

A View from The Bridge

The Diamond Jubilee celebrations saw many GTC members out and about covering street parties, beacon lighting ceremonies and multiple other events organised to mark this historic milestone. There were many highlights, including the concert at Buckingham Palace, Thanksgiving Service at St Paul's, and procession of carriages through London but, from an OB point of view, the most challenging and unusual task was probably the coverage of the 1000-boat flotilla on the Thames. GTC sponsor companies ACS and Ikegami were involved at the very heart of things by providing the cameras on board the Royal Barge. Meanwhile, GTC member James Day's contribution was supervising the 'finish line' cameras at Tower Bridge, where an array of imaginatively placed cameras offered up great angles and shots of the passing flotilla, including the spectacular moment when the bridge opened up – and who can forget the choir of valiant 'drowned rats' who sang with so much spirit while drenched to the skin! First, James explains just what was involved at the Tower Bridge end of this huge exercise.

Great pictures, shame about the commentary

Much has been written in the media about the BBC's treatment of the River Pageant and how it failed to reach the public's expectations in terms of commentary and information. But at the same time, great praise was heaped on the pictures offered up throughout this very long transmission.

the long distances and tricky travel turned this into a long and exhausting process.

All angles covered

The camera rig started early on the Friday morning and we soon had the local cable-connected cameras up and running. The first three were positioned high on the Tower Bridge towers, looking west, east

the water to give unique shots as the bridge rose in front of it and the flotilla passed through close by. In addition to this, a small standard-lens camera was placed on the steps jutting out from Shad Thames at water level for a 'worm's eye view' underneath the bridge.

Meanwhile, two other standard-lens cameras were placed on Tower Pier and St Katherine's Pier, plus

behind where the Queen's boat would tie up (also with 86 lenses); and across the river opposite the end position, on Butlers Wharf Terrace. This camera was equipped with a 100:1 lens.

Roaming around was a vox-popping handheld operating on the bridge approach roads, while two more handhelds were on board ships just east of the bridge: TS Tenacious, a tall ship moored to the south, and HMS Hurworth, a minesweeper moored just astern of the Queen's eventual position.

Four of the RF cameras had big 86 lenses, leading to extensive power supply issues and, since mains was not available at most of the positions, much planning was involved in ensuring a plentiful supply of batteries, resulting in complex charging arrangements

The view we never saw!

Last, but far from least in terms of effort anyway, was a camera taken up to the top (87th floor) of the Shard, the brand new tallest building in Europe, which overlooks the whole of London and especially this part of the Thames. Months of negotiation and a hundred emails had finally resulted in permission for a camera to be set up there. This is still a building site with all the safety issues that brings, let alone the normal problems arising from working in such an elevated position. This involved a huge effort from all involved – including walking

Our part of the operation, with facilities provided by a Visions truck and using SIS Live RF and comms links, eventually involved 20 cameras (a mixture of Philips LDK 6000s and Sony 1500s), dotted along the stretch of the river from London Bridge in the west to the other side of Tower Bridge in the east. These positions had been chosen by executive producer Claire Popplewell and technical producer Peter Taylor a couple of months earlier. I took a walk-around recce with Peter on 3 May and we made a few adjustments at that point but the final list was only arrived at about five days before the rig started.

and centrally down on the 'bascules' (the bits of road that rise when the bridge opens). These were all fitted with wide-angle lenses and mounted on bazookas with offset bowls, and placed in narrow walkways accessed through windows. The large vertical drop to the public areas called for extensive safety bonding and much careful assembly of all the component pieces.

Then we had two 86-lens cameras at road level by the bascules looking west and east, plus a wide-angle jib on the east corner of the South Tower, which would capture some amazing shots as the bridge opened – inches away from the lens – and also as the flotilla passed by just yards below.

Another great position was that of an ACS Smarthead remote camera underneath the bascules, close to

another wide-angle jib was set up in front of the Tower of London among the trees and the crowds.

To top it all for the bridge coverage, the Cammotion Vortex was in position in the middle of the road by the North Tower providing spectacular rising and falling shots through the bridge supports.

