NaSTA 20 - Talk for Non-Techies-the current future tech and opportunities – and some learning from my career

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Hon Sec Treasurer UK Section 2012-18
International Membership Director 2015-17
www.smpte.org/uk

Look for NaSTA in the sidebar for these slides

What are SMPTE’s features

- Membership organisation almost 8000
- International with 1/3 members not in USA
- Not a charity – USA Not For Profit
- Covers all Moving Images Audio and Metadata
- Has Members – is run by members not staff
- Delivers Education
- Sets Standards “set in Stone” almost

SMPTE in the UK serves all who are working with the technology of moving pictures and associated sound & metadata – creatively, practically and innovatively in any format, and on any platform

www.smpte.org/uk
Who are you?

• Subject?
  • History/Geography
  • English
  • Non English Languages
  • Journalism
  • Theology
  • Medicine
  • Law
  • Arts
  • Science
  • Technology /Computer Science
  • Engineering
  • Maths

Which station /University ?

What role?
• Prod/ Direction
• In front of camera
• Craft
• Engineering

What about Weitzel?

• Scripted an entire Blue Peter
• Produced and Directed items for “Tomorrows World”
• Produced wrote directed edited BBC Trailers and Eng. recruitment
• Was a BBC Official spokesperson on Sex and Violence in Programmes
• BBC Exec Producer for Audio Description
• Did the risk assessment for “Otis the Aardvark dressed as nun on skateboard on the ring road !”

• Has qualifications in
  • Electrical Engineering (KCL)
  • Theology (KCL)
  • Management specialising in Corporate Strategy (Uni Of Westminster)
  • Group Psychotherapy (Birkbeck)
• Has been organising meetings for IEE/IET/RTS / SMPTE for over 45 years
• Wrote first letter to The Times on “Engineering our Future” in 1980
• Served on Council of IEE and the Board of Governors of SMPTE
• SMPTE Fellow 2017  peter@weitzel.com
And in Techie / Business ?

- Knew that he wanted to work “behind the camera when 7 years old
- First paid by the BBC when 14 years old (52 years ago)
- Joined BBC in 1976 – and has worked in Projects/ Strategy 1978-2010
- Installed first GVG 300 Vision Mixer in PAL (and it had a NEC DVE) costs £800K in 1980
- Designed installed studio with very software controlled Vision mixing system for BBC Sport
- Led teams installing new core systems in BBC Nations and Regions – while also going stereo and about 5 other projects
- Led the international standardisation of Teletext in various forms including the worlds first open standard EPG (& PDC)
- Major author of DVB Subtitle standard
- Developer, Editor and Implementer of Audio Description in the UK
- Co wrote the BBC Technology Business plan
- Working with Video and Audio over IP in 2000
- TDA for BBC broadcast connectivity 20 years
- Consulting for major International broadcasters
- Project Director first international UHD2 transmission (“8k”) 2008 (MPEG over IP)
  - Mentored over 200 trainees

Agenda

- The Technologies you will be working with ...
- Some things I have learnt – and you need to be aware of
- What are the TV Industries – and it not just Media !

............... So where can you get jobs !

Last Year – Past Present and Future
The Past – when I was your age

- Three analogue terrestrial SD TV channels
- The Future “is Digital” – what ever that meant
  but the BBC and ITV were broadcasting “digits to the home”

The BBC and ITV did everything themselves –
Few facilities houses and very few Production Companies
Lots of small (UK) Manufacturers

Some technologies and techniques

IP – the techy type
IP – The programme makers type
IP – the viewers type
“We live an connected world”
Remote Production
Objects
IMF
Metadata
Better Pixels
**IP the techies type**

**IP** = Internet Protocol

Use on almost everything “digital”
Not just the internet
A way of putting data into “packets”
and routing then to the right place

- If it is a file then it also uses TCP/IP
  If it does not get there it resends

- If its is a stream it uses UDP
  If it does not get there it’s lost!
  and may be multicast
  But clever streams also use TCP/IP

- IP does not care if it is video audio or data
  so techies have to !!

- As everyone uses it is almost everywhere
  and relatively cheap

Broadcasters have some specialist requirements

Native Files are very large and thus needs acceleration to move
Uncompressed video is UDP Multicast at many Gbit/sec and requires constant low latency ST 2110 ST 2022-6
Thus Broadcasters use Managed Networks – and Software Defined Networking SDN

The internet is totally Unmanaged for each packet as it goes through – often a different route to the last packet .... latency changes

**BBC** has had AoIP for 20 years
And VidoIP for 17 years

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**IP the Production type**

**IP** = Intellectual Property

Your ideas in a concrete form....
Which you can trade, protect and exploit Internationally – Based on

Berne Convention for the Protection of Literary and Artistic Works of September 9, 1886
Covers things like

- Copyright
- Moral rights
- Limits of reproduction
- Fair dealing,
- Orphan rights etc. etc.
- But subtly different for literary, dramatic, musical, Artistic, Broadcast, Sound recordings etc. etc.

