NorDig T report to Excom

NorDig Excom meeting 7th March 2019 Stockholm, Sweden

NorDig ExCom agenda 7th March 2019:
Place: Clarion hotel, Arlanda in Stockholm

1. Agenda and report from previous meeting
2. Organizational matters
   2.1. Membership situation
   2.2. Financial matters
   2.3. Organizational matters
   2.4. NorDig basic rules of communication final version for approval

3. **Report from NorDig/T**
   3.1. NorDig/T status & planning
   3.2 NorDig/T mandate y2019-2020 – wait Excom approval
   3.3 Specifications:
      3.3.1 NorDig Test Plan v3.1 final proposal – wait Excom approval
      3.3.2 NorDig Test stream (AC4) – wait Excom approval
   3.4 HEVC update (for future NorDig IRD spec v3.2), report back and proposal
   3.5 NorDig article in DVB Scene Magazine

4. Report from Industry
5. Reports from members, DVB and other
6. Any other business
7. Date and place for the meetings in 2019, next 7th Oct 2019

Green Text: text highlighted for Excom **(waiting Excom decision/approval)**

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NorDig 20 years

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Overview NorDig T specification work :

- Rules of Operation
    - Latest published: RoO v2.5 (published October 2016)
    - Update of RoO to v3.1, focus for 2019 but first TestPlan v3.1. Excom (Oct 2018) asked for changing layout to same as IRD spec, most important content for RoO shall be items necessary to avoid misbehavior in IRDs.

- Unified IRD specification
    - Latest published: IRD spec v3.1 (published October 2018)
    - AP from Excom Oct 2018 meeting:
        - SI ECP and Audio SI APD optional today (IRD v3.1), but interest from Excom to mandate it and AP to NorDig/T check (into a small update v3.1.1) – see separate slide

- Test Plan
    - Latest: Test Plan v2.6 (published Dec 2017, now incl Test for HbbTV)
    - Test Plan v3.1 now final draft ready – waiting Excom approval, see separate slides
        - Test Plan v3.1 incl new updated tests for SSU and therefore proposal withdraw Test Plan v2.6 SSU addendum

- Video – potential HEVC extension: dynamic HDR and HFR
    - investigating report to Excom - see separate slides

- Accessibility
    - Status usage of Accessibility services among NorDig members/broadcasters - see separate slides

- EPG/EIT exchange file format
    - Workshop Nov 2018 and new May 2019.
    - Inputs to TV Anytime organisation to update TV Anytime/ETSI specifications

- Website and admin

Overview - informative

group – status - chairman

NorDig T – *active* – Per Tullstedt, Teracom

NorDig T subgroups – status

- Audio – *active* – Johan Lindroos, SVT

- Test – *active* – (Pasi Toiva, Labwise) Per T and Peter M has co-chaired in absence of Pasi during autumn 2018/early 2019

- HbbTV – no meeting last period - Des Mac Giolla an Chloig, RTÉNL

- Accessibility – *active* – Kjell Norberg, NRK

- API/PVR – *active* – Erik Vold, NRK

- EPG/Event exchange metadata – *active* - Peter Mølsted, consultant (NorDig tech secretary)

- SSU – active – Per Tullstedt, Teracom

- CA/CI+/Sec – *within NorDig T*

- Video – *active* - (Per Tullstedt, Teracom)

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NorDig T (main group) meeting calendar 2019:

meetings 2019 are booked as shorter (typically 2-3h/meeting) compared to 2018 (5-6h/meeting)

- NorDig T, #1, Thu 31st January 2019, webinar, 10:00-12:30 CET
- NorDig T, #2, Tue 26th February 2019, webinar, 10:00-14:00 CET

  Informative: Excom 7th March

- NorDig T, #3, Tue 2nd April 2019, webinar, 10:00-12:30 CET
- NorDig T, #4, Tue 14th May 2019, TBD physical/webinar, 10:00-15:00 CET,
- NorDig T, #5, Tue 18th June 2019, webinar, placeholder, 10:00-12:30 CET
- NorDig T, #6, Tue 27th August 2019, webinar, 10:00-14:00 CET
- NorDig T, #7, Tue 24th Sep 2019, webinar, 10:00-16:00 CET.

  Informative: Excom 10th October (target RoO v3.2/3.1, IRD spec v3.2, Test Plan 3.2)

- NorDig T, #8, Thu 17th October 2019, webinar, 10:00-14:00 CET
- NorDig T, #9, Tue 3rd December 2019, webinar, placeholder, 10:00-12:00 CET.

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List of Countries using NorDig specifications (outside NorDig members),
Nothing new to report, same as last meeting (same as previous report).

Several IRD manufactures and other mentions that several other territories and DVB networks refers or uses NorDig as basis for their IRD specs (especially "newer" networks). Among reasons seems open spec and content (T2, HbbTV, subtitling etc).

