Digital Turmoil for South African TV [1]

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1. Introduction

South Africa is, like the rest of Africa, located in ITU Region 1 and therefore subject to the removal of protection for its analogue television frequencies in June 2015.[3] South Africa has formally taken on this challenge, devoting considerable resources and policymaking effort to implementing a transition from analogue to digital television – with, however, little constructive effect. Moreover, though one of Africa's most important television markets, South Africa is far from being the most advanced in progress towards digital switchover among African countries. Even in Southern Africa, its neighbours, Mauritius and Namibia, can claim to lead. Namibia has had a digital terrestrial television (DTT) service (pioneered by the South Africa-based, but increasingly pan-African, MultiChoice group) since 2005 (though terrestrial reception is confined to a few thousand homes in Windhoek). Mauritius has had digital terrestrial services since 2006, with new Mauritius-originated channels on-stream from 2008, and is also well on the way to meeting its switchover target of 2011/2012 – having already achieved 100% national coverage and with around 80% of television households already having switched over from analogue to digital. Both Mauritius and Namibia have adopted the DVB-T[4] standard -- the same standard which South Africa and other Region 1 countries formally adopted at the ITU RRC-6 meeting in 2006.[5]

South Africa has set successive ambitious targets for digital switchover of television (ie, migration of its terrestrial TV signals from analogue to digital). In early 2007, the Cabinet approved a digital switch-on date of 1 November 2008 and analogue switch-off on 1 November 2011 – thus calling for a rapid three-year migration period (RSA, 2007). This migration timetable was reaffirmed in the draft Department of Communications (DoC) strategy and implementation plan documents released in March 2007 (DoC, 2007a, 2007b); re-emphasised in then-Communications Minister

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[3] ITU Regional Radiocommunication Conference (RRC-6), International Telecommunication Union, May-June 2006, Geneva.

[4] Digital Video Broadcasting-Terrestrial, the standard which was approved by the South African Bureau of Standards (SABS) in 2005, adopted by government representatives at the ITU RRC-6 in Geneva in 2006, and made official South African policy by Cabinet in February 2007.

[5] Other African countries adopting DVB-T include Algeria, Ethiopia, Ghana, Kenya, Morocco, Nigeria, Cape Verde, Tunisia and Uganda.

Dr. Ivy Matsepe-Casaburri's Budget Vote Speech in May 2007 (Matsepe-Casaburri, 2007),[6] and integrated into the DoC's official Digital Migration Policy of August 2008. Latterly, however, the DoC has acknowledged that the switchover target date may need to be reviewed (Ensor, 2010; McLeod, 2010c), and the regulator ICASA[7] has ruled that analogue switch-off can only be in 2013 at the earliest.

The structure of South Africa's television broadcasting system is familiar. There is a public service (some would say state) broadcaster, the SABC;[8] a significant commercial sector divided between the largely advertising-financed e.tv and the largely subscription-financed M-Net/MultiChoice stable of services; a regulator, ICASA, enjoying formal independence of government; and two transmission networks: Sentech, owned by the government (and, in South African parlance, a para-statal) and Orbicom (a branch of the MultiChoice pay-TV operation). South Africa also has an IT sector of reasonable size and sophistication with the competencies and ambition to manufacture DTT-enabled STBs (set-top boxes), with digital satellite STBs already being manufactured in South Africa for use in several countries.

The government's digital migration plans have been striking both for their consistent ambition – eg, in aspiring to a notably short migration period of only three years – and for the frequency of their revision. At the time of writing, in August 2010, South Africa's DTT policy is in turmoil. A primary contributor to the turmoil was the government's decision in mid-2010 to review the technical standard, DVB-T (which South Africa had adopted at the ITU in 2006) after powerful lobbying in favour of adoption of the ISDB-T standard.[9]

In addition to uncertainty about the DTT transmission standard, there is, at the time of writing, continued uncertainty on the features of, and manufacturing strategy for, the DTT set-top box – in spite of government and industry beginning talks on these matters in mid-2007. Moreover, the past few years have been a particularly torrid time for several South African broadcast sector stakeholders, including the SABC, the signal distributor Sentech, the government (DoC), and the regulator ICASA.

The flagship broadcaster, the SABC,[10] has experienced the resignation of its Board, appointment of an interim board, dismissal of its Chief Executive, prosecution of members of its senior management for alleged fraud, proposed legislative revision of its governance regime to make it more directly answerable to the Minister of Communications (DoC, 2009), a financial bail-out amounting to nearly ZAR1.5bn (USD205 million) (SAPA, 2009),[11] and, latterly, an intense disagreement between the duo of new CEO Solly Mokoetle and new Board Chairman Ben Ngubane on one hand and the remainder of the Board on the other – resulting in: a Parliamentary enquiry (itself controversial for Parliament's attempt to hold part of the hearing in private); calls

[6] Minister Matsepe-Casaburri died in April 2009, leading to the appointment of her successor, General Siphiwe Nyanda.
[7] Independent Communications Authority of South Africa.
[8] South African Broadcasting Corporation.
[9] Integrated Services Digital Broadband-Terrestrial.
[10] Notionally a public service broadcaster but predominantly a state-owned commercial broadcaster competing against privately-owned rivals for audiences and advertising revenues.
[11] The ZAR (South African Rand) was at the time of writing valued at roughly 7.3 ZAR to 1 USD.

for the resignation of both Ngubane and Mokoetle; suspension of Mokoetle by the Board; and an announcement by Mokoetle, through his lawyer, that he would take legal action to fight against the suspension (SAPA, 2010a). Meanwhile, the regulator, ICASA, is widely viewed as weak and lacking in competence,[12] and it too is faced, via a proposed legislative amendment, with a potential change in governance (again, to make it more responsive to the Minister) (DoC, 2010). Symptomatic of ICASA's difficulties were the legal proceedings initiated against it in 2009 by one of the leading commercial broadcasters, e.tv, seeking to set aside ICASA's digital switchover regulations on a number of grounds (Vecchiatto, 2009). e.tv's plea resulted in ICASA revising and re-issuing (in early 2010) the regulations. ICASA has also found itself having to contradict government policy on the dual illumination period. ICASA has clearly stated that the government-mandated 1 November 2011 analogue switch-off is not feasible (ICASA, 2009a). In 2009, the regulator proposed a revised switch-off date of 30 March 2012 (ICASA, 2009b), and then, in February 2010, ICASA ruled that, because of multiple uncertainties, the start date of the three-year migration could not be determined and would only be announced at a later date – effectively pushing the analogue switch-off date to mid-2013 or later (ICASA, 2010). In contrast, it was only in mid-2010 that the government began to publicly acknowledge the unrealistic nature of the 2011 switch-off target, with the Communications Minister only willing to say that the 2011 switch-off *might* need to be revised (Ensor, 2010; McLeod, 2010c).

