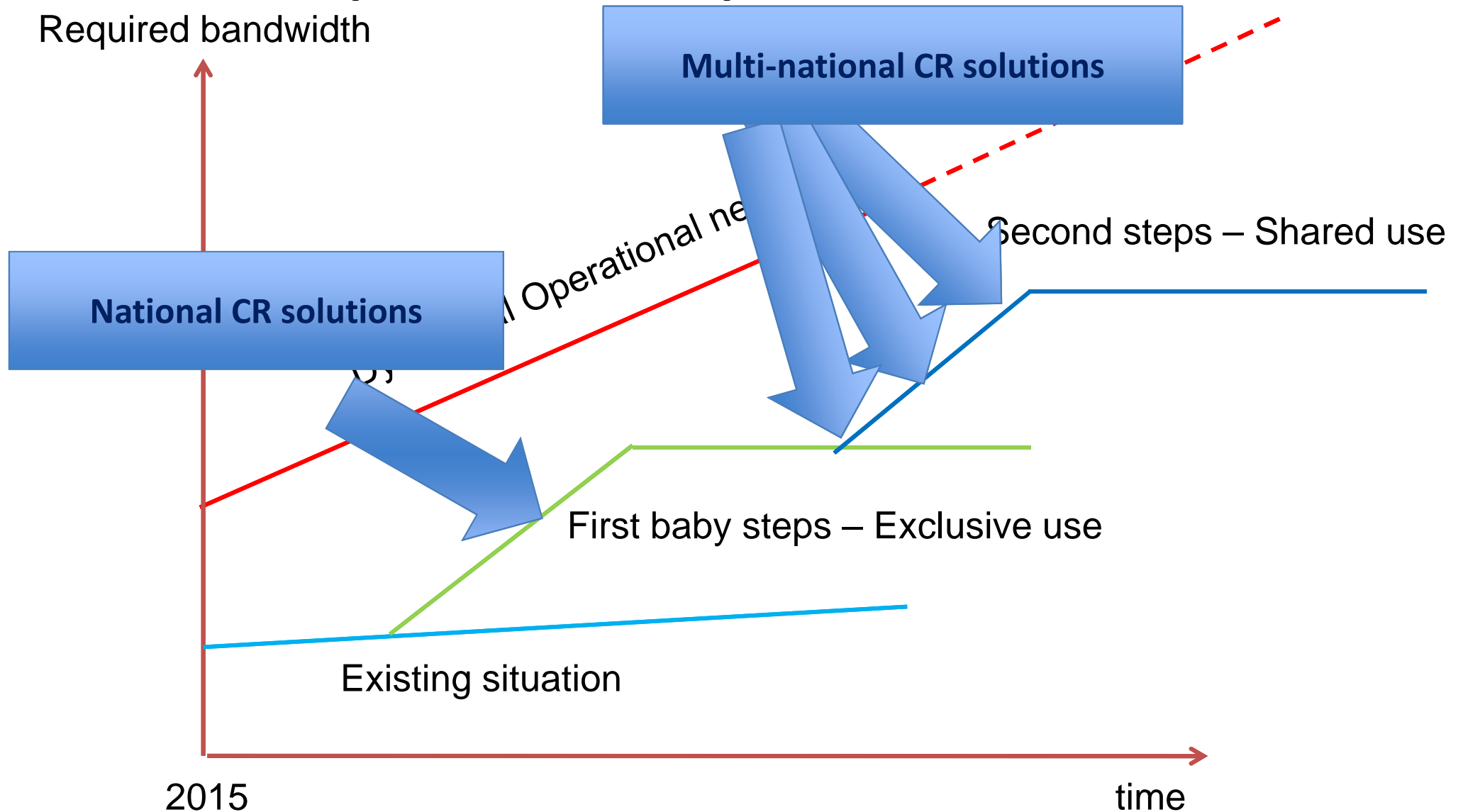
RTG recommendations (1/2)

- Start implementing baby steps as soon as possible
 - Reduce process time for spectrum assignment
 - Reduce assignment duration
 - Allow “generic” allotment
 - To handle multi-RAT/WF SDR equipment
 - Should enable nations to experiment Cognitive Radio systems within their own spectrum and to break of “Dead lock symptom” (Bart Scheers, Milcom 2012)
 - National feedbacks should play an important role in CR acceptance and development of multi-national CR waveforms.
 - Initiative should be taken by NATO to adapt existing procedures.
 - Improve prediction tools
 - Insert REM capabilities in the assignment process

RTG recommendations (2/2)

- Work on a roadmap to introduce multi-nation spectrum sharing techniques
- Work on NATO procedures to allow shared spectrum
 - Minor changes to ACP 190 identified in the report.
- Work towards STANAGs
 - On CR waveforms.
 - Initiative should be taken by NATO to launch a WG for the STANAG.
 - Start by including CR features in existing/ongoing waveforms.
 - Use outputs from RTG-140 «Cognitive Radio Networks».
 - On computer readable policy language for spectrum management.
- Work on CR equipment certification for policy loyalty

Expected improvements





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