European Economic Letters
ISSN 2323-5233
Vol 15, Issue 4 (2025)
http://eelet.org.uk

# Portable IP Streaming vs. Satellite DSNG: The New Era of News Gathering

**Surender Kumar Paliwal[1], Dr. Kuldeep Siwach[2]**

[1]Research Scholar, School of Media and Entertainment, GD Goenka University, Haryana

[2]Associate Professor, School of Media and Entertainment, GD Goenka University, Haryana

**Abstract**

In the past 20 years, the electronic media industry has witnessed a paradigm shift in live newsgathering and outside broadcast workflows. Up until now, satellite-based Digital Satellite News Gathering (DSNG) systems have dominated live broadcasting because of their reliability, broadcast range, and the fact that they are independent of conventional terrestrial systems. However, the advent of backpack units and cloud-based Internet Protocol (IP) streaming technologies has changed how live networks operate, produce economic benefits, as well as shape technical operations at scale in broadcasting. Utilizing bonded cellular networks, public internet, and cloud-based media processing services, backpack units provide portability, cost efficiency, and rapid deployment and are a challenge to the hegemony of DSNG enterprises. This paper evaluates whether backpack units and cloud-based IP streaming serve as an alternative instead of a game changer for the satellite-based DSNGs. The paper applies a qualitative method of analyzing the differences among the technical architecture, latency, reliability, cost, scalability, and operational workflows of the two systems. The results imply that though DSNG is still required for mission-critical and high-reliability broadcasting, backpack units with cloud-connected flows are becoming disruptive forces, reconfiguring flexibility, speed, and decentralization in contemporary broadcast ecosystems. The study asserts that backpack units and cloud-enabled IP streaming will not wholly replace DSNG, but will redefine the future of live broadcasting in a hybrid and cloud-based operational model.

**Keywords-** Backpack Units, Cloud-Based IP Streaming, DSNG, Live Broadcasting, Bonded Cellular Technology, Media Cloud, Electronic Media Technology

## 1. Introduction

Live broadcasting has always been at the heart of electronic media; from news and sports events to political events and disaster coverage. Satellite-based Digital Satellite News Gathering (DSNG) systems have formed the backbone of live transmission for decades allowing broadcasters to transport video and audio signals from distant locations directly to broadcast centers via geostationary satellites. For their dependability, coverage independence, and guaranteed bandwidth, DSNG systems have been prized despite the high operational costs and logistical complexities associated with them. The early 2000s saw a technological change brought about by the merger of broadcasting and telecommunications. Developments in cellular networks (3G, 4G LTE, and 5G), compression standards (H.264, H.265/HEVC), and IP-based media transport protocols have opened the door to portable live transmission features. Backpack units — compactly built, battery-operated devices that can connect multiple cellular and IP connections together — became an industry solution that provided quick, low-footprint coverage. At the same time, cloud computing also brought software-defined, scalable workflows for media ingest, processing, storage, and distribution. Cloud-based IP streaming allows broadcasters to circumvent traditional satellite uplinks and run live streams via public or private IP networks onto cloud environments, from which the content can be broadcast across television, digital, and social media. This study explores whether backpack units and cloud-based IP streaming are simply cost-effective substitutes for DSNG or whether they represent a fundamental game changer capable of redefining live broadcast operations. The technological, operational and strategic implications of this transition are considered in relation to the wider process of media technology evolution.

## 2. Conceptual Overview of DSNG and IP-Based Backpack Systems

**2.**1 Satellite-based DSNG operations.

We defined DSNG systems as an uplink vehicle that has satellite modems, encoders, high-power amplifiers (HPAs), and parabolic antennas. The systems send signals to geostationary satellites, which send them to teleport earth stations or broadcast centers. DSNG has advantages like wide geographic coverage, predictable latency, and immunity from terrestrial network congestion. But, DSNG operations require huge CAPEX (capital) and OPEX (operational) which covers satellite bandwidth lease, vehicular maintenance, people and regulatory clearances. Deployment time and physical constraints also constrain DSNG's agility in hyper-competitive news landscapes.