Further, the Communications Minister himself, General (Retired) Siphiwe Nyanda (who succeeded Matsepe-Casaburri upon her death in April 2009), dismissed his digital switchover advisory board (the "Digital Dzonga")[13] in April 2010, and then also dismissed his top civil servant, the Director-General of the DoC, Mamodupi Mohlala (formerly a Councillor at ICASA), in July 2010. A new Digital Dzonga was appointed four months later, in August 2010, and in the same month Mohlala was reappointed as Director-General – though only, it seems, as a procedural device prior to her being found another comparable public sector appointment (Jones, 2010). Both Nyanda and Mohlala are controversial figures: Mohlala for a putatively autocratic and clientalistic management style (Mapiloko and Underhill, 2010) and Nyanda for his alleged use of his office to secure government and para-statal company contracts for his associates and his own and associated companies (Basson, 2010).

The problems for the DoC on digital migration began in March 2007 with the release of its draft Digital Migration Policy and Strategy documents, which drew criticism from a wide range of stakeholders. Despite being given only a small timeframe for input, stakeholders managed to generate lengthy submissions pointing to a multitude of problems in the plans. Stakeholders were assured that their inputs would be reflected in the DoC's final Digital Migration Policy to be

[12] See, for instance, T Lund (2009) Icasa: 'Fire Them All'. *FIN24.com*, 18 May. Available at http://www.fin24.com/Business/Icasa-Fire-them-all-20090518 [Accessed 1 August 2010].

[13] "Digital Dzonga" translates as "Digital South." Set up in 2008, the 12-member council comprised representatives of the ICT industry, broadcasting, labour and consumer groups. Minister Nyanda stated, on disbanding the Dzonga, that he had received a report "suggesting a possible conflict of interest" among some of them. It might be thought unsurprising that a body made up of representative stakeholders included parties with interests in the outcome of the switchover process.

gazetted in June 2007. But this June 2007 deadline was missed, and the policy was eventually only finalised more than a year later, in August 2008, and made public in September 2008.[14]

Meanwhile, the woes of the SABC, ICASA and the DoC have at times been matched by failures at Sentech, the para-statal signal distributor which is expected to provide the DTT distribution network for terrestrial broadcasters (SABC, e.tv, M-Net). Like the SABC, Sentech ran a huge loss in the 2009/10 financial year, with one estimate putting the loss at ZAR214 million (USD29 million) (Mochiko, 2010). In January 2010, a task team appointed by the Communications Minister called for, and received, the resignations of the entire Sentech Board, and its CEO, Sebiletso Mokone-Matabane. A new Sentech Board and acting CEO took over on 1 April 2010, but the troubles continued in August when Sentech's presentation of a turnaround plan to Parliament was cancelled by the Parliamentary Portfolio Committee on Communications because Sentech only distributed its presentation documents to the Committee on the morning of the meeting. The Sentech Board Chairman reportedly urged the Committee to hear the presentation, by saying: "There are many problems with what is happening in Sentech. These are going to increase. I appeal to you — let Sentech do its presentation" (SAPA, 2010b).

In terms of actual progress towards digital migration, there has, somewhat ironically, been a certain degree of digital migration in South Africa during the tumultuous period since the Cabinet mandated the migration in 2007. A few hundred thousand South Africa households have joined the body of digital satellite TV households by signing onto the MultiChoice and TopTV pay-TV services (MultiChoice, 2010; BizCommunity, 2010). But this does not address the core of South Africa's terrestrial television digital migration strategy, which requires terrestrial analogue free-to-air services and homes to migrate to a terrestrial digital free-to-air system rather than to digital satellite pay-TV. At the time of writing, the only households consuming digital free-to-air TV are the few thousand homes – in Pretoria, greater Johannesburg (including Soweto), Cape Town and Durban – participating in the (separate) DTT trials currently run by SABC and M-Net and consuming trial digital add-on channels.

In short, nearly two years into a migration process that was supposed to begin in earnest on 1 November 2008, household migration to DTT has not even begun in South Africa – a daunting situation given the scale of the household migration that is intended.

South Africa's DTT policy incoherence is overshadowed and exacerbated by concurrent attention to both a Public Service Broadcasting Bill (to establish, among other things, a new legislative foundation for the SABC and community broadcasters) (DoC, 2009), and a Bill to reformulate the operations of ICASA (DoC, 2010). Both bills are controversial, not least because both presage increases in Ministerial powers (and consequential diminution of SABC's and ICASA's independence): a representative provision is that specified in clause 2(d) of the ICASA Amendment Bill which requires ICASA to "implement policy and policy directions made by the Minister in terms of the Electronic Communications Act and Postal Services Act;" (DoC, 2010) –

[14] The DoC's Broadcast Digital Migration Policy of August 2008 was made public in the Government Gazette on 8 September 2008.

this in spite of the Constitutional protection of ICASA's independence in broadcasting matters under Section 192 of the South African Constitution (RSA, 1996).[15]

2. The Scale of South Africa's Migration Challenge

There are around 9 million TV households in South Africa, and at present only around 2 million of these households are consuming digital TV, via the satellite pay-TV multi-channel offerings of MultiChoice and TopTV (MultiChoice, 2010; Bizcommunity.com, 2010). That leaves another roughly 7 million TV homes still using analogue free-to-air terrestrial signals – through which these households access three SABC channels (SABC 1, SABC 2, SABC 3), the e.tv free-to-air channel, and, in some metropolitan areas, a community TV channel. These 7 million households receive their analogue TV signals via the traditional set-top "rabbit ears" antenna, or a rooftop antenna, and the signals they receive are transmitted by the more than 200 Sentech transmission towers around the country. It is these 7 million analogue free-to-air households that need to migrate over to digital for government's plans to succeed and analogue switch-off can occur.