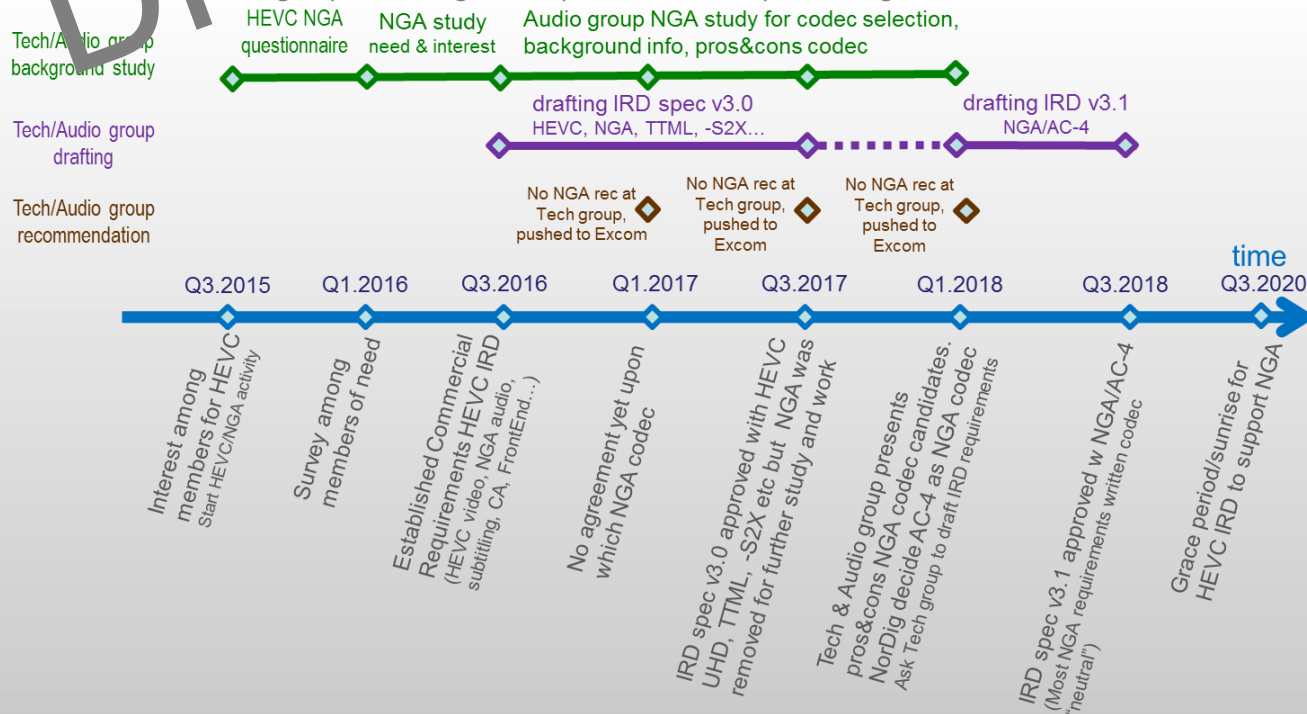| Country / Network	Status
Turkey DTT	Confirmed via Vestel
Several eastern Europe countries	Indications, not confirmed
Malaysia *(blue copy)*	Digita
German DTT (Media broadcast/TDF)	Based on/reference to NorDig IRD
Georgia DTT	Based on/reference to NorDig IRD (v2.2)
French DTT/FAVN ??	Based on/reference to NorDig IRD v??
Italien DTT + Satellite	Partly based on/reference to NorDig IRD (v2.5, RF), partly own requirements (e.g. SI)

NorDig T was invited to one French DTT forum (FAVN) meeting Nov 2018. Asked to present info of NorDig process around establishing HEVC IRD, especially about NGA. Johan Lindroos and Per Tullstedt participated and presented short about our NorDig work, however excluded sensitive part from our work.

NorDig - info about the HEVC and NGA process
from NorDig Technical group and Audio subgroup meeting with FAVN 2018.11.15

NorDig timeline for HEVC and NGA work (here especially NGA part)

- NorDig Excom gives mandate to NorDig Tech group and approves proposal from tech group
- NorDig Technical group normally prepare drafts and comes w recommendation for selections to Excom who approve/decide
- Sometime Technical group can not agree and pushes decision up to NorDig Excom to decide, this was the case for NGA

Investigate members usage of accessibility features and how it is signalized within the NorDig area (audio- and subtitle- languages, dubbing, spoken subtitles, sign languages and more). Make an overview.

(Full report in Annex B of this presentation).

Mission
- To understand the current state of accessibility services across the NorDig region
- To survey the members and gather feedback
- To find the pain points in workflows
- To find possible pain points in the customer experience
- To learn if the technologies specified in the NorDig specification are being used
- To find our why certain technologies are used or not used

Questionnaire Jan 2019

Questions asked to what extent the following accessibility / disability services types are used today:
- Audio Description (AD)
- Spoken subtitles (audio captioning)
- Same-language Subtitles (captioning) / Hard-of-Hearing Subtitles (HoH or HHS)
- Sign Language Description (video)
- Common questions

(Prime time in this questionnaire was defined from 19:00 to 23:00 every day, may differ in countries)

Conclusions 1

The use of accessibility in broadcast services

- More requirements and guidelines for accessibility are expected to be drafted as a result of the EAA and AVMS Directives (EAA = European Accessibility Act and AVMSD = Audio visual media services directive)

- It was identified that in many cases, except "Same Language Subtitles", the provision of Accessibility services was lower than ideal, although always meeting minimum regulations, this may be because of several reasons:

  – Broadcasters want everyone to be able to receive their services, so transmission is done the simplest way which may not always be the most spectrally efficient or the best use of available technology.