NOTE Consent forms – “ in media not yet invented”
... in perpetuity

C D & P Act 88

An Act to restate the law of copyright, with amendments; to make fresh provision as to the rights of performers and others in performances;........

to make provision with respect to devices designed to circumvent copy-protection of works in electronic form; to make fresh provision penalising the fraudulent reception of transmissions; .....

to make provision for the benefit of the Hospital for Sick Children, Great Ormond Street, London;
to enable financial assistance to be given to certain international bodies; and for connected purposes.
IP the Viewers type

The expectation to get on the internet, and access
- The www
- Social media
- Email
- Streaming services etc.

“Anything ............”

“Any time Any place Any where”

See https://www.youtube.com/watch?v=5ROK_ifesX8
Note this is from the 1970s – certainly in the 80s and 90s this was what broadcasters/ The BBC were thinking

We live in an connected world

Technology has enabled ideas to be exchanged instantly –
Both good and evil ..... 
What is true?
What is informed?

We can see the goings on around the world in a moment!

And you can get your message around the world without the BBC- just as easily as you tell your family

Some Technology steps
- Writing
- Printing
- The telephone
- Sound recording
- Film
- Radio and TV Broadcasting
- “the Internet”
- “5G” – see techies presentation

And Most Holidays in the UK were booked via Teletext Adverts
https://www.smpte.org/sections/united-kingdom/events/untold-stories-teletext-celebrating-40-years-digital-broadcasting
Remote Production

“Extending the camera cables”
Minimum on site staffing
• Less travel (and CO₂)
• Lower Hotel Bills
• Less Time away from Base
Consistent Look and Feel from Central Production team
As it is cheaper – more output

But you can also
“put the mixer electronics on site ...and control remotely”

Examples
EPL – all Cameras backhauled to IMG
Euro Paris 2016 BBC Studio
- mixer controlled from Salford
  with local and remoted graphics
Beijing Olympics 2008 – Proxy editing
...... And NaSTA stations using it

Cameras can be remotely controlled
not just PTZ – and crab
but the techy bits - Iris black level colour balance etc.’ even from Ealing to Australia

And there is more on “Remote Production” in the techies presentation

Objects

Story telling
The ‘objects’ refer to the different assets that are used to make a piece of content. E.g a scenes in a drama or a caption
By breaking down
• a piece of media into separate objects,
• attaching meaning to them, (metadata)
• describing how they can be rearranged, (metadata)

A programme can change to reflect the context of an individual
https://www.bbc.co.uk/rd/object-based-media

Technical
Individual components Video Audio
Subtitles/text with (technical) Metadata
Linked together by a list SDP or CPL
More metadata
Referenced by a Unique ID (UMID)
even more Metadata (very techy)
If stored – in a non File system structure
If streamed - time alignment matters PTP RTP
Deliver Objects plus the lists to get the output!
**IMF Interoperable Mastering Format**

ST 2067 aka how to deliver to Netflix

Designed to solve two problems

a) To make versioning/localisation of films easy (J2K)
b) To provide a way of shipping the required content to and from POST house
c) ...... now Makes TV + Digital Production easier ProRes TSP2121
d) May Replace AS11 delivery in UK
e) And is how you deliver to Netflix
f) Being developed for TWO videos - Signing - DPP in the UK.

take the original version at the highest quality

And the save only the differences of what makes up that version
Plus
Lists to say how to make the version you want ......

Composition Play List CPL
(shipping elements PKL)
And a “This technical format”
Output Play List OPL

https://mrmxf.com/shorts/

What’s versioning / localisation

A typical Feature film has over 700 versions
With various audios - stereo 5.1. ATMOS
as well as language/market
and subtitles more languages than the audio!
As well as different cuts of the video to reflect
the local cultural requirements

BUT Just store OV and the differences – with the “how to make”
– a lot less storage needed say 30 times
And the greatest challenge ....