It can be expected that some of these analogue households will migrate via the satellite pay-TV route, by becoming subscribers to MultiChoice or TopTV or another licensed subscription TV provider (eg, the Christian-based Walking on Water service or the Super 5 Media operation formerly known as Telkom TV, both of which have yet to come to market). The affordability of digital satellite pay-TV has improved greatly in recent years in South Africa, with the lowest-cost packages from MultiChoice and TopTV sitting at ZAR99 (USD14) per month, significantly cheaper than the package that was MultiChoice's sole offering in the period up to late 2007 when it was the country's only satellite pay-TV licensee. After ICASA's licensing of potential pay-TV competitors to MultiChoice in late 2007, MultiChoice started offering cheaper packages, and when one of those new licensees, TopTV, came to market in May 2010, this new entrant also offered low-cost bouquets.

Thus, it can be argued that ICASA's licensing of potential competitors to MultiChoice in late 2007 has thus far been the only policy/regulatory intervention to have secured a measure of migration towards digital TV in South Africa. However, this migration has been mostly among relatively well-off households and, as in the United States, the UK and elsewhere, it is South Africa's low-income households that pose the greatest challenge to digital migration. Even if another 1 million households were to move over to digital via satellite pay-TV in the coming years, that would still leave another roughly 6 million analogue TV households that need to be enticed, or compelled (or a bit of both) to migrate. And around 4.5 million of these households are too poor to afford the equipment necessary for migration, notably the set-top box, and in some cases a yagi aerial (DoC, 2008). It is these 4.5 million low-income TV households that will determine the pace of digital migration in South Africa – just as it was the presence of low-income US households still consuming analogue which forced President Barack Obama to delay American digital switch-off in early 2009 (AFP, 2009).

[15] Which provides for "an independent authority to regulate broadcasting in the public interest, and to ensure fairness and a diversity of views broadly representing South African society."

3. Digital Terrestrial Television (DTT)

In countries such as South Africa, with no cable-TV and a dearth of wired telephony,[16] it is wireless platforms that are the key to migration. The two main wireless digital TV platforms at present are digital satellite (also known as direct-to-home, DTH) and digital terrestrial (DTT). The South African government has decided that DTT is the best platform for getting analogue free-to-air households to go digital, with satellite only used for remote households. The choice to use digital *terrestrial* free-to-air, as opposed to digital *satellite* free-to-air, to drive migration, was made on the grounds that: digital terrestrial set-top boxes are cheaper than digital satellite boxes; digital terrestrial reception doesn't require the household to purchase a satellite dish; converting Sentech's existing analogue terrestrial transmission towers into digital-capable towers is a better investment than paying foreign firms for satellite capacity; and digital terrestrial systems are seen by some as better for national security/sovereignty, as they are not susceptible to the interference/whims of foreign satellite transmission firms.[17]

The plan for South Africa, as proposed by the Digital Migration Working Group (DMWG) in 2006 and endorsed by the DoC's policy of August 2008, is for the para-statal signal provider Sentech to roll out the new digital terrestrial DTT network – and, to the extent that satellite DTH signals might be needed to reach households in remote areas, both Sentech and Multichoice's Orbicom unit already have that capacity, via their leasing agreements with international satellite providers.

4. The DTT Transmission Standard

To date, South Africa has planned and begun to implement a system using the DVB-T standard. DVB-T provision at 8Mhz is knitted into the national radio frequency plan and is specified in the 2008 Broadcast Digital Migration Policy. However, as stated above, adoption of the DVB-T standard has recently been thrown into question. The Director-General of the DoC, Mamodupi Mohlala, stated in early June 2010 that Southern African Development Community (SADC) members were reviewing their earlier agreed adoption of the DVB-T standard and were considering the possible adoption of another standard – possibly DVB-T2 or ISDB-T. The Minister of Communications, General Nyanda, was reported on 2 June 2010 to have confirmed that a review would take place and that it might delay switchover by "a few months." Other stakeholders, including ICASA and the major broadcasters, claimed that any delay would be longer (ICASA claimed at least six months) and broadcasters argued that a change to the standard already adopted was inadvisable (Ensor, 2010).

The possible replacement of the DVB-T standard by ISDB-T has occasioned much concern (transition from DVB-T to DVB-T2 is relatively straightforward and offers clear benefits in terms of spectrum efficiency). Two non-exclusive explanations for consideration of ISDB-T circulate:

[16] ITU ICT indicators suggest that in 2007 fewer than 10% of South African homes had a wired telephone connection. See ITU (2008) *Africa, ICT Indicators, 2007*. International Telecommunication Union. Available at http://www.itu.int/ITU-D/ict/statistics/at_glance/af_ictindicators_2007.html [Accessed 1 August 2007].

[17] It has been observed that this rationalisation has little substance in view of the fact that South Africa's terrestrial transmitters are fed by satellite.

first that there are reasons of high politics to change standards and, second, that there are potential pecuniary advantages to decision-makers if such a change were to be made.[18]

In terms of high politics, South Africa is cultivating development of an international bloc – the "BASIC" group (Brazil, South Africa, India, China) – so as to advance South African (and other developing world) interests. The ISDB-T standard has been developed in Japan but adopted and further developed in Brazil – a leading BASIC group member. On 18 April 2010 the President of Brazil, Luiz Lula da Silva, announced that the BASIC group would work towards a common standard for digital television.[19] However, the Southern African Digital Broadcasting Association (SADIBA), which coordinated a Southern African commitment to DVB-T in 2006, commented that ISDB-T has "limited and fragmented implementation in Japan and Brazil,[20] with recent adoption by Argentina, Peru and Chile, among others" (McLeod, 2010a).

SADIBA warns that ISDB-T does not offer technological benefits over DVB-T. "It is not the most advanced technology available today, and nor is it more [spectrally] efficient, affordable, interactive or more flexible than DVB-T" (McLeod, 2010a). The Association says implementing ISDB-T will result in "increased radio interference, poor spectrum efficiency and perpetual spectrum wastage" and will not conform to a binding agreement signed by South Africa and International Telecommunication Union Member States in 2006 or to the frequency band plans coordinated through the ITU with other Group 1 states in Europe and elsewhere in Africa. "It's really looking like there will be a showdown over this," wrote SADIBA representative Gerhard Petrick.[21] "No-one has asked for a change in the standard other than the department of communications, which has been lobbied hard by Japanese and Brazilian lobbyists." And further, Petrick wrote, "Efforts to reconsider the standard are not based on any scientific or factual assessment of the performance of these standards" (McLeod, 2010a). Critics of ISDB-T also claim that its STBs will cost more (comparing Brazil and UK prices for STBs) than DVB-T boxes and that there is uncertainty about the costs and practicability of modifying a system, working on 6Mhz in Brazil, to the South African 8Mhz standard. To do so would *prima facie* require a new, and thus costly, chip set dedicated to South African conditions. Moreover, adoption of a new standard would, broadcasters estimate, incur a delay of three to five years in effecting switchover.