  – There is a perception that legacy receivers may cause problems are preventing broadcasters from launching new services or using new features.

Conclusions 2

The use of accessibility in broadcast services

- Pre-testing of Accessibility features on receivers (typically based upon Nordig testplan) may not always catch all problems and broadcaster use-case. (Some functionality like receiver mix is used outside Nordig area)

- Re-testing of new Accessibility features on legacy receivers is likely to be expensive and broadcasters need to have a simple launch program.

- Broadcasters tends to use other types of broadcast technology than those recommended in Nordig/DVB, like setting up separate services for new accessibility features.

- Broadcasters do-not prioritize informing consumers about their accessibility services and how to find them on different IRDs.

- Conclusion: We have a common spec, but all broadcasters are doing things their own way.

Next Steps

- The Nordig Accessibility group should prepare a short document explaining the work of the group and ask ExCom members to pass this to their internal accessibility teams.

    - Invite them to contribute and ask questions.

    - We propose a to set up a best practice workshop with broadcasters, manufacturers and distributors

    - Broadcasters who are considering to launch a new or modify an existing accessibility service should contact Nordig Accessibility group.

- We should gather information from accessibility groups and broadcasters to understand what their pain points are.

- Collaborate with these accessibility groups so they can inform their members how to find/use the existing services.

    - We propose a question to external accessibility groups*: Should Nordig Broadcasters deliver additional accessibility services even if not all IRDs can receive them initially?*

- Investigate the implications for streaming services on accessibility

Excom view?

Report to Excom about HEVC HFR + dynamic HDR *(see separate slides):*

- *DVB plan to finalise its work for HFR and dynamic HDR to summer 2019*

- *Earlier proposal to start NorDig work in parallel Spring 2019 drafting HFR + dymanic HDR with goal to a final draft to autumn 2019.*

- Investigating as Excom asked Oct2018:

  - *Members interest now 2019 for HFR and/or dynamic HDR (should NorDig add both or one of them?).*

  - *If HFR and/or dynamic HDR is recommended, then should it be included as a new IRD "profile" (two NorDig HEVC "profiles" (basic HEVC and HFR/dHDR HEVC IRD) or extent the existing HEVC IRD "profile" (with a certain grace period)?*

  - *, HFR, should HFR HEVC IRD support both dual PID (backward compatible) and single PID or only single HFR PID?*

  - *If dynamic HDR, how many of DVB three alt to be included? Which one if not all?*

- *Reminder to Richard/David for Friday meeting to ask for broadcasters service plan*

Report to Excom about HEVC HFR + dynamic HDR*:*

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draft

Report to Excom about HEVC HFR + dynamic HDR*:*

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HbbTV status:

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NorDig EPG group and Event exchange file format:

• Minor corrections to guidelines

• Work to promote/help impl and use of NorDig EPG/event file format and keep TV Anytime spec up to date.

• Open workshop Nov 2018 at TV2DK in Copenhagen,

• Next open workshop May 2019

- Test Plan v3.1 final draft proposal:
  - Now stable candidate draft, agreed within NorDig/T and active in Test group, waiting Excom approval
  - (Test group chair Pasi Toiva been too buzy, not yet "approved" this candidate)
  - Major update of most parts, from TestPlan v2.6 to this v3.1, (text update, ref, new requirements etc)
    - FrontEnd – fully updated (incl optional parts like -S2X)
    - Video/HEVC – updated
      - One test task, 4 Colorimetry, that in v2.6 been "ToBeDefined" still in v3.1 "ToBeDefined" due to complexity and time to draft, no concreate proposal presented, proposal to wait with this.
    - Audio/NGA - new NGA updated
      - Legacy audio test tasks not fully updated regarding ref and other minor changes
    - Subtitling/TTML – fully updated
    - SSU/SW updating – fully updated
    - Interfaces – fully updated
    - PVR – partly updated
      - Updated tests' requirements for v3.1, but not yet incl HEVC elements into test procedures, could be action for next update.
    - HbbTV – fully updated
    - SI, menus, user pref. settings
      -
  - Remaining typo & ref. check – Excom view? Approve?
- NorDig Test streams
  - NorDig has "no" test stream since past (except LTE reference signal for testing interference)
  - New NorDig Test stream for NGA/AC-4 created (Dolby) - waiting Excom approval
- Self-certification SSU Testing – OTN and USB SSU Approved by Excom Oct 2018 – no change

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NorDig Unified IRD spec v3.1 Oct 2018 (NGA/AC4, HbbTV v2.0.2, HEVC Sec):