The RF cameras were stationed further away: on the next bridge along (London Bridge) high up on buildings

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A complicated tech spec

Due to the large distances involved and associated problems with getting cables anywhere remote, seven of our 20 cameras would be on RF radio links. To add to these complications, four of the RF cameras had big 86 lenses, leading to extensive power supply issues. Mains was not available at most of the positions, so much planning was involved in ensuring a plentiful supply of batteries, resulting in some pretty complex charging arrangements. The RF receiving point was on top of The Tower Hotel, next to where the scanner was parked. However, as the directional receive aerials could not pick up any local testing, everything had to be rigged in its final position before any fault-finding could take place. Again,



▲ A 'Canaletto moment' as the colourful rowing fleet passes under the bridge



▲ Stuart MacDonald directing, with Ian Trill vision-mixing



▲ The Spirit of Chartwell passes under the bascules, raised at 90 degrees for a Royal Salute



▲ Rigging the cameras high above the bascules of Tower Bridge, with all-important failsafe safety bonding, was quite an exercise!

Not everything worked. On OBs, it never does. The secret is to not show that on the screen. Next time, we will do it better!

up the last 20 or so floors with all the gear as the lifts stop at level 65 – only to be thwarted by the appalling weather on Pageant Day. Basically, the top of the Shard never emerged from the clouds. A great shame. The view is astounding and I will certainly be going up there when the public viewing galleries eventually open.

A very long, wet day

Pageant Day started for us at about 07.30, with rerigging the cameras that could not be left out overnight for security reasons, and finished around 20.00 when a mostly soaking wet and tired crew had finished the derig and everything had been packed away. An excellent packed lunch from Pret a Manger had kept us going but there had been few chances for any sort of extended break between starting on camera at 11.00 and the end. Many cameras could not be left unattended as they were in public areas.

As anyone watching the event will know, the weather deteriorated dramatically during the afternoon and eventually the rain just poured

down. My position on the North Tower looking west was immediately under the horizontal walkways high above, which seemed to result in a waterfall effect directed towards my head just to add to the general misery created by the constant rain. Luckily, the lifejacket our safety officer insisted I wear due to my proximity to a large drop into the Thames just about kept me afloat!

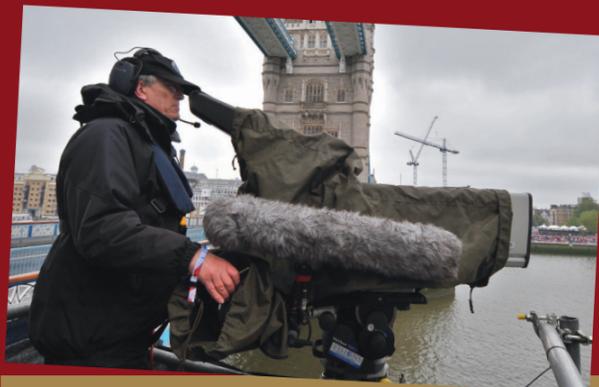
Could we have done more to keep the rain off our lenses? We were using a lot of 86-type lenses for which there is no current solution. They need better lens hoods undoubtedly. If these were commercially available, they would be used. Gaffer tape and cardboard is not universally available on every street corner and would probably have drooped into shot in the ensuing monsoon anyway. Twenty miles away, it hardly rained at all that day, so in a way we were just unlucky. How much time and expense should be spent on such unknowns? Using equipment provided by others means just that. You cannot carry around with you a selection of all the 'extras' that might

help. We did what we could with the facilities made available to us.

Overall it was a technical triumph though. This was the biggest OB for many a year: over 90 cameras in total, fed through eight scanners, spread over several miles either side of a river in a very busy city among a million

spectators on the day. There were more than 20 cameras on the boats. The technical planning sheet was 217 pages long!

Not everything worked. On OBs, it never does. The secret is to not show that on the screen. Next time, we will do it better!



Fact File

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On Board the Spirit of Chartwell

GTC sponsors ACS provided remote and stabilised camera systems for all the key events during the Diamond Jubilee weekend: the concert at Buckingham Palace, the Thanksgiving Service at St Paul's, inside Westminster Hall and route cameras for the Procession. Here, Sam Heaphy of ACS explains what was involved in the most sensitive part of their Jubilee involvement: providing continuous unobtrusive coverage on board the Royal Barge.