The Group Executive for Regulatory Strategy at e.tv, Lara Kantor, who was formerly a senior executive at the SABC and Chair of the first Digital Dzonga, has stated that South African manufacturers and broadcasters have invested more than "a quarter of a billion Rand" in DVB-T

[18] There is an abundance of testimony to this effect on South African blogs, news and Internet discussion fora. Proponents of ISDB-T have also claimed that DVB-T trials in South Africa have revealed significant problems of implementation though this claim has, convincingly, been refuted by broadcasters and others with direct experience of the trials.

[19] Establishment of a common, BASIC standard seems unlikely given that China already has a (different) digital terrestrial standard and that India has announced its adoption of DVB-T2.

[20] For an account of switchover in Brazil (commissioned by the South African trade association, the National Association of Broadcasters (NAB)) see Farncombe (2010) *Case Study: The Brazilian Digital TV Market.* May 2010, Farncombe Consulting Group. Available at http://www.nab.org.za/contentfiles/82_Farncombe%20Brazil%20Case%20Study%20Report.pdf [Accessed 1 August 2010]

[21] Petrick is Chief Technologist for MultiChoice and formerly worked for Sentech. He is active in SADIBA (Southern African Digital Broadcasting Association), notably in its Policy and Regulatory and Digital Radio groups.

and that much of this investment would be wasted if the standard were to be changed (McLeod, 2010b). Petrick of SADIBA has estimated that R270 millon (USD37 million) has been invested (Petrick, 2010).

Kantor has summarised the problems with switching standards as follows: "If we adopt this standard we will be undermining the African consensus as all countries on the continent have agreed on DVB-T.[22] Secondly, the industry's enormous financial investment in DVB-T would be wasted. Thirdly, ISDB STBs are more expensive (ie. a DVB-T STB will cost around R700 while an ISDB one would cost in the region of R1,400). Fourthly, the adoption of ISDB would put the commercial launch of DTT back by about four years. Lastly, there is a lack of ISDB skills and technology in South Africa" (Screen Africa, 2010).

5. The Set-Top Box (STB)

STB prices are particularly important in South African conditions. Much of the South African population is very poor: GDP fell 2% in 2009 and GDP per head is 107th in the world. Moreover, South Africa has a particularly high Gini coefficient (marking the size of income differentials in the country) of 65.[23]

As noted above, it has been estimated that 4.5 million TV households will not be able to afford the STB, at whatever price, that will be needed to receive DTT transmissions. (It must also be borne in mind that some households, depending on their location, will also need to make use of rooftop yagi aerial to receive DTT, which will create another new cost.) The government has made a commitment to subsidise STBs by ZAR2.5 billion so that 70% of the estimated R700 cost of each STB can be covered by government for the 4.5 million low-income households (Sentech, n.d.). If Kantor's aforementioned estimate that going with ISDB-T instead of DVB-T will double the cost of the STB, then presumably government's STB subsidisation budget will need to be recalibrated. Also potentially undermined by a higher-priced STB would be the government's assumption that about 1.5 million households that do have the necessary discretionary income can be enticed by a low-priced STB and "digital incentive channels" to migrate to DTT without subsidisation.

Another contentious STB issue, regardless of the transmission standard adopted, is the issue of whether conditional access (CA) should be built into the standard specifications of the box. A CA system would allow, among other things, the SABC to ensure that, for the purposes of licence fee collection, all TV households are captured on a database and (controversially for anti-poverty, civil liberty and information rights advocates) potentially disconnected from the DTT network should they be found not to have paid their annual TV licence fee.

It also must be decided whether the DTT box should be compatible with the established population of satellite pay-TV boxes, and, if so, exert regulatory/legislative power to ensure that the satellite pay-TV operators (currently MultiChoice and Top-TV) cooperate. (It could be a significant boost

[22] However, some reports suggest that Kenya and Tanzania have resiled on their previous commitments to DVB standards and are to adopt the ISDB standard. See NexTV Latam (2010) *African Ministers in Favour of ISDB-T*. 14 July. Available at http://www.nextvlatam.com/Nota.aspx?IdContenido=1491 [Accessed 1 August 2010].

[23] See CIA (n.d.) "World Factbook," Central Intelligence Agency. Available at https://www.cia.gov/library/publications/the-world-factbook/index.html [Accessed 1 August 2010].

to DTT uptake if satellite pay-TV subscribers were able to move over to DTT without having to buy a new STB.)

Steps also need to be taken, presumably via the re-constituted Digital Dzonga advisory body, to dispel any myths that might be circulating among the general public in relation to digital TV reception, eg, a belief that one cannot view digital TV on an analogue TV set. The reality, of course, is that a digital STB allows standard definition digital services to be viewed on any TV set, analogue or digital. Nonetheless, some consumers may mistakenly believe – perhaps encouraged by some salespeople at electronics shops – that for reception of digital TV (whether high or standard definition), a digital, HD-enabled set is required. All South African DTT channels will initially be in standard definition, thus only requiring a digital STB, not a digital, HD-enabled set. The DoC seemed to be playing into this potential misunderstanding to some extent in 2007 with its draft proposal that there be a moratorium on sales of analogue TV sets from 1 November 2008 onwards. Two written submissions to the DoC at the time pointed out that analogue TVs would still be appropriate for digital reception (RC&C Manufacturing, 2007; Teledex Manufacturing, 2007), and one submission warned: "As soon as this proposal become[s] public knowledge it will effectively 'kill' the TV market…It is unlikely that the TV industry would survive this experience" (RC&C, 2007: 2). The DoC subsequently dropped the proposal.

Also important with regard to STBs is the manufacturing. The DoC and the Department of Trade and Industry (dti) have both said that they want to see significant local manufacturing of the DTT STB as a boost to the South African electronics industry. In its written submission to the DoC in 2007, South Africa's main existing set-top box (STB) maker, UEC Technologies of Durban -- which has been manufacturing digital satellite STBs for use by MultiChoice pay-TV customers since the launch of DStv in 1995 -- emphasised its 13 years of experience with STBs, and its desire to cooperate with government in development and manufacture of South Africa's DTT STB (UEC Technologies, 2007). UEC and other potential South African DTT STB makers are making (plausible) claims that they have invested significant sums in preparing for manufacture DVB-T products, and thus they are particularly concerned by the government's flirtation with a change of standard to ISDB-T – and to an 8Mhz version of ISDB-T which has not thus far been used anywhere.