- Two items (ECP and APD) needed more time to sort out, pushed Excom March 2019 meeting
  - AP for NorDig-T/Audio to investigate further why not mandate APD and recommend for ECP.
  - Excom to decide if or not change these two from optional to mandatory and then if release a smaller update v3.1.1

- CA/Security – CI+ Enhanced Content Protection (ECP):
  - Background:
    - Requirement text included for CI+ ECP requirements, but as <u>optional</u>
    - Part Industry against mandating (Samsung, Vestel), part/most Industry can accept mandating,
      - Samsung view is that ECP is a platform specific issue (similar as CAS & DRM)
    - Italy UHD DTT spec mandates CI+ ECP
    - Technical group have highlighted that this could potentially be required from Content Owners (eg MovieLabs) for more or less all payTV HEVC services (not just UHD), since HEVC comes with new TV format
  - Excom Oct 2018 – keep ECP as optional for v3.1, Excom will ask members (espec operators) view of mandating this and if needed for members Excom release (March 2019) an update of IRD spec v3.1.1
  - NorDig T and Secretary:
    - Secretary (Kari E.) has checked with all NorDig operators for their view (should NorDig change to mandate or keep as optional), no report back from Operator asking NorDig to change from today's optional.
    - NorDig T recommend to keep as optional/Excom to decide.
  - Excom view?

NorDig Unified IRD spec v3.1 Oct 2018 (NGA/AC4, HbbTV v2.0.2, HEVC Sec):

- Two items (ECP and APD) needed more time to sort out, pushed Excom March 2019 meeting

- Audio – NGA/AC-4 Audio Preselection descriptor (APD)
  - Background:
    - NGA/AC-4 included as mandatory for NorDig HEVC IRDs (grace period until July 2020)
    - NorDig NGA/HEVC IRDs shall be able to separate & have separate settings for AD and spoken subtitling
    - all necessary NGA/AC-4 signalling included, BUT the APD is included as optional for HEVC IRDs, APD improves e.g. selections among Accessibility audio. APD is the DVB standardised way to differentiate AD and Spoken Subt and to incl text labels.
    - Dolby: APD is recommended by Dolby, as Dolby can see it most IRDs likely to support APD by mid 2020.
    - members wants to mandate, some TV manufactures asks for optional
      - reports indicates that HighEnd HEVC TV sets seems to support APD, while LowEnd/entry level HEVC TV sets seems not yet support this.
  - Excom Oct 2018 – decided to keep APD optional for v3.1, BUT with clear intention to mandate APD (with grace period until 1 July 2020) at Excom meeting March 2019 into update IRD spec v3.1.1.
  - NorDig T
    - Most (broadcaster and operator) members for mandating APD and most IRD manufactures can accept mandating APD (from 1 July 2020)
      - One IRD manufacture (Samsung) is investigating internally
    - Recommend that it is OK to mandate APD and grace period (until July 2020) is necessary.
    - The prepared new NorDig AC-4 test stream includes APD (if Excom approves it today)
    - Excom to decide (mandatory or keep optional) and how&when (v3.1.1 in March or)?

NorDig Unified IRD spec future – "v3.2" proposals:

- General
    - Bug list - a few number of listed items,
        - (CI+ ECP optional or mandatory - see other slides)
        - (Audio APD signaling optional or mandatory - see other slides)

- Video: dynamic HDR and/or HFR
    - Excom earlier decided for incl of a HFR HEVC IRD profile within 2 years after our first HEVC IRD profile Dec 2017, NorDig T has not started this work,
    - NorDig T/video report back to Excom dHDR and HFR, see other slides

- CA/CP/Security
    - CommonInterface v2 (USB), still monitoring status, members interest?

- Audio – none

- Subtitling – none

- HbbTV - none

- FrontEnd – none

- SSU - none

- PSI/SI, menus etc…

- Others?

Excom view?

NorDig T – **PROPOSAL** mandates & items for period 2019-2020 - waiting Excom approval

Based upon updating old mandates (see Annex A for clean version without markup and Annex B for old mandates 2017-2018)

- General: Keep IRD, RoO and Test Plan in line with each other

- RoO
  - Maintain and update NorDig RoO - focus for 2019 RoO v3.1
  - (Excom Oct 2018) changing layout to same as IRD spec, focus for RoO on items necessary to avoid misbehavior in IRDs

- Test and Test plan
  - Maintain and update NorDig Test plan to match IRD spec
    - Review and where possible combine similar test cases to make it easier and faster to test
    - "minimize" redundant test cases if possible without compromising with test quality, to speed up time for verification testing.
    - Update and improve test cases

- NorDig Unified IRD spec
  - Maintain and update NorDig IRD specification
    - debugging, references to international standards and specifications are up to date)
  - NorDig IRD spec update - investigate HEVC dynamic HDR and HFR (depends Excom decision)
  - Other items (listed since earlier):
    - Review and improve IRD's auto update for network changes?
    - (depending on Excom decision) SSU update for new possible alternatives?
    - Handle mix of broadcast and OTT in same channel list? (similar to or based upon DVB-I)
    - Other proposals?