BBC Events is the production entity within the BBC that is normally responsible for producing coverage of state occasions, national celebrations and commemorative services. The relationship between BBC Events and ACS has evolved over the past five years, with many national and international broadcasts drawing on the company's specialist expertise in providing high-end compact remote cameras. The Royal Wedding of Prince William and Kate Middleton in 2011 and the Papal Visit of 2010 (previously covered in Zerb) were both examples of the ACS SMARThead playing a significant part in the OB facilities.

During the summer of 2011, ACS was approached by BBC Events to consider an exclusively remote camera proposal for the broadcast coverage on board the Royal Barge, the centre of the Diamond Jubilee Pageant. The initial plan was based on four camera

positions but this eventually doubled to eight. Detailed planning and the process of obtaining Buckingham Palace approval for the installation started with a series of meetings in January on the Spirit of Chartwell (a vessel loaned for the purpose).

An unobtrusive presence

The principle aim of using multiple remote cameras was obvious in that the alternative was for two or three PSC cameramen to move around on the top deck throughout the Barge's progression down the Thames. However, this would have been obtrusive and almost certainly rejected by the Royal Press Office at Buckingham Palace.

Image quality considerations for the live broadcast, and also for archiving purposes, required the use of full 2/3-inch HD cameras and lenses. Minicams including 'ball' style systems were rejected because of their



▲ Remote cameras onboard the Spirit of Chartwell provided unobtrusive closeup shots of the Royal Family throughout the four-hour flotilla pageant

inherent limitations of lens size, as well as sensor and processing quality. Conversely, full-size cameras on remotes would be far too bulky and, as a result, unacceptable.

ACS has a tradition going back many years of purchasing compact full broadcast cameras, either as 'T' style systems or, more recently, with the emphasis on the latest generation of 'brick' or 'box' style cameras. These, coupled with wide-angle or standard lenses (x22), and attached to a SMARThead pan and tilt remote, offer a very compact full HD solution.

Ikegami cameras

The choice was made to use the Ikegami HDL-51 multi-format camera, on the grounds that this is the smallest camera in its class to offer excellent image quality, fully featured OCPs and a proven reliability record. Mark Capstick and Simon East of

Ikegami UK have always provided a friendly service with good technical support plus extra help whenever it's needed. Since all the cameras were to be of the same type we would have the added bonus of there being no issues with matching.

Hiding the cameras

The Spirit of Chartwell was subjected to a very extensive 'aesthetic' design make-over. This involved elaborate mouldings being hung over the prow of the ship, a royal dais and spectacular floral and plant arrangements. This brief description does not begin to do justice to the efforts or extent of the design team's work! ACS worked closely with the film production designer Joseph Bennett and the art director Dominic Hyman to minimise the presence of the SMARTheads and their mounting

When the rain became really heavy, the art director kindly moved around from one camera to the next wiping the lenses

Technical details for the Ikegami HDL-51

Scanning system	1080 (50Hz) interlaced, 1080 (59.94Hz) interlaced 1080p (23.98Hz) progressive, 1080p (25Hz) progressive 720p (50Hz) progressive / 720p (59.94Hz) progressive
Image sensor	2/3-inch 2.5M pixel CMOS sensor
Effective picture elements	H1920 × V1080 (1080i format) H1280 × V720 (720p format)
Optical system	2/3-inch 3 CMOS, f1.4
Lens mount	2/3-inch bayonet (B4) (conforms to BTAS-1005B)
Output signals	HD SDI signal (BNC 2ch): SMPTE292M Video signal (1ch): Analog R,G,B / Y,Pb,Pr selectable Phase reference signal 1ch: 3 level sync 0.6Vp-p
Sensitivity	F8 at 2000 lux
S/N	-54dB (Y)
Horizontal resolution	1000 TVL (1080i)
Optical filter	3200K, 5600K, 5600K+1/8ND, 5600K+1/32ND
Gain control	0dB, +6dB, +12dB, +18dB, +24dB, +30dB, selectable
Operating temperature	-10°C ~ +45°C (+14°F ~ +112°F)
Operating humidity	30% ~ 90% (non-condensing)
Power requirement	DC12V (11 ~ 16V)
Power consumption	Approx. 20W
Weight approx.	1.5kg (3.3lbs)
Dimensions	W90 × H103 × D180mm



▲ Clothed and unclothed! The Ikegami HDL-51 in the showroom and in position and wrapped up for the rain on board the Royal Barge

hardware. Special stands were fabricated that meant the minimum footprint while allowing for height and level adjustments. These were then covered with a 'velvet' fabric to blend sympathetically with the surroundings and prevailing colours.

