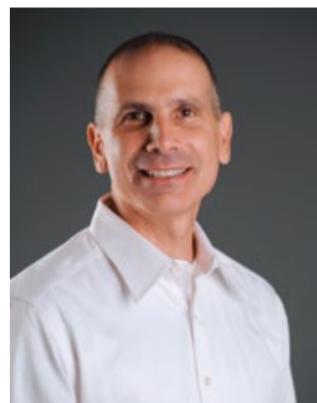




A LANDSLIDE VICTORY FOR CELLULAR BONDING



"Sky 150"
Sky News UK General Election Coverage



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Election coverage is where news broadcasters have a tailor-made opportunity to make their mark. Sky News has led the way with technology, using the 2010 UK general election night as the time to transition from SD to HD, simply because so many people were watching. The broadcaster followed suit with the 2015 general election, delivering 138 live IP feeds from 150 key counts and constituencies countrywide using LiveU's cellular uplinking technology.

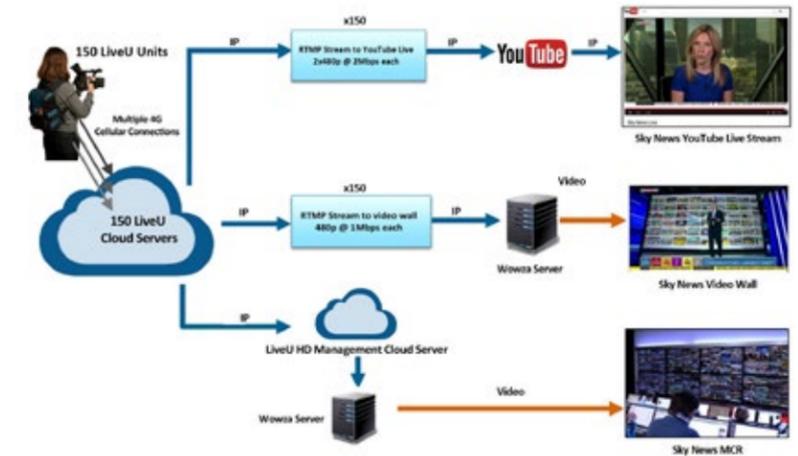
Sky News was keen to replicate and expand upon its coverage of the Scottish Referendum 2014. There it provided additional coverage from 32 locations, using apps and iPads. During early planning stages for 2015, a demo unit of LiveU's LU200 ultra-small transmission device arrived at Sky News HQ. After conversations with LiveU and further internal discussions, it was decided that LiveU units out in the field, providing coverage of 150 constituency declarations at 138 key counts, would give Sky News a unique selling point for its coverage of the election. From December 2014, planning began in earnest.



The Scottish Referendum project provided additional TV feeds as well as online coverage (all 32 locations were streamed live on YouTube) on top of the feeds provided by traditional TV OB trucks, the audio and picture quality were not ideal. When it came to providing coverage from 150 declarations, the Sky150 as it came to be known, the decision was made to use 'proper' hardware units and a proper camera. As Deputy Head of News Technology Richard Pattison explains, as soon as you are talking a project with this scale, you straight away have to work with a partner that has the capacity to provide the 150 units. "Once we saw the LU200, LiveU came to the forefront," he says. It helped that the Sky News technical team was already familiar with LiveU, having been the first user in Europe, and now with multiple units around the world for everyday news coverage.

Pattison adds, "It was a perfect storm. We had a working LU200 demo unit in our hands. It was small, it was neat, it was compact, it could take an HDMI input from a prosumer camera. We knew it was a brand new product, we knew LiveU would be interested in pushing its capabilities, so that was the driver to go with LiveU." Purely for practical reasons, Sky News decided to use both LU200s and LU400s. Also, the LU400 has the advantage of accommodating four SIMs and four modems, giving the option to use one SIM from each of the main mobile providers in the UK. The broadcaster used six LU200s to follow each of the main parties out on the campaign trail through the whole pre-election campaign.

The 138 transmission units were paired with Sony PJ620 Handycams, each manned by a team of trained media students and young journalists. This was in addition to the existing 49 traditional OB trucks providing live feeds to the newsroom – as deployed for the last election – using capacity on an ad-hoc basis from providers Globecast, SIS Live and Arqiva.



New era, new delivery infrastructure, new studio

It was clear from the outset that Sky News could not simply add 138 additional baseband video sources to their existing studio matrix for capacity reasons as well as the associated cost, space and power. So Sky News worked with LiveU to develop a completely new, IP-based, delivery solution that took advantage of ad-hoc cloud infrastructure and heavily utilised software such as Wowza and FFmpeg.

An SD proxy of all 138 LiveU feeds was routed to Osterley over IP, via 138 cloud-based LU2000 MMH servers, each cloud server also steaming its feed live to a YouTube Live Event. Sky News customers were able to access these live streams from the Sky News App and website, enabling a greater choice of live viewing for the customer. Once a count had finished, the live stream was replaced with a clip of that constituency's declaration. Pattison and Smith worked closely with Przemyslaw Pluta, the Head of Creative Platform Solutions at Sky News, to develop bespoke 4K monitoring and switching solution that would utilise and control cloud infrastructure, heavily integrating software such as VLC, FFmpeg and Node.js.