continue NorDig mandates & items for period 2019-2020 - waiting Excom approval

- Video, audio, subtitling
    - **Video** codec: NorDig's first subset of HEVC (DVB's UHD, HDR&WCG, SFR), incl video processing and I/O (HDMI).
    - **New Video** codec: investigate issues with adding HEVC HFR support, check with Industry, make proposal
        Questions that needs to be prepared by NorDig:
        - *two NorDig HEVC "profiles" (SFR HEVC + HFR HEVC) or one (HEVC that supports HFR),*
        - *HFR both dual PID (backward compatible) and single PID or only single HFR PID,*
        - *dynamic HDR how many of DVB three alt to be included?*
    - **New Video** codec: If Excom decide, propose tech requirements for HEVC HFR which incl also dynamic HDR, target ready to Oct 2019
    - **Video**: Secure good IRD implementation for mixing/blending of SDR content (HbbTV, menus, subtitling) on top of HDR video.
    - **Audio** NGA (~~MPEG-H and~~ Dolby AC-4), monitor DVB and Dolby specifications and recommendations ~~and get more info about its efficiency and functionality (not yet proposed to specify).~~
    - ~~**Audio** Monitor and report NorDig members interest for next generation audio (MPEG-H and Dolby AC-4) and formats. Check with industry support for new audio codecs.~~
    - ~~**Audio** Surround sound, is it possible to reduce the problems with down-mixing, especially investigate broadcast side.~~
    - **Audio:** monitor evolution immersive audio and object based audio.
    - **Audio:** if it is possible supports with tests and trials of NGA audio (both basic NGA and more advanced NGA).
    - **Subtitling**: monitor DVB specifications (TXT subt, DVB Subt, TTML) ~~update requirements for subtitling to handle HEVC services, ensure subtitling support for HDR and/or UHD video for HEVC IRDs.~~
    - ~~**Subtitling**: investigate new subtitling formats for HEVC IRDs, like EBU TT-D (as stated in HEVC commercial requirements).~~
    - **HbbTV**: Investigate use and mandate of new codes (HEVC and NGA) for (HEVC) HbbTV/Hybrid IRDs.

continue NorDig mandates & items for period 2019-2020 – waiting Excom approval

- HbbTV
  - NorDig HbbTV test and test cases:
    - Maintain NorDig developed test cases. Propose new test cases to be developed if needed.
    - ~~Update NorDig Test Plan with new/updated HbbTV test requirements (based on ref as much as possible to HbbTV test suit, clarify if HbbTV optional test is mandatory for NorDig Hybrids)~~
    - ~~Contribute to HbbTV.org the NorDig developed HbbTV test cases for inclusion in HbbTV standard Test suits (include as much as possible in HbbTV standard test suits).~~
    - ~~Propose budget for NorDigs HbbTV activities (costs , descriptions, alternatives)~~
    - ~~Supervise and manage any NorDig HbbTV consultancy work (currently Sofia Digital)~~
  - NorDig HbbTV IRD requirements:
    - Maintain and update HbbTV requirements
    - ~~Investigate possibilities to mandate HbbTV capability for HEVC IRDs, could HbbTV be a similar basic functions as Teletext? HbbTV is the standardized way to deliver UHD content via OTT/broadband.~~
    - Monitor and report HbbTV spec development and usage.
  - Investigate additional HbbTV feature and requirements that are of interest for NorDig members (to be confirmed by –T and Excom before detailed proposal and any incl into IRD spec).
  - HbbTV implementation:
    - Monitor and report HbbTV implementation in NorDig networks and other networks,
    - Monitor and report implementation status on IRD side
    - Monitor and discuss experience and issues/problems with launching HbbTV services
  - HbbTV DRM
    - Monitor HbbTV DRM ~~implementation, interest for common DRM requirements~~
    - ~~Monitor technologies and functionality (common encryption, CAM/CI+ etc)~~
    - Review security requirements ~~if needed to ensure handling UHDTV ("4k") premium OTT content~~.

continue NorDig mandates & items for period 2019-2020 – waiting Excom approval

- Accessibility
    - Work with harmonization of broadcast and better describe current broadcast for IRD manufactures
    - Subtitling, propose updates and new IRD requirements both for normal and hard-of-hearing subtitling, especially for HEVC IRDs.
    - Investigate use of accessibility features and how it is signalized within the NorDig area (audio- and subtitle- languages, dubbing, spoken subtitles, sign languages and more). Make an overview.
    - Create document explaining the work of the group, (which ExCom members to pass this to their internal accessibility teams). Gather information from accessibility groups and broadcasters to understand what their pain points are.
    - Set up a best practice workshop with broadcasters, manufacturers and distributors
    - Investigate the implications for streaming services on accessibility
    - HbbTV for Accessibility services – investigate how HbbTV can be used for Accessibility and if needed propose changes to IRD and RoD requirements
    - Investigate benefits with NGA for accessibility.
- CA and CI
    - monitor and report CIplus LLP (CI+ v1.4 and v2.0) and DVB work (CI+ v2.0 etc) within these topics to NorDig Excom and Technical group.
    - Review security requirements if needed to ensure handling UHDTV ("4k") premium OTT content (see also HbbTV)
- EPG/Event exchange file format:
    - Investigate and decide common ("NorDig standard") Event Info file format (Broadcast + OTT), interchange between Content Providers to Distributers. Shall support event info and metadata for both broadcast (linear TV) and OTT (linear and on-demand/catch-up).
    - Promote use from NorDig members.
    - Maintain Establish NorDig specification of common EPG/Event exchange file format based upon proposed TV Anytime.
    - Propose how to maintain EPG/Event exchange file format
    - Secure TV Anytime update its specification for Right Management and workshop inside NorDig around Right Management
    - Guidelines for "last minutes" updates of program start and changes ("last minutes" refers to shortly before but also afterwards for "correcting" catch-up segmenting).