6. Signal Provision

For terrestrial over-the-air TV transmission in South Africa to go digital, Sentech has to upgrade and convert roughly 220 terrestrial transmitter sites around the country so that the sites can transmit DTT. This upgrade was estimated in 2007 as costing R1 billion, of which government had in 2007 only committed just over R200 million (DoC, 2007a: 16). And at the time of writing in 2010, the financial value of government's commitment to Sentech's digital infrastructure programme was still uncertain (*MyBroadband*, 2010).

In mid-2010, Sentech claimed to have rolled out around 40% of its planned population of DTT transmitters (*MyBroadband*, 2010) – significantly below then-Communications Minister Ivy Matsepe-Casaburri's target, set in her Budget Vote Speech of 24 May 2007 when she said: "I am pleased to inform the honourable members that Sentech is on schedule to meet Government's commitment by providing about 80 percent Digital Terrestrial Television (DTT) coverage by the 2010 FIFA Soccer World Cup" (Matsepe-Casaburri, 2007). Paradoxically, the DoC might at

preseent be pleased if Sentech has only completed half of its DTT transmitter rollout – because a government switch of endorsement from the DVB-T standard to ISDB-T will require changes to the transmission specifications.

The government's emphasis on achieving widespread DTT household coverage in time for the South Africa-hosted June/July 2010 FIFA World Cup was seemingly based on two key assumptions: 1) the (valid) expectation that the World Cup could have been a driver of DTT receiver purchases by soccer-loving households if the SABC (the official free-to-air World Cup broadcaster in South Africa) had been able to offer World Cup programming (eg, game replays, highlights packages, alternate language commentary) on extra free-to-air DTT-only digital incentive channels; and 2) the (erroneous) belief that Sentech DTT transmission could have played a role in helping South Africa fulfill its legal commitment to FIFA to provide high-quality digital TV feeds for use by international broadcasters. In any event, the World Cup has now come and gone, with only the few thousand DTT trial households able to watch the World Cup on DTT, and with the necessary digital feeds provided to FIFA via, as had always been the plan, a combination of digital land-lines and satellite uplinks.

In addition to the issues around Sentech's infrastructure rollout and who will cover the cost of it, there are several additional uncertainties that relate specifically to the "dual illumination" period: the period when the incumbent terrestrial channels (SABC 1, 2 and 3, e.tv, and, possibly, some community TV channels, and maybe the M-Net terrestrial subscription channels) will need to be transmitted simultaneously in both analogue and digital. This dual transmission period is necessary to allow people who have not yet switched over to get a full offering of analogue TV, while at the same time ensuring that those who do switch over get all the channels they are used to, but now in digital form, as well as the new digital-only incentive channels that the SABC and other incumbent broadcasters will be expected to transmit (though SABC's funding and delivery capacity remain in doubt) in order to incentivise switchover.

The dual transmission trial phase has begun with digital transmission of the four existing national free-to-air channels (SABC 1, 2 and 3 and e.tv) and one additional e.tv channel (eClassics) and six additional SABC channels (SABC Movies, SABC Sport, SABC NI (News International), SABC Knowledge, SABC Tots and SABC Junior.[24] However, DTT decoders have only been distributed to trial homes[25] and are not yet commercially available. Dual illumination gives rise to several complexities, including:

- Uncertainty around the percentage of population coverage that Sentech can achieve with its DTT network (and thus the coverage which broadcasters can promise in their applications to ICASA for authorisation of digital incentive channels), given uncertain government funding for Sentech's infrastructure programme and apparent financial/operational weaknesses in several of Sentech's business units;
- ICASA's promised inquiry (ICASA, 2010), in terms of Section 67 of the Electronic Communications Act (ECA), into whether Sentech is in an anti-competitive position (as argued by e.tv in its court challenge to ICASA in 2009) due to Sentech's control over the

[24] See T Manners (2010) SA's Digital TV Live Test Channels Revealed. *MyBroadband*, 25 February. Available at http://mybroadband.co.za/news/Telecoms/11592.html [Accessed 1 August 2010].
[25] M-Net has also undertaken some DTT trials in the three major metropolitan areas.

only national terrestrial signal transmission infrastructure and its control over the setting of terrestrial transmission tariffs;

- ICASA's promise (ICASA, 2010) to force pro-competitive measures onto Sentech if Sentech is found to be in an anti-competitive position, eg, ICASA could regulate Sentech terrestrial transmission tariffs and/or compel Sentech to provide no-cost digital terrestrial transmission to broadcasters during the dual illumination period;
- ICASA amendment of terrestrial broadcaster licences in order to recognise broadcasters as users of both analogue and digital multi-channel frequencies, and possible amendment of broadcaster digital tariff agreements with Sentech should Sentech's tariff-setting be found to be anti-competitive; and

- Public protests if a community TV station loses its analogue frequency during dual illumination. (ICASA has stated that community stations cannot be guaranteed analogue frequencies during dual illumination because "frequencies are not enough to satisfy existing demand" (ICASA, 2009: 22) and Cape Town TV is particularly vulnerable because of frequency scarcity in that part of the country.)

There is an expectation from broadcasters that state-owned Sentech must be enabled and/or compelled to provide low-cost, ideally free, digital transmission during the dual illumination period. Sentech, meanwhile, claims that it needs to recover costs associated with its DTT infrastructure rollout via transmission fees – an assertion given some validity by government's slowness in committing funds to Sentech's DTT project.