“Invented” in the early 1990s
By Carol Owens and others at the BBC
Enables you to know what you have ......
AKA – the Bits about Bits

Without it ......
You cannot make a programme – its in an Edit decision list and more
Cannot deliver a programme - It is in AS11DPP and Netflix spec
The viewer cannot view a programme - it is in the EPG to help select and then in DVB, ATSC and all the streaming protocols
You don’t know who has viewed

Metadata

All the “Stuff” that tell you about a Media asset ........
UMID / EIDR
Time_in
Producers_name
Program_title Program_Alt_Title
Lens_type
Aspect_Ratio
 Programme_Map_Table
Transport_Stream_ID

• Challenge is To maintain it (Only loose it when you want to)
• Use it correctly
• Manage it efficiently
• Index using it
• Do not reinvent it
• Do not re-keyboard it
The Techies list Today & next years

- Better Pixels and Sound
- Connectivity even more!
  - 5G for emission
  - 5G for contribution
- Remote Production
- Virtualisation
- Microservices
- AI ML
- AR MR
- Metadata

Future of the BBC.....
It does a lot more than just TV!
... And FAANGs do etc...
Promotes UK culture
Worldwide reach in radio Tv and web - and Film!
Training and R&D ... Industry leadership
>16% of UK Media Market
It has more commercial channels in UK than PSB – & Four News 24/7
Find out what it does!

Questions??

For answers Keep on Learning-
look at www.smpte.org/webcasts

Also good sources
https://mrmxf.com/shorts/

Or Contact me Peter@weitzel.com
The Industries and Jobs

It was just the BBC and a few other Broadcasters
Or the manufacturers – it is now a lot more complex and BIGGER

Basic Sector grid of the Industries

<table>
<thead>
<tr>
<th>Creative</th>
<th>Cservice</th>
<th>Tservice</th>
<th>Manuf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Film</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV</td>
<td>Large and small</td>
<td>Post Soho, Salford, Pinewood, Bristol</td>
<td>SP, S, Many Small + multi-national</td>
</tr>
<tr>
<td>Dig Media</td>
<td>Educ</td>
<td>R&amp;D</td>
<td>Consult</td>
</tr>
<tr>
<td></td>
<td>Military</td>
<td>Health</td>
<td>&quot;CCTv&quot;</td>
</tr>
<tr>
<td></td>
<td>Gaming</td>
<td>Events</td>
<td>......</td>
</tr>
</tbody>
</table>

Notes:
Many Industries - not one!
The large Services sector may be split to cover wide spectrum from "Adverts" VFX via POST = Creative
Through OBs to Transmitters (Service Providers) and Systems Integrators = Technical
Note some are "not Media and Entertainment field"
And that Story telling skills and being organised work anywhere..... PR works well anywhere!

See a lot more mostly techie in "formation of UK Section" in https://www.smpte.org/sections/united-kingdom/events/bill-lovell-memorial-lecture-2017

Large and small e.g. Post Soho, Salford, Pinewood, Bristol

And that Story telling skills and being organised work anywhere..... PR works well anywhere!
Skills you need

• Working effectively both individually and collaboratively as part of a team
• Ability to communicate clearly and concisely using appropriate discretion
• Build and maintain positive relationships with colleagues, customers and suppliers

• Demonstrate a passion for the broadcast media industry and its productions
• Display a strong work ethic and commitment. And understand being timely
• Work accurately with a high degree of attention to detail whilst maintaining a wide overview
• Think creatively and logically to solve both “technical” and creative issues (remember fundamentals)

• Contribute to a process continual improvement of workflow and technique
• Proactively keep up to date with latest developments within the industries

• Uphold ethical and professional standards & Maintain company and customer confidentiality

Non Modo..... Sed etiam

The skills seem to be opposites.....
• You need to have a breadth of view and experience - NaSTA is good at this!
...... And grow them – Don’t just sit in the corner!
There is a assumption that you will grow / keep up to date
• So Read attend meetings/ webinars and “share your knowledge” with others
You will move across the industries doing different jobs / roles for many employers (and clients)
• So look beyond the “Production” space – to the business /wider issues even techies!
Enjoy it – Story Telling is fun – And Broadcasting even more so!!
Questions??

4 Points from Peter’s Career
Use these as triggers to your thoughts and actions

As I slide away from being at the heart of the industries
I have felt these comments have great relevance – to all

• But you know a lot of people – Bruce Devlin Aka Mr MXF

• I did not know you have done so much ..
  & not done it all yourself but with lots of people – My brother*

• But no one thinks like you – Barbara Lange Exec Dir SMPTE

• Get Involved in voluntary work – and use it to extend your experience by experimenting. Me !!!!

* After this event - look at the lecture video and slide pack – and a video made on Ipad
https://www.smpte.org/sections/united-kingdom/events/bill-lovell-memorial-lecture-2017
... You know a lot of people...