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NorDig was invited in Nov2018 by DVB Scene Magazine to contribute with an article around our NorDig work with NGA and 3rd generation IRDs (HEVC, NGA, TTML, S2X…) to coming paper in March 2019 to DVB World Conference.

Many thanks to Peter Molsted, Johan Lindroos, Kari Eriksson, Ingve Bjerknes, Olli Sipilä and Per Tullstedt for the help contributing (with support from Industry Elfed, Richard and David)!!

Extract from coming article:

NorDig receiver spec adds Next Generation Audio

In October 2018, NorDig released a new update of its Unified Requirements IRD (Integrated Digital Receiver) specification. The main updates in version 3.1, compared to the previous version 3.0 (2017), were: NGA (Next Generation Audio decoding based on the Dolby AC-4 audio codec, HbbTV updated to v2.0.2, optional DVB-S2X, and additional security requirements for HEVC-based services based on CI+ ECP.
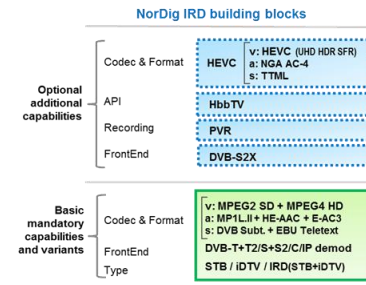
NGA is now a mandatory requirement for future HEVC receivers in the NorDig specifications. In choosing AC-4, NorDig has become one of the first regional specification organizations in Europe to support an NGA codec.

The process of making the decision to select both HEVC and NGA with AC-4 took two to three years in NorDig. The new NGA requirements, together with previously specified HEVC video and DVB TTML subtitling requirements, now make the requirements complete for the reception of HEVC-based services, all in accordance with DVB specifications.
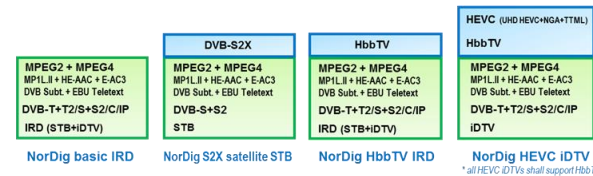
Defining the 3rd generation IRD – HEVC based
NorDig started the study work for the third generation of TV services (HEVC-based) in late 2015, starting with a survey among members and establishing commercial requirements. It was identified that the excepted lifespan of a new profile was to be long (10 years or more) and that it needed to be a significant step forward compared to the existing MPEG-4 HD based profile in order to be justified. The commercial requirements stated that the duplication of tools or codecs fulfilling the same commercial requirement should be avoided, i.e. no toolbox approach unless necessary……………

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NorDig IRD building blocks

Examples of NorDig IRD configurations

END presentation

NorDig-T report

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After here some detailed informative slides

ANNEX

- – Annex A: PROPOSED NorDig T mandates 2019-2020 clean version wo markup
- – Annex B: NorDig T old mandates 2017-2018 (March 2017)
- – Annex C: NorDig Accessibility report member usage 2018-2019

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ANNEX A

NorDig T new **PROPOSED** mandates 2019-2020

CLEAN VERSION WITHOUT MARKUP

CLEAN VERSION WITHOUT MARKUP CHANGES

NorDig T – **PROPOSAL** mandates & items for period 2019-2020 - waiting Excom approval

Based upon updating old mandates

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  - Other items (listed since earlier):
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CLEAN VERSION WITHOUT MARKUP CHANGES

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    - **Audio:** if it is possible supports with tests and trials of NGA audio (both basic NGA and more advanced NGA).
    - **Subtitling**: monitor DVB specifications (TXT subt, DVB Subt, TTML)
    - **HbbTV**: Investigate use and mandate of new codes (HEVC and NGA) for (HEVC) HbbTV/Hybrid IRDs.