Sentech's operational woes have seen it attacked from several quarters. In 2007, the DoC openly cast doubt, in its draft digital migration documents, on Sentech's ability meet its technical commitments for digital migration. The DoC called for Sentech to re-structure itself and to seek outside technical assistance. Sentech response was that it "strenuously" denied that it lacked "the necessary technical and/or managerial skills to effect digital migration," and that it dismissed the DoC's call for "structural changes" and for a "technical partnership," saying it "not been consulted by Government (its shareholder)" on the matter of a technical partnership (Sentech, 2007: 9).[26]

The SABC's has also taken swipes at Sentech, including the 2007 statement that "SABC notes that there has been a reduction in the current quality of service from Sentech and we are concerned about Sentech's capacity to roll out DTT within the timeframes allocated" (SABC, 2007: 30). In the same document, the SABC also criticised the lack of clarity around state subsidisation of the extra transmission costs necessary during dual illumination (2007: 16). Further, e.tv was highly critical of Sentech's claims that digital transmission of a single channel would cost 70% of the current cost of transmitting an analogue channel. As e.tv put it, with each digital multiplex able to carry around eight channels, at a 70% charge "Sentech will earn 560% of the signal distribution fee currently charged for an analogue service" and "this is hugely inflated…" (e.tv, 2007: 16-17).

[26] The perception of Sentech's capacity to implement new services was done no favours by the failure of its MyWireless wireless Internet offering, which failed to gain significant market share when it came on the market in 2004 – even though it was the only wireless Internet service offering in South Africa at the time MyWireless was finally discontinued in 2009 and contributed to Sentech's dismal financial performance in 2009/10 (See Mochiko, 2010).

Unsurprisingly, MultiChoice's signal distribution subsidiary Orbicom has also been critical of Sentech's role in recent years. In an April 2007 submission to the DoC, Orbicom's objected to the emphasis placed on Sentech as the primary role-player in digital terrestrial migration, given Orbicom's possession of a licence to provide terrestrial signal distribution to M-Net. Orbicom protested that "there are a number of statements in the draft Strategy and draft Implementation Plan which suggest that Sentech is currently the only licensed broadcast signal distributor in South Africa,…" (Orbicom, 2007: 2).

7. The Broadcasters and Programming

There is a danger of the aforementioned technical issues distracting attention from what is the most important requirement for digital migration: new service offerings. Given that the state is not in a position to pay 100% of the cost of set-top boxes and aerials necessary to convert analogue free-to-air homes into digital free-to-air homes, then some degree of incentivisation is necessary through additional service offerings via DTT. And while the government policy documents speak of the lure of non-broadcast digital services made possible by DTT (eg, interactive e-government), the main driver of migration to digital TV must certainly be TV.

The SABC, as a free-to-air public service broadcaster, a state-owned enterprise, and a receiver of funding through a legislatively-mandated compulsory annual TV licence fee payable on each TV set in operation in the country, has a duty to provide the additional and enhanced programming necessary for its sole shareholder, the government, to meet its switchover goals. But the SABC in its present state is not in a position to adopt a leadership role in any matter, let alone such a massive undertaking as driving digital migration. Its finances, management and governance are all in turmoil, and its relations with the South African independent production sector are extremely troubled due to delayed payments to production companies in the 2009/2010 financial year – delays which resulted in layoffs, and even company closures, in the very sector that will be called upon to produce additional and enhanced digital programming.

In addition to the SABC's woes, there is little evidence in the South African broadcasting sector of a new revenue stream or funding source to cover the increased broadcaster costs that will be required to produce additional channels and to deploy additional programming. At the same time, there is every reason to believe that some elements of the current revenue flow to broadcasters will be disrupted by fragmentation of audiences across multiple channels and will require shifts in approaches to generating ad spend and marketing revenue (eg, greater emphasis on product placement).

The commercial free-to-air broadcaster e.tv, which also has public service obligations in return for being the only national free-to-air commercial licencee, is also expected by government and the regulator to play its part in driving migration. But e.tv also faces uncertainty in terms of its ability to generate the revenues necessary to fund additional programming.

The SABC is calling on the state to provide additional core funding for its programming, but the Treasury is unlikely to be forthcoming given the huge financial bailout it has recently had to provide to the public broadcaster – and given Parliament's scathing interactions with the SABC in 2010.

One ray of light could come from the aforementioned Public Service Broadcasting Bill, which calls for the state to create a Public Service Broadcasting Fund (PSB Fund). Any broadcaster would be able access the fund in support of public interest programming, but this potentially useful mechanism for supporting the additional programming needed in the new digital dispensation is included in a bill made uncertain by other, highly contentious provisions, including provision for a dedicated income tax for the SABC, provision for greater Ministerial control of the SABC, and provision for greater municipal government influence in community broadcasting. Moreover, any such commitment would require public funding and would compete against a host of other claims – including education, health, housing, universal affordable access to clean water, sanitation and electricity, etc.

Another potential boost to the viability of digital incentive channels could come from ICASA when it conducts its promised (ICASA, 2010) review of the 2006 TV local content quotas. The existing quotas mandate 55% local content for SABC public service channels (SABC 1 and 2), 35% for the SABC public commercial channel (SABC 3), 45% for commercial (e.tv) and 10% for terrestrial subscription (M-Net). In its review of the quotas, ICASA could, for instance, revise the rules to allow a greater number of programme repeats to count towards local content scoring, and the new rules could allow additional local content points to be earned when alternative language tracks are provided for the same programme. ICASA will also be under pressure to reduce the local content percentages, and to make the percentatges apply not per channel but rather across all the channels delivered by a broadcaster. For instance SABC has argued that ICASA should consider a 25% local content quota "across the multiplex" for the SABC channels (SABC, 2007: 6).

6. Citizen Access

ICASA has promised, in its finalised Digital Migration Regulations of February 2010, that each broadcaster application ICASA receives for authorisation of a new digital channel will be subject to a public process to determine whether the proposed channel meets a "public value test," and ICASA has additionally said it will be open to suggestions, during these public processes, as to what constitutes public value (ICASA, 2010). Thus, it is difficult at this point to predict which types of digital channels will be judged as having "public value" and receive approval from ICASA.

Given this current absence of clear parameters for determining what ICASA regards as the desired outcomes of digital broadcasting, we will rely on the same criteria that we proposed in 2004 (Armstrong and Collins, 2004). As we pointed out in 2004, the SABC's Editorial Policies of 2003 call for the SABC to strive towards universality by "making its services available throughout South Africa" and by ensuring its services are affordable. Meanwhile, the 1998 Broadcasting White Paper calls for services that "recognise the special character of language broadcasting" (DoC, 1998), and the SABC Language Policy of 2003 says that programming "must strive to reflect the needs of each language community" (SABC, 2003a: 35-38, 26). Thus, three "citizen access" criteria emerge, against which South African TV can be evaluated -- 1) signal coverage, 2) affordability and 3) home-language provision – and we argued in 2004 that South African terrestrial free-to-air TV was weak in all three respects. Today, six years later in 2010, we make the same argument, because:

- signal coverage is still by no means universal, as 8% of adults live in remote places that do not receive any free-to-air terrestrial TV signal (*MyBroadband*, 2008);
- affordability is still a problem, with hundreds of thousands of households still not owning a TV set; and
- home-language provision is still low for all groups except English home-language speakers, with speakers of four of South Africa's 11 official, Constitutionally-protected languages -- Xitsonga, Tshivenda, siSwati and isiNdebele – being particularly poorly served.