During the planning it was decided to use the ACS integrated fibre system. A standard SMPTE 311 cable provides all the services for the camera and SMARThead: HD SDI transport, genlock, OCP data, head data, GPI and 12 & 24 volt power are all available on a single cable. The cabling was run in under an overhang in the superstructure above the main cabin windows from the bow to the aft area where the racks were located. A waterproof timber cover was made and dressed with red velvet drape to cover the racks which, because of space restrictions, had to be located outside.

Ops room

In addition, a fully-featured control room was created. The only viable space available was the crew mess room which was situated to the aft of the ship on the main deck level. This room accommodated an operational crew of five, consisting of director John Kirby and the two remote camera operators (Bruce Miller and ACS' Gareth Davies, each controlling four cameras), a vision engineer and links engineer.

Camera control was via eight

Ikegami OCP-200 panels. An engineering touch-down matrix was provided with outputs fed to a 17-inch OLED monitor and a Harris multi-function video scope. A HS-AV450 compact 16-channel HD mixer was used to select the cameras, with the mixer output feeding SIS Live-provided Link L1500 microwave transmitters. An integral multi-viewer built into the mixer was fed to a 42-inch LCD to provide a 'pseudo' stack and the director cut the cameras himself. Two additional monitors were provided for the mixer out/TX.

The fly-away racks located on the aft deck housed the fibre base stations and SMPTE connections. Other components included the mixer processor, Evertz HD D/As and operator preview matrixes. The latter was controlled via serial data through the ACS SMARThead desk, which allows the operator to see the camera/head selected on a single preview monitor. A tally system was built using mixer GP outputs and then distributed to both GPI on the OCP-200s and tally-boxes with camera idents for the operators.

In addition, two stereo mics were rigged on the upper deck on the port and starboard sides and these were fed into an SQN mixer plus two discrete pre-amps.

Rigging the Barge

The installation took place at the Royal Docks over three days,

The choice was made to use the Ikegami HDL-51 multi-format camera, on the grounds that this is the smallest camera in its class to offer excellent image quality, fully featured OCPs and a proven reliability record

including testing and facilities checks. Fortunately, for that part the weather was good. A brief rehearsal was carried out on the day before the Pageant to allow the crew to familiarise themselves with the equipment and the environment. Then the Royal Barge travelled overnight on 2 June from the Royal Docks to Cadogan Pier in Chelsea which would be our departure point.

On Sunday 3 June, at 07.00, the crew arrived at the pier. As forecast, the weather was not ideal. There had been heavy rain overnight and by early morning this had become a steady drizzle. It did improve slightly by early afternoon but was set to become worse. The early arrival allowed us plenty of time to get everything powered up and checked. Nevertheless, we still had a few minor dramas with the ship's power, which had plagued us during the rig; however, a solution was quickly found by running in an additional 16 amp feed.

The cameras and lenses were fitted with rain covers but, of course, while this protects them, it does not stop rain landing on the lens front element!

In fact, the rain did not cause any problems until the latter stages of the Pageant. When it did become really heavy, the art director kindly moved around from one camera to the next wiping the lenses. All the equipment remained reliable throughout the day, save a few minor microwave breakups.

This assignment was without doubt an extremely interesting challenge and also a very memorable and extraordinary occasion. BBC Events and the associated production team were delighted with the results: great views of the Pageant in progress with continuous intimate views of the Royal Family's reaction to what they were experiencing. That was the idea and that was what was delivered.

Fact File

Aerial Camera Systems
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Ikegami Cameras
www.ikegami.de/products/
broadcast/hdtv_camera