CLEAN VERSION WITHOUT MARKUP CHANGES

continue NorDig mandates & items for period 2019-2020 – waiting Excom approval

- HbbTV
  - NorDig HbbTV test and test cases:
    - Maintain NorDig developed test cases. Propose new test cases to be developed if needed.
  - NorDig HbbTV IRD requirements:
    - Maintain and update HbbTV requirements
    - Monitor and report HbbTV spec development and usage.
  - Investigate additional HbbTV feature and requirements that are of interest for NorDig members (to be confirmed by –T and Excom before detailed proposal and any incl into IRD spec).
  - HbbTV implementation:
    - Monitor and report HbbTV implementation in NorDig networks and other networks,
    - Monitor and report implementation status on IRD side
    - Monitor and discuss experience and issues/problems with launching HbbTV services
  - HbbTV DRM
    - Monitor HbbTV DRM
    - Review security requirements

draft

CLEAN VERSION WITHOUT MARKUP CHANGES

continue NorDig mandates & items for period 2019-2020 – waiting Excom approval

- Accessibility
  - Work with harmonization of broadcast and better describe current broadcast for IRD manufactures
  - Subtitling, propose updates and new IRD requirements both for normal and hard-of-hearing subtitling.
  - Create document explaining the work of the group, (which ExCom members to pass this to their internal accessibility teams). Gather information from accessibility groups and broadcasters to understand what their pain points are.
  - Set up a best practice workshop with broadcasters, manufacturers and distributors
  - Investigate the implications for streaming services on accessibility
  - HbbTV for Accessibility services – investigate how HbbTV can be used for Accessibility and if needed propose changes to IRD and RUO requirements
  - Investigate benefits with NGA for accessibility.
- CA and CI
  - monitor and report CIplus LLP (CI+ v1.4 and v2.0) and DVB work (CI+ v2.0 etc) within these topics to NorDig Excom and Technical group.
  - Review security requirements
- EPG/Event exchange file format:
  - Promote use from NorDig members.
  - Maintain NorDig specification of common EPG/Event exchange file format.

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ANNEX B

NorDig T old mandates 2017-2018

NorDig T - mandates & items for period 2017-2018 – (approved by Excom March 2017)

- RoO
    - Maintain and update NorDig RoO.

- Test and Test plan
    - Maintain and update NorDig Test plan to match IRD spec
        - Review and where possible combine similar test cases to make it easier and faster to test
        - "Minimize" redundant test cases if possible without compromising with test quality, to speed up time for verification testing.
        - Update and improve test cases

- NorDig Unified IRD spec
    - General: Maintain and update NorDig IRD specification (debugging, references to international standards and specifications are up to date)
    - Update NorDig IRD spec v3.0 – inclusion of (SFR) HEVC IRD profile during 2017:
        - Inclusion of HEVC IRD requirements according with Excom decision and approved HEVC commercial requirements.
        - Update guidelines wordings in GUI and translations (mainly related Accessibility and Audio)
        - Review and improve IRD's auto update for network changes
        - (depending on Excom decision) SSU update for new possible alternatives
        - Handle mix of broadcast and OTT in same channel list
    - After NorDig IRD spec v3.0 – prepare and investigate possibility for NorDig HFR HEVC IRD "profile"

continue NorDig mandates & items for period 2017-2018 – (approved by Excom March 2017)

- HbbTV
  - NorDig HbbTV test and test cases:
    - Maintain NorDig developed test cases. Propose new test cases to be developed if needed.
    - Update NorDig Test Plan with new/updated HbbTV test requirements (based on ref as much as possible to HbbTV test suit, clarify if HbbTV optional test is mandatory for NorDig Hybrids)
    - Contribute to HbbTV org the NorDig developed HbbTV test cases for inclusion in HbbTV standard Test suits (include as much as possible in HbbTV standard test suits).
    - Propose budget for NorDigs HbbTV activities (costs , descriptions, alternatives)
    - Supervise and manage any NorDig HbbTV consultancy work (currently Sofia Digital)
  - NorDig HbbTV IRD requirements:
    - Maintain and update HbbTV requirements (spring 2017 NorDig require HbbTV v2.0.1).
    - Investigate possibilities to mandate HbbTV capability for HEVC IRDs, could HbbTV be a similar basic functions as Teletext? HbbTV is the standardized way to deliver UHD content via OTT/broadband.
    - Monitor and report HbbTV spec development and usage.
  - Investigate additional HbbTV feature and requirements that are of interest for NorDig members (to be confirmed by –T and Excom before detailed proposal and any incl into IRD spec).
  - HbbTV implementation:
    - Monitor and report HbbTV implementation in NorDig networks and other networks,
    - Monitor and report implementation status on IRD side
    - Monitor and discuss experience and issues/problems with launching HbbTV services
  - HbbTV DRM
    - Monitor HbbTV DRM implementation, interest for common DRM requirements
    - Monitor technologies and functionality (common encryption, CAM/CI+ etc)
    - Review security requirements if needed to ensure handling UHDTV ("4k") premium OTT content.

continue NorDig mandates & items for period 2017-2018 – (approved by Excom March 2017)

