

# IEEE DySPAN 2008 Demonstration Track Call for Proposals

## Introduction

IEEE DySPAN 2008 will provide the opportunity to conduct live demonstrations of dynamic spectrum systems and networks. This year's event will build on the huge success of the demonstrations at IEEE DySPAN 2007 by offering an invaluable opportunity to **demonstrate, experiment, and interact** with other world-leading researchers. This is a call for proposals to demonstrate systems, prototypes, and critical technology components and algorithms at IEEE DySPAN 2008.

IEEE DySPAN 2008 will be held in the Millennium Knickerbocker Hotel, Chicago, IL from Oct. 14 – 17<sup>th</sup> 2008. Further information regarding the symposium is available at <http://www.ieee-dyspan.org/2008/>

In addition to pre-planned demonstrations, unique opportunities may exist for experimentation by participants. Such opportunities include general measurements of spectral activity during the demonstration and experimentation sessions; the interaction of various, independently-developed systems and networks; and the coexistence of systems using different spectrum adaptation algorithms.

To participate in the demonstration and experimentation activities, candidates must complete the attached form to provide a description of the proposed demonstration and/or experimentation. The proposals will be evaluated by the DySPAN demonstration committee based on the following criteria:

- **Technical Significance:** the extent to which the demonstration illustrates advances in dynamic spectrum access technologies.
- **Demonstration Maturity:** the demonstration must be mature enough “to leave the lab.” Demonstrations involving RF transmissions must include *a priori* or *in situ* risk mitigation measures to ensure regulatory compliance and coexistence with other spectrum users.
- **Demonstration Supportability:** the demonstration must be performed within the capabilities and resources of the DySPAN symposium. Demonstration systems should ideally coexist with other potential demonstrations on a coordinated or uncoordinated basis.

The selected demonstrations will undergo a final review approximately 45 days prior to the symposium to ensure their operational readiness.

Accepted proposals are encouraged to submit a two to four page demonstration description to be included in the DySPAN 2008 proceedings.

## Important Dates

February 29, 2008	Complete attached proposal form and submit to <a href="mailto:dyspandemos@ctvr.ie">dyspandemos@ctvr.ie</a>
April 1, 2008	Notification of demonstration proposal acceptance
September 1, 2008	Submission deadline for demonstration paper
October 14-17, 2008	DySPAN symposium

## Regulations and transportation

Regulatory licenses will be negotiated and procured by the demonstration committee based on submitted system capabilities. It is therefore necessary to have knowledge of all possible frequency ranges a device is capable of using if certain frequencies are restricted for experimental use in Chicago.

It is the responsibility of each demonstration participant to secure shipping and handling of their equipment to and from the demonstration site. Those companies/research institutions that will ship equipment from outside of the US may wish to arrange a Carnet. The Carnet is a type of “Merchandise Passport” that can be used as proof that you are temporarily importing commercial samples or professional equipment for exhibition in the host country. US Customs and Border Security is part of the Carnet program as are many other countries. Demonstrators from countries that do not participate in this program will need to contact their local customs officials to facilitate transportation. A suitable link to learn more about Carnets is: <http://www.uscib.org/index.asp?documentID=718>

Other points of note:

- Moving large amounts of electronics through an airport (especially customs) is going to take time. Consider using airfreight for transferring equipment. Otherwise, prepare well in advance and be sure to have all supporting documentation on hand.
- It is also advised that participants consider insurance for any hardware during the symposium and shipping process.
- To obtain a shipping address for the symposium, send a request to [dyspandemos@ctvr.ie](mailto:dyspandemos@ctvr.ie)

## Contact Information

Tom Rondeau and Keith Nolan

Email: [dyspandemos@ctvr.ie](mailto:dyspandemos@ctvr.ie)

Phone: +353 1-8968443

[www.ieee-dyspan.org/2008/](http://www.ieee-dyspan.org/2008/)

# DySPAN 2008 Demonstration Proposal

Complete the following form with as much detail as possible. This information will be used to evaluate suitability of admission into the DySPAN Demonstration Session based on the technical significance to the symposium, demonstration maturity, and demonstration supportability.

## Contact Information

Primary Contact Name	Monisha Ghosh
Organization	Philips Research North America
Address	345 Scarborough Road
	Briarcliff Manor, NY 10514
Phone Number	(914) 945-6415
Email Address	monisha.ghosh@philips.com

## Abstract

Provide a concise (300 words) summary of the proposed demonstration and its technical significance.