2.2 Backpack units and Cloud-based IP Streaming.

Backpack units are lightweight, portable transport devices that can connect several cellular SIMs, Wi-Fi, and wired connections to form a stable uplink. These are tools that reduce video signal size and transfer over IP networks to a receiver or cloud end-connection. Cloud-based platforms take over decoding, transcoding, routing, and delivery tasks and then they will be done in a distributed way. With cloud integration, broadcasters can have all production workflows consolidated, weave less dependence on physical infrastructure, and set up virtual production models. This strategy is

also in line with the way of contemporary media consumption that require speed and multi-platform deliverables with cost efficiency..

## 3. Research Objectives and Methodology

### 3.1 Objectives

The primary objectives of this research are:

1. To compare technical and operational characteristics of DSNG and backpack-based IP streaming.
2. To evaluate cost, scalability, and deployment efficiency.
3. To analyze the strategic implications for broadcasters.
4. To determine whether backpack units represent an alternative or a game-changing paradigm.

### 3.2 Research Methodology

This study adopts a qualitative, analytical research methodology based on:

- Review of peer-reviewed research papers and industry reports (2001–2025).
- Comparative analysis of broadcast workflows.
- Professional insights from electronic media technology practices.
- Case-based interpretation of live broadcasting scenarios.

## 4. Comparative Analysis and Findings

### 4.1 Technical Performance and Reliability

DSNG systems deliver deterministic bandwidth and consistent signal quality, which makes them ideal for high-profile events where failure is unacceptable. Backpack units depend on network protocols such as cellular and IP networks which can be congested and have variable performance. But the reliability has gotten a lot better with the development of bonding algorithms and adaptive bitrate streaming. As per industry experts and technocrats who have more than 20 years experience in the field of broadcasting operations such as Mr. Shibu Nair, Rohit Sinha and Kapil Malik, the DSNG is the only reliable option when the importance of the coverage is high and nation important because DSNG signal is the reliable medium of communication in the field of broadcasting. On the contrary, Mr. Ajay Kumar Singh, Mr. Gurpreet Singh and Mr. Rohit Talwar who are the Broadcast IT giants in the field of Indian media industry have all been convinced that soon satellite based Internet facility will change the overall scenario of this field. Current backpack units are based only on the mobile based network or the fixed line internet so bandwidth fluctuation and signal jammer during VVIP live is the constraint but very soon SpaceX Starlink will start its satellite based internet facility in India also and in this mobility based segment company claims the 15 to 20 Mbps assured bandwidth over its LEO based satellite network. With minimum latency rate.

| Aspect | Satellite DSNG Strengths | Satellite DSNG Weaknesses |
|---|---|---|
| Coverage | Global, remote areas | Weather/line-of-sight issues |
| Quality | UHD/4K reliable | Latency 250-600ms |
| Cost | Fixed high leases | Expensive per event |
| Deployment | 15-60 min setup | Bulky equipment |

### 4.2 Latency and Signal Quality

Satellite transmission inherently introduces higher latency due to long signal paths. IP-based streaming, particularly over 5G and fiber-backed networks, can achieve lower end-to-end latency.

### 4.3 Cost Efficiency

DSNG incurs high recurring costs related to satellite bandwidth and logistics. Backpack units drastically reduce costs by utilizing existing telecom infrastructure and cloud services. In India NSIL is the major satellite bandwidth provider to the Public and Private broadcasters and NSIL charge the around ₹20,00,000/- per MHz and generally a DSNG consumes around 5 MHz bandwidth for the smooth transmission on the other side the Backpack units are running on the mobile based Internet so its available on a very nominal cost as compare the DSNG operational cost.