Will the migration to DTT improve South African TV's citizen access?

On the first part of the test – expanding signal coverage – DTT does not improve the score. While cheaper to transmit because of its lower power usage, DTT poses the same problems as analogue terrestrial in the dynamics of extending its transmission infrastructure. Extending coverage to the remaining 8% of South African adults still not receiving a terrestrial signal is difficult because these un-served people live in low-population-density areas with low per-capita incomes and low levels of electrification and TV ownership, making it uneconomical for broadcasters to pay for transmission into these zones and thus uneconomical for the signal provider(s) to roll out transmission infrastructure to these areas. As the SABC said in its 2003 Universal Service and Access Policy, "a huge investment in infrastructure results in reaching only a very few people, or provides a social but not a financial return" (SABC, 2003a: 38). There is no evidence to suggest that capital expenditure on DTT infrastructure will be significantly more economical – in terms of the ratio of increased viewership to expenditure on extending the transmission network – than it is with the existing analogue infrastructure, and there is abundant evidence that Sentech, given its current financial/management woes, will hard-pressed to replicate its 92%-of-population analogue coverage in digital.

In terms of the second citizen access criterion – user affordability -- DTT once again does not improve the current situation. A key barrier to TV signal access in South Africa is low household income, particularly in rural areas. Many households do not have the money needed to buy a TV set and/or to finance access to a regular electricity supply to power the set. The SABC 2003 Editorial Policy on Universal Service and Access says programming must be "delivered via the most appropriate technical means available at an affordable price to broadcasters and audiences alike" (SABC, 2003a: 38). In terms of affordability to broadcasters, DTT is cheaper than analogue as a terrestrial broadcast platform (once the analogue/digital dual illumination period is over). But in terms of affordability to audiences/viewers, digital platforms are problematic, because they require the consumer to purchase new or additional reception equipment. As the SABC put it in 2003, "the key question is whether these advances in technology will help us to deliver affordable public broadcasting services, or merely add to the inequality in provision of services and widen the digital divide" (SABC, 2003a: 36).

On third part of the test – home-language TV provision – DTT does potentially generate an improvement, but with many contingencies. According to the 2001 Census, only 8.2% of South Africans identified English as their home language, with 23.8 percent speaking isiZulu at home, 17.6 percent speaking isiXhosa, 13.3 percent Afrikaans, and so on (OMD, 2010). Thus, English is not the primary home language in the majority of South African households and the majority of households would benefit from more opportunities to consume non-English programming.

At present, the majority of South African TV programming is English-only, and digitisation is, at best, unlikely to improve the proportion available in languages other than English and may well worsen the relative position of languages other than English. While the present SABC 1 and SABC 2 do carry non-English programming and subtitled programming (allowing consumption in English and one other language), the majority of SABC 1 and SABC 2 programming is English-only. SABC's third television channel, SABC 3, is English-only, and e.tv is almost entirely English (apart from some early-morning newscasts in other languages). Community TV stations offer programming in a wide range of languages, but their broadcast footprints are small.

DTT could to some extent ameliorate this home-language programming deficit because its interactive, multi-channel characteristics could allow viewers to choose among multiple language tracks or multiple subtitling options for a single programme, including services for persons with disabilities. But this benefit is contingent on the SABC and other broadcasters finding the financing necessary to produce alternate audio and subtitling tracks for programming.

A second way in which DTT could improve home-language TV programming provision would be if the SABC were to commission the two still-born regional TV channels, SABC 4 and 5, which were licensed by ICASA in 2005 as non-English channels, but which have not yet been launched. ICASA "granted" licences to these SABC for the two channels – one to serve the north of the country, one to serve the south. The channels were to use the languages (apart from English) most widely spoken in the respective areas –however ICASA did not formally "issue" the licences. ICASA refused to licence SABC 4 and 5 on the grounds that the channels could not go ahead without dedicated government funding, ie, the regulator effectively told the government, which had controversially forced the channels onto both the SABC and the regulator with the Broadcasting Amendment Act of 2002, that if it wanted the two new channels it would have to pay for them. Treasury has so far refused to fund the channels.

A new DTT dispensation could potentially breathe some life into SABC 4 and 5, because the transmission costs would be much lower than in analogue. There is a push for the resuscitation of the idea of SABC 4 and SABC 5 in the DoC's 2008 Broadcast Digital Migration Policy, which calls for the SABC to "cater for three public regional television channels" in the digital dispensation (DoC, 2008: 17). The DoC's 2009 Public Service Broadcasting Bill also re-emphasises the need for regional TV, and calls for regional TV channels to be funded by the proposed new PSB Fund. ICASA, however, is less bullish on the idea of the SABC rolling out regional channels, stating in its (now revised) 2009 DTT Regulations and Position Paper that it is "mindful of the financial implications of introducing additional regional services" (ICASA, 2009: 18).

It is unfortunate that the Public Service Broadcasting Bill of 2009 repeats the call, from the 2002 Broadcasting Amendment Act, for the SABC's regional services to be broadcast "regionally" (DoC, 2009: Section 12(3)(a)(i)). This contradicts the useful potential for SABC regional TV services to be part of a national multiplex, which would allow, for instance, a Tshivenda-speaker living in the south of the country to consume Tshivenda-language progamming carried on the northern-focused SABC 4 service, and, likewise, a siSwati-speaker living in the north to consume southern-focused SABC 5 programming in siSwati. Planning for only northerners to view the northern channel and only southerners to view the southern one is based on the false logic (ironically reminiscent of the

apartheid era) that the living patterns of black South Africans can and should be mapped out in terms of contiguous ethnic/linguistic enclaves and homelands in particular parts of the country. The reality is that cities and towns in all parts of South Africa, and even rural areas to some extent, have been multi-ethnic and multilingual for roughly 100 years, since the beginnings of the mining industry: the artificial mono-ethnic rural enclaves forcibly created during apartheid were, and are increasingly becoming, a fiction.