Like most studios, Sky News operates an SDI environment, so monitoring 138 IP feeds required some new facilities. Sky News' Chris Smith, Development Executive – News Technology, used the Wowza media server application running on a MacPro to take the inbound LiveU RTMP streams and make them available within the studio environment as multicast streams. These streams could then easily feed multiple monitoring stacks without increasing the external bandwidth overhead in to the studio. Sky News then built a completely new monitoring environment, utilising 4K monitors.

The solution developed by Pluta and Smith allowed the visibility of all the inbound proxies throughout 4K infrastructure at full resolution. At any point during the election coverage, an HD stream of the four most relevant LiveU SD proxy feeds could be selected via a user-friendly touchscreen, web-based switching matrix and converted to baseband video. At this point the Sky News NOC could make them available to ingest or the gallery. The solution provided audio monitoring and basic information (location details, etc.), meaning producers could easily identify the geographical origin of each video feed. Any changes were distributed in real-time across all connected users and notifications were posted.

Originally designed as an operational command and control facility for the News Technology team, Sky News decided to capitalise on the spectacle of 138 simultaneous live feeds and built a brand new studio around the monitoring solution, from where they anchored their election programme. The new studio enabled the production and technical teams, along with the results team, to see what was going on across all incoming feeds at all the critical counts and consistencies, as well as providing a dynamic backdrop to our election coverage. Compared to older black box systems, IP provided Sky News with an enormous amount of flexibility. As Pattison explains, "It does create challenges in that you are trying to operate in an environment that's set up for baseband video, but if you can overcome those challenges, it gives you any amount of flexibility." As the icing on the cake, Pluta and Smith took full advantage of the multicast streams with 150 live feeds used as a static and scrolling feature across the Sky News UHD video wall.



Powerful results

As Pattison explains, it wasn't just the LiveU units that made the difference on the night. LiveU Central, LiveU's unified management system, was very important to the whole operation and was used in an innovative way. He says, "We used it to name all the feeds for the producers, then we could also monitor which units were no longer in use because a count was completed."

Thanks to LiveU Central, the technical team could easily track the status of modems, Ethernet ports, what connectivity was being used, or whether a unit was connected or not. It made technical support very simple as all the relevant info could be seen and adjustments made.

LiveU's support was also very important to the whole project. According to Pattison, this came primarily in two areas. He says, "This was a ground up project and LiveU absolutely had to be tightly involved; it's not something we could have done on our own. Support on the night was also important. We're a team of two people, so just to have our partners from Garland Partners Ltd. and a couple of the guys from LiveU was extremely helpful. Because of the remote capability, between the six of us we were able to quickly get the units up and running."



Summing up the outcome of the night, Pattison says, "We had the added unique selling point of having more live sources than any of our competitors. We were able to take results directly from our LiveU feeds and feed them into the system before other news organisations had them. These were the marginal, key seats that [significantly impacted] the final election results." He added, "We're very happy. It was an audacious project and there were a number of wildcards: the involvement of a large number of students; a large number of locations with varying levels of connectivity; and a relatively small team to pull it all together. It was a lot of hard work, but it was extremely satisfying to see all those live feeds up and running."



Young journalist stringers

Sky News had recruited and trained 270 young journalists as stringers. They were equipped with Sony PJ620 Handycams and a LiveU LU400 transmission unit to scale coverage to more than 270 declarations at 176 locations in total for the election. The basic idea was trialed for the Scottish independence referendum. Sky's technical team, led by deputy head of news technology Richard Pattison, had assembled each camera pack, which contained four sim cards (one for each main network operator) for belt-and-braces connectivity. Since around 20 of the sites didn't provide reliable connectivity, Sky had installed high-speed broadband fibre on location and erected temporary broadband over a satellite dish from Eutelsat service Tooway.





All 150 LiveU feeds were routed to Osterley over IP in what Sky said was the largest IP OB of its kind. Each stream was sent to Google cloud servers and streamed live to YouTube. Simultaneously, an SD proxy was sent to Sky's News Operations Control (NOC) room in Studio B and displayed on 10 4K monitors.



"When our producers choose what they want to put on air, the stream was converted to baseband video and sent to the gallery for playout," says Pattison. "To the best of my knowledge, no one has attempted to stream 150 concurrent live streams over IP before," says Chris Smith, Sky's news technology development executive. "We considered doing 450 but thought that was too much of a stretch this time."

The students filmed the declarations but did not provide commentary. In addition, Sky's NOC ingested 43 satellite feeds from trucks for mixing into the TV broadcast. It was buying capacity for 33 on an ad-hoc basis from providers Globecast, SIS Live and Arqiva.



SIS LIVE DRIVEFORCE

SIS Live is the largest supplier of contribution feeds for election night. It is fielding 39 trucks and staff from its fleet, plus 29 vehicles leased on long-term contracts to Sky, ITV and ITN Productions.

Branded DriveForce, these vans feature an automated, roof-mounted VSAT antenna. The company is also selling satellite capacity and providing 14 additional camera crew, 55 engineers and a trailer with 10 receiver dishes on board.

"Our crew co-ordinates the contribution links, live stand-up and two-ways, as well as managing tape or hard-drive playouts," says managing director David Meynall.

This is the first election to use satellite capacity in the Ka-band, a more powerful frequency than the traditional Ku-band.

"The big advantage is that customers get the flexibility of guaranteed bandwidth but at far lower cost," says Meynall. "DriveForce's design makes for fully automated acquisition of links and simple online booking that frees operators to do other work."