**With the switch-over to digital television in February 2009, the UHF band will become available for unlicensed use, pending the final FCC rule and order. The incumbents that need to be protected are digital television and wireless microphone signals. Hence, some of the key requirements for an unlicensed radio to operate successfully in this band are (i) the ability to quickly and robustly sense spectrum availability (ii) MAC protocols that allow seamless multichannel operation, without any user intervention and (iii) QoS guarantees in the face of channels becoming unavailable due to the appearance of incumbents. The Philips prototype is one of the first to demonstrate these features in a fully cognitive radio platform operating in the UHF television bands (Channels 21-51). The prototype senses, transmits and receives in the UHF band. The sensing algorithms detect television and wireless signals down to -114 dBm. The MAC protocol is based on distributed beaconing and coordinated “quiet periods”. The prototype will be used to demonstrate real-time video streaming in the UHF band in the presence of incumbents.**

## Description

The description should include sufficient detail such that the evaluators can understand the purpose, configuration, design, and conduct of the demonstration/experiment.

### Primary technical goals

This prototype demonstrates the following:

- (1) Robust sensing of television (ATSC and NTSC) and wireless microphone signals, which is a necessary first step for implementation of cognitive radio in the television bands.
- (2) Distributed MAC protocol implementation demonstrating distributed beaconing and quiet periods for sensing.
- (3) The application will be a high-definition video stream running on the platform. We will demonstrate that the appearance of an incumbent in the channel being used causes no degradation in the video because the underlying protocol seamlessly switches to an available channel.

## Description

Pictures, screen shots, and system drawings are encouraged (attach as necessary)

## Operational parameters

Frequency Ranges

UHF Channels 21 - 51

Bandwidth

6 MHz

Peak Input Power to Antenna

100mW

Antenna polarization and gain

Omnidirectional antenna

Waveforms (modulation type)

OFDM

## Technical Significance

Address the technical significance of the demonstration/experiment.

Description of the technologies

The prototype will be used to demonstrate the following features of cognitive radio in the UHF bands:

- (1) Set-up of quiet periods
- (2) Set-up of back-up channels
- (3) Sensing during quiet periods
- (4) Incumbent detection and channel vacation.

The above will be done while maintaining QoS of a high-definition video stream.

A discussion of the perceived impact of the demonstration to dynamic spectrum in general and the DySPAN audience in particular

While individual pieces of a cognitive radio platform in the UHF band have been demonstrated before, this demonstration will span all of the principal requirements of a cognitive radio: sensing at low levels, distributed coordination of channel availability via beaconing and quiet periods while maintaining QoS of the application. It will conclusively show that these technologies are mature and can be transitioned into real products in a very short time.

## **Technical Maturity and Operational Capabilities**

Provide sufficient detail regarding the maturity of the demonstration/experimentation.

Current state of the technology, hardware, and software

The prototype hardware and software is available and currently being tested under different scenarios in the lab and field. The sensor only detects television signals.

Amount and type of work yet to be done prior to DySPAN

Inclusion of wireless microphone sensing algorithms.

Multiple network operation.

Risk mitigation methods to be implemented to ensure proper operation within regulatory constraints

The operation of the prototypes will be subjected to the final FCC rule and order. In the interim, we will require a FCC waiver to allow transmission in the UHF band with operation parameters as defined earlier.

Previous experience and trials of demonstration equipment's coexistence with other communication systems

Note that a summary of existing test results may be useful in conveying the operational readiness and stability of the demonstration/experiment

The complete prototype has been tested in the Philips labs and limited field testing had also been done. More testing is underway to determine the operating characteristics. The spectrum sensing algorithms have been extensively tested both by Philips and the FCC and found to be reliable down to -114 dBm. The MAC protocols have also been tested separately and found to perform as designed.

## Logistical Needs

Include the logistical needs for supporting the demonstration/experiment at DySPAN. These details allow the planners to properly acquire and allocate resources to support the demonstrations.

Amount of space required (sq. ft or sq. m)

16 sq. m

Number of demonstration tables required

2

Input power requirements and number of outlets (note: US uses 120V, 60 Hz power with a NEMA 5 (flat 3-prong) plug)

120V, 20 outlets

Approximate power consumption

1000W

Storage and security requirements for equipment

TBD

Instrumentation and other support equipment requested of DySPAN

TBD

Internet/network access (wireless, wired, number of ports, etc.)

Ethernet connection (8 ports)

Other needs



## Checklist

- Contact information is complete and accurate
  - Abstract
  - Description is complete, including all operation parameters requested
  - Technical specification
  - Technical maturity and operational capabilities
  - Logistical needs described as fully as possible
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- We grant permission to make the information in this proposal public.