But regardless of how programming and transmission of SABC 4 and 5 are conceptualised, the fate of the channels – and of that particular approach to increasing non-English home-language programming provision – is ultimately dependent, as it always has been, on provision of state funds, and there is little evidence of such funds being forthcoming in the short-term.

And thus, the transition to DTT, as it is currently playing out, does not promise any great difference to South African free-to-air television's capacity to deliver on citizen access as evaluated in terms of our three citizen access criteria: signal coverage, affordability and home-language provision.

7. Conclusions

The South African government has clearly been seduced by the idea of a rapid three-year switchover to digital TV. All over the world, in many areas of public policy and service delivery, "going digital," and doing it quickly, is fashionable. South Africa is certainly not alone in succumbing to this fashion.[27] But the harsh reality is that the South African government's insistence on a rapid switchover in three years – instead of a more realistic timeframe of, say, twice that duration (six years) or longer – has exacerbated the already-significant difficulties posed by digital migration. The logic of a quick switchover may look good on paper, eg, in the DoC Digital Migration Policy of August 2008, which said that "this shorter 3-year dual illumination period will reduce the costs of digital migration" (DoC, 2008: 10), but the three-year timeframe and 1 November 2011 analogue switch-off continually insisted on by the DoC since 2006 were not plausible in reality.

Three years is too short a timeframe for migrating roughly 6 million households, 4.5 million of which need a huge degree of subsidisation. The last line of the Minister's "Foreword" to the August 2008 DoC policy document gave an indication of the naive and desperate nature of the planning, when it said "[t]he looming switch-on date on 1 November 2008 requires us to work at a lightning speed…." (DoC, 2008: 4). Except in times of war or elections, very few democratic governments anywhere in the world have managed to "work at a lightning speed," and it is unclear why the DoC felt that South Africa could provide an exception to the rule.

As this piece was being prepared in August 2010, the Communications Minister, General Nyanda, was quoted in the media as saying that the 1 November 2011 switch-off date *might* have to be revised (McLeod, 2010c). Thus, the government seems finally ready to (almost) acknowledge what the regulator ICASA made clear in February 2010 – that the earliest possible analogue switch-off would be in 2013, not 2011. And even ICASA is almost certainly being unrealistic (or too deferential to government) in implying that a 2013 switchover might be workable. The reality is

[27] The UK's "commitment" (if so halting and incoherent a policy can be described as a "commitment") to digital radio switchover provides a "first world" case in point.

that South Africa, like many other African countries, is going to be hard-pressed to meet even the June 2015 analogue switch-off deadline set by the ITU.

Thus, there is now the strong possibility that the delays in South Africa's digital migration will provide an intriguing and involuntary test case for what happens when a country persists with analogue terrestrial television signal transmission beyond the ITU deadline of June 2015.

It is our view – an unfashionable view which is not at present widely shared, or at least not widely articulated in public – that failing to switch off analogue by June 2015 will not do any great harm to South Africa. It is open to debate whether the removal of protection for South Africa's analogue television frequencies is likely to result in any harm if analogue transmissions were to continue. There is scant likelihood that neighbouring countries will authorise or establish services that will interfere with South African services using the unprotected frequencies.

The benefits of switchover have to be balanced against the disadvantages. The main potential benefits of digital switchover in any country are: securing protection of television transmissions from interference through international agreement (ie, via compliance with ITU planning); securing spectrum economies and the "digital dividend" when "sweet spot" spectrum is released for telecommunications, eg, wireless broadband); reducing broadcaster transmission costs; improving image quality; and improving the range of terrestrial services, including providing interactive services.

However, the extent of these benefits varies from country to country. Is there, for example, a realistic prospect of neighbour-country interference should South Africa continue with analogue transmissions after 2015? Is there urgent demand from telcos for released spectrum? Is there a business case (and/or public finance) in the short-term for additional television services using the greater spectrum efficiencies and lower-lost transmission endowed by digitalisation? And how do the uncertain short-term benefits compare to the more certain short-term *costs* of switchover (notably the cost of renewing the transmission infrastructure, the additional programming costs, and the cost of the STB required by every analogue television receiver and the additional rooftop receiving aerials required in some cases)?

Digital-only TV transmission offers potential benefits in the medium- to long-term for South Africa, but not necessarily in the short-term, and thus the transmission cost-savings that might be realised through a rapid switchover would be a case of a "false economy" that generates other costs, both political and economic. Moreover, it is not clear that South Africa can, or will, realise the potential benefits (notably additional services – whether TV or, using released spectrum, broader telecommunication and IT services) that switchover offers.

Switchover requires strong coordination among government, the regulator and industry players, and, in the case of South Africa, a great deal of government subsidy. Achieving the necessary levels of funding and coordination is difficult in a country such as South Africa which continues to have very high levels of poverty, inequality and need for social service spending; where, in 2009, the last year for which data was available, GDP fell; and where several branches of government, and many para-statal institutions, presently lack effective management.

The DoC's August 2008 Digital Migration Policy, which we quoted earlier in relation to its naive call for "lightning speed" towards migration, did actually strike a more realistic tone at another place in the document, when it said: "For the digital migration process in South Africa to be successful within the three year dual illumination or transitional period decided by Government, it is necessary to have a clear government policy and Implementation Plan. Also critical is the cooperation of all the relevant stakeholders working together with the public" (DoC, 2008: 9-10). As this article has outlined, the DoC has not succeeded in providing the "clear government policy and Implementation Plan" that it proclaimed to be essential. And the DoC's goal of "stakeholders working together with the public" has been undermined by government-created uncertainty around the Digital Dzonga advisory body meant to coordinate citizen interaction with the process; by insistence on an unrealistically short dual illumination; and by the flirtation with adoption of a new transmission standard.

The South African government's repeated insistence on an extremely rapid switchover – via a dual illumination period of only three years – may sound visionary and efficient as a means by which to "go digital" and quickly begin to enjoy all the potential benefits of the new digital-only dispensation. However, insistence on such an ambitious target is terribly misguided given the actual realities of the South African broadcasting sector, and this clumsy target-setting is merely serving to exacerbate the difficulties already inherent in the South African digital migration path. Most importantly, the degeneration of public policy formation and implementation evidenced in the troubled institutional experiences of the SABC, Sentech, ICASA and the DoC suggests that South Africa is losing the capacity to implement a policy shift of the complexity of digital television switchover.

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