And are known by so many people for the right reasons...
- Being helpful/ getting things done/ maintaining confidences/
  knowing a lot about a lot / being wise / working hard/
  being approachable/ apologising if (rarely) wrong/using connections
Not .... Never delivering / Name dropping / always with excuses..

Many people - lots outside “your normal work”
– others in “the Industry “ competitors suppliers customers
and others – Techies/Craft/Finance/Law/Business
And trading favours ..... 

THE NEXT CENTURY

These are triggers to your thoughts & actions

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.... Do a lot ..... not all yourself

A lot = (Volume*Range*1/Time)*(Planning* Resourcing* Expertise)
Often small short jobs are valuable, but much work is long projects or BAU.

.... And working on many streams at once – cross fertilisation

Showing leadership – in teams (everyone has an Appointed Role)
Or in Groups (all people are more of less equal / you have no given Authority)
Enabling monitoring to control and reporting /communicating....
Getting good colleagues / educating the Team/Group to the task

Congratulating success, learning from failure – but if monitoring – you saw it coming!!
Living with others doing things wrong/ not how you would do it....

THE NEXT CENTURY

These are triggers to your thoughts & actions

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...Do a lot ..... By being Organised

What are you trying to do?
......Aims Requirements and how does it fit in the world?
How are we going to do it ?
......Planning, Resourcing, Monitoring, Project Management
How do you know you’ve finished and is it was successful?
......End of Project Review means really learning and sharing the lessons
Not just what the “Manager” “Leader” does
Every one has to know this – and do it for your bit !

THE NEXT CENTURY

These are triggers to your thoughts & actions
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... No one thinks like you - ideas

• Looking at things as a whole.... 
...............And are things “Broadly similar”
• Where does it / I fit in
• Comfortable with Complexity working in real & abstracted world
• Analysis of what there is - Seeing the Connections
• Synthesis of what may be ... Making Connections work
• Having Good Memory – through connections (I know some one)
• Seeking Fundamentals == a Radical approach

THE NEXT CENTURY

These are triggers to your thoughts & actions
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No one thinks like you - more ideas

- Be curious  why and how – what context ?
- Planning and doing “thought exercises”  
  Weitzel’s “Minimum Hassle algorithm” – not minimal work
- Asking questions ....and listening  and probing and analysing the answers 
  then conveying my opinions advice and sharing knowledge and experience 
  and the reasoning I have employed -
- Documenting every thing -  Sharing ideas

“The Project manager is responsible for everything “ (almost!) 
And "look for the essential detail“
- a “just do it” attitude – after some thought & being quick thinking helps! -

THE NEXT CENTURY  These are triggers to your thoughts & actions
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No one thinks like you – business

Being Business like in everything
for each opportunity see what it means
- For your company/employer - how much profit, positioning in market etc.
- For the bit of the company you work for – Interesting or valuable work for your colleagues 
- For the industry/ society at large -
- For your benefit - personally, intellectually , professionally or in your employment 
- For your activities benefit – getting others to do your work!
- For your friends and contact benefit – gets you better known as a “nice guy” in the industry.
And Aim to enjoy your self  -  Think as you do not as I do

THE NEXT CENTURY  These are triggers to your thoughts & actions
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....Volunteering

- **Outside work** – Church, Schools, Sports clubs etc.
  *Doing different things* – Finance, Governance etc. with wide range of people
- **Linked with your job** – Societies like SMPTE RTS and with Suppliers & Customers

*Gaining experiences and make connections* (e.g. arranging lectures chairing meetings)
- and being *able to experiment* where it does not matter too much..... ...
- **Inside your job** - setting out what you are doing next .....

*Exploiting what you know / are good at* – and aim to gain new experiences and discover more ...... *A lot easier the younger you are!*

*Essential in todays “Gig economy”*

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**Questions??**

Look at the slide packs over the years
at [https://www.smpte.org/sections/united-kingdom/nasta-conference-presentations](https://www.smpte.org/sections/united-kingdom/nasta-conference-presentations)

Also good sources

Or Contact me Peter@weitzel.com
NaSTA Tech Awards
Get your station to enter
- It might double the awards for your Programme!!!

Cover a wide range
• Innovations/ Products
• A major programme
• Developing Facilities
• Growing Skills / Learning
Ideally “all of the above”
but the balance may be very different

Does it make better Television?
Tech for is own sake is not wanted

There is no show reel!!
But why not make one?
• Good layout
• Logical story telling
• Appropriate Diagrams/ photos/URL
• State requirements WHY
• Describe What and How
• Why was it a success (or not)
• What next?
“ A Hand out to sell your abilities”

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