ST Engineering

CASE STUDY

TRANSFORMING CONNECTIVITY IN RURAL PERU WITH DVB-NIP (SMART DTH)

How a Next-Generation Broadcast Technology Is Closing the Digital Divide Across Remote Territories

Across Peru, access to content and information is still defined by geography. In more than 60,000 communities, connectivity and television remain out of reach, leaving millions disconnected from education, culture, public services, and trusted national media. In rural regions where daily life revolves around agriculture and livestock, the absence of digital access is not just an inconvenience, it's a structural barrier.

To address this persistent divide, the College of Engineers of Peru (CIP) and the National Institute of Radio and Television of Peru (IRTP) began deployement of its Smart DTH initiative built on the DVB-NIP standard. By converging broadcast efficiency with IP capabilities, DVB-NIP enables multi-channel television, radio, and digital services (including on-demand content) to reach even the most isolated communities via satellite. What is emerging in Peru is more than a technology pilot. It's a blueprint for how DVB-NIP can deliver meaningful digital inclusion at national scale.

A Connectivity Challenge Defined by Geography

Peru's terrain presents one of the most complex connectivity environments in the world. The Andes mountains, deep valleys, dense rainforest, and highly dispersed rural settlements make terrestrial infrastructure difficult and costly to deploy. While electrical grids reach many remote areas, digital access has lagged far behind.

Historically, public broadcasting relied on linear satellite distribution feeding single-channel terrestrial repeaters. This approach provided limited reach and is now

technologically obsolete, with analog transmission equipment no longer manufactured. As a result, millions of Peruvians remain disconnected from educational programming, public information, and digital services that urban populations take for granted.

This is precisely one of the types of use cases DVB-NIP was designed to address.

DVB-Native IP (NIP): best of both worlds

The DVB-NIP standard introduces a fundamentally different approach to media distribution by merging the scale of broadcast with the flexibility of IP. The technology enables a hybrid architecture capable of delivering both linear and non-linear services over a single satellite platform.

Unlike traditional DTH systems, DVB-NIP supports multi-channel HD television, digital radio, and IP-native services such as video-on-demand, e-learning platforms, and digital libraries. The result is not simply expanded TV access, but a fully converged media and data delivery layer that can serve entire communities across multiple devices.

By leveraging a single satellite feed for both broadcast and IP data, DVB-NIP allows countries like Peru to use legacy infrastructure and deploy modern digital services without relying on costly terrestrial rollouts.

Pilot Deployment: Bringing Smart DTH to Apurímac, Tumbes and Ayacucho regions

To validate the model, CIP led an early deployment in Apurímac, one of Peru's most remote regions. Located more than 22 hours from major urban centers, the region provided a real-world test of whether DVB-NIP could deliver both technical performance and societal impact under extreme conditions.

The pilot connected households using Smart DTH terminals capable of delivering multi-channel HD television alongside on-demand and digital data services.

Smart DTH continues to stand out as one of the most cost-efficient pathways to scale digital inclusion in Peru's challenging geography. By leveraging satellite-first architecture, the model removes the need for capital-intensive terrestrial infrastructure

Local content caching enabled always-available access to educational and cultural media, even without continuous connectivity

For many families, this marked their first meaningful connection to national media and digital knowledge resources. The success of the Apurímac deployment demonstrated that DVB-NIP is not only technically viable, but immediately transformative at the community level.

Pilot Overview

- 240 terminals in the Tumbes region
- 50 terminals in Apurimac region
- 10 terminals in the Ayacucho region
- Access to 12 HD TV channels
- Local content cached on low-cost servers for offline access

Community and Funding Model

Despite growing validation through field deployments and strong engagement from academic and engineering communities, large-scale institutional backing remains limited. The immediate objective is to deploy 800 satellite kits to cover the entire district of Torayawhich is one of many underserved rural areas still lacking reliable connectivity. Building on successful early deployments in regions such as Tumbes, Apurímac, and Ayacucho, this next phase aims to demonstrate district-wide impact and strengthen the case for broader institutional adoption.

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Looking Ahead: A Blueprint for Similar Markets

With its complex geography and vast number of remote communities, Peru is emerging as a compelling reference model for countries facing comparable connectivity challenges. The lessons learned from early Smart DTH and DVB-NIP deployments extend well beyond national borders, offering a scalable framework for regions where traditional terrestrial infrastructure is difficult or economically unviable.

"In nations defined by rugged terrain and dispersed populations, hybrid broadcast-IP architectures provide one of the few realistic pathways to deliver trusted information and digital services across multiple devices at scale."

Wilfredo Baro Fanola Merino
Professor of Telecommunications

DVB-NIP Ecosystem

Distribution of OTT over satellite using multicast can serve multiple markets and applications. The distribution format isn't limited to video (live/ linear, SVOD/Subscription Video on Demand) only, also files such as push VOD (Video on Demand) and PDFs can be pushed out to receivers.