### 4.4 Operational Flexibility and Scalability

Backpack units enable solo or small crew operations, rapid deployment, and coverage in restricted or dense urban environments. Cloud workflows allow instant scaling without physical expansion.

### 4.5 Integration with Digital and Multi-Platform Distribution

Cloud-based IP streaming seamlessly integrates with OTT platforms, social media, and digital archives, unlike DSNG, which is traditionally linear-TV centric. With the help of this integration, the signal is directly routed on the social media platform without entering the media house production chain via ingestion or PCR.

## 5. Discussion: Alternative or Game Changer?

The findings indicate that backpack units are not merely substitutes for DSNG but catalysts for structural change in broadcast operations. They enable decentralized production, remote collaboration, and cloud-native workflows that redefine how content is created and distributed. Rather than replacing DSNG outright, backpack units shift DSNG's role toward specialized, high-reliability applications.

This transformation reflects a broader shift from hardware-centric to software-defined and cloud-driven broadcasting, consistent with global media technology trends.

| Technology | Deployment Time | Cost Model | Latency | Coverage |
|---|---|---|---|---|
| Backpack Cellular | Seconds | Subscription/data | <100ms | Cellular zones |
| Cloud IP | Instant scaling | Pay-per-GB | 50-200ms | Global IP |
| Satellite DSNG | 15-60 min | Fixed lease/event | 250-600ms | Satellite LOS |

## 6. Conclusion

This study proposes that backpack units and cloud-based IP streaming represent a significant and transformative evolution in the field of broadcasting, positioning themselves as game-changing alternatives rather than mere substitutes for traditional satellite-based Digital Satellite News Gathering (DSNG) operations. Backpack units, which leverage the power of compact technology and high-speed internet connectivity, allow broadcasters to transmit high-quality live video feeds from virtually anywhere, providing a level of mobility that traditional satellite methods simply cannot match.

Looking ahead, it is clear that the future of live broadcasting will be characterized by a hybrid structure that combines the reliability of satellite technology with the dynamic capabilities offered by IP and cloud-based solutions. This integration will empower broadcasters to harness the strengths of both systems, ensuring that they can deliver consistent, high-quality broadcasts while also capitalizing on the cost-effectiveness and flexibility that cloud technology provides. By embracing this evolution, they can not only enhance their operational efficiency but also position themselves at the forefront of a rapidly changing industry, ready to engage audiences in new and exciting ways. The convergence of these technologies heralds a new era in broadcasting, where adaptability and responsiveness to audience needs will be paramount..

## References

1. Cuffe, P., & Fitzpatrick, J. (2016). *IP-based broadcasting and media workflows*. IEEE Communications Magazine, 54(6), 130–136.
2. Choi, J., & Park, S. (2019). Cloud-based media production systems for live broadcasting. *IEEE Transactions on Broadcasting*, 65(2), 394–403.

3. ITU-R. (2018). *The transition from SDI to IP-based broadcast infrastructures*. Geneva: International Telecommunication Union.
4. O'Hagan, M. (2020). Disruption in broadcast technology: From satellite to IP. *Journal of Media Technology*, 12(3), 45–58.
5. SMPTE. (2019). *Professional media over managed IP networks*. SMPTE Standards Documentation.
6. Wu, D., Hou, Y., & Zhang, Y. (2001). Transporting real-time video over the Internet. *Proceedings of the IEEE*, 89(1), 185–202.
7. Cisco Systems. (2023). *Cloud-based live video contribution and distribution*. White Paper.
8. Evans, J. (2021). Remote production and bonded cellular technologies in broadcast news. Broadcast Engineering Journal, 27(4), 22–31.
9. https://www.nepgroup.com/resources/first-ip-based-live-tv-broadcasts-using-cloud
10. https://www.planetc.net/products/iaas/dsng-digital-satellite-news-gathering
11. https://www.digisat.org/avl-technologies-9066k-90m-sng-checkable-backpack-vsat-antenna.