- Video, audio, subtitling
    - **Video** codec: NorDig's first subset of HEVC (DVB's UHD, HDR&WCG, SFR), incl video processing and I/O (HDMI).
    - **Video** codec: investigate possibility and issues with later adding HEVC HFR support.
    - **Video**: Secure good IRD implementation for mixing/blending of SDR content (HbbTV, menus, subtitling) on top of HDR video.
    - **Audio** NGA (MPEG-H and Dolby AC-4), monitor and get more info about its efficiency and functionality (not yet proposed to specify).
    - **Audio** Monitor and report NorDig members interest for next generation audio (MPEG-H and Dolby AC-4) and formats. Check with industry support for new audio codecs.
    - **Audio** Surround sound, is it possible to reduce the problems with down-mixing, especially investigate broadcast side.
    - **Subtitling**: update requirements for subtitling to handle HEVC services, ensure subtitling support for HDR and/or UHD video for HEVC IRDs.
    - **Subtitling**: investigate new subtitling formats for HEVC IRDs, like EBU TT-D (as stated in HEVC commercial requirements).
    - **HbbTV**: Investigate use and mandate of new codes (HEVC and NGA) for (HEVC) HbbTV/Hybrid IRDs.

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continue NorDig mandates & items for period 2017-2018 – – (approved by Excom March 2017)

- Accessibility
  - Work with harmonization of broadcast and better describe current broadcast for IRD manufactures
  - Subtitling, propose updates and new IRD requirements both for normal and hard-of-hearing subtitling, especially for HEVC IRDs.
  - Dialogue Enhancement - investigate members interest for this and if they are able to broadcast this
  - Audio, propose requirements related to supplementary audio for HEVC IRDs (audio + accessibility group)
  - Supplementary Audio (Audio description, Spoken subtitling), investigate how NorDig broadcasters status today broadcast this and how much difference there is around this in NorDig broadcast.
  - HbbTV for Accessibility services – investigate how HbbTV can be used for Accessibility and if needed propose changes to IRD and HbbTV requirements
  - Investing new technology and equipment for accessibility services.
- CA and CI
  - monitor and report CIplus LLP (CI+ v1.4 and v2.0) and DVB work (CI+ v2.0 etc) within these topics to NorDig Excom and Technical group.
  - Review security requirements if needed to ensure handling UHDTV ("4k") premium OTT content (see also HbbTV)
- Others
  - EPG/Event exchange file format:
    - Investigate and decide common ("NorDig standard") Event Info file format (Broadcast + OTT), interchange between Content Providers to Distributers. Shall support event info and metadata for both broadcast (linear TV) and OTT (linear and on-demand/catch-up).
    - Promote use from NorDig members.
    - Establish a NorDig specification of common EPG/Event exchange file format based upon proposed TV Anytime.
    - Propose how to maintain EPG/Event exchange file format
    - Secure TV Anytime update its specification for Right Management and workshop inside NorDig around Right Management
    - Guidelines for "last minutes" updates of program start and changes ("last minutes" refers to shortly before but also afterwards for "correcting" catch-up segmenting).

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ANNEX C

NorDig Accessibility report

Members usage of accessibility services 2018/2019

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NorDig Accessibility

NorDig Accessibility group

- To understand the current state of accessibility services across the NorDig region

- To survey the members and gather feedback

- To find the pain points in workflows

- To find possible pain points in the customer experience

- To learn if the technologies specified in the NorDig specification are being used

- To find our why certain technologies are used or not used

Questions asked to what extent the following accessibility / disability services types are used today:

- Audio Description (AD)

- Spoken subtitles (audio captioning)

- Same-language Subtitles (captioning) / Hard-of-Hearing Subtitles (HoH or HHS)

- Sign Language Description (video)

- Common questions

  (Prime time is from 19:00 to 23:00 every day, may differ in countries)

This questionnaire was sent to broadcasters in the NorDig area in the beginning of January 2019.

The Survey

Members contacted	Replies were provided from
SVT - Sweden	SVT Sweden
TV4 - Sweden	TV4 Sweden
NRK - Norway	NRK Norway
TV2 - Denmark	TV2Denmark
YLE - Finland	YLE Finland
MTV -Finland	MTV Finland
RTE – Ireland	
Discovery	
Cmore – Sweden	
DR – Denmark	
TV2 - Norway	

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Analysis

- The results were tabulated to provide a regional overview of the accessibility features

- Rows represent the features/questions

- Columns for each country which replied

- Overall AD is used .....

Service A: Audio Description (AD)	TV4 Sweden	SVT Sweden	NRK Norway	TV2 Den-mark	YLE Finland	MTV Fin-land
Percent on air broadcast prime time	0%	4% Dont't measure Prime/ Noi prime	69 hours of Norwegian programs in 2018. Reruns not included. 125 hours of Swedish and Danish programs in 2018. Reruns not included. Norwegian AD of our 19 largest TV-series.	0	In total 18 hours during 2018	0
Percent on air broadcast not prime time	1%			0	In total 18 hours during 2018	0
How is the AD transmitted	~~on main service~~	Simulcast in separate channel	Separate TV-channel. In our video player "NRK TV".	-	DVB audio component, language code dutch Dutch was chosen because not all receivers read the secondary descriptor for the right parameters. Dutch was included in the first receivers.	
Why is this method chosen?	We have not developed separate service	Easiest for the users	Easy accessibility for our audience.	-	A familiar technical implementation, when already using several audio components in different languages	
Broadcast or receiver mix?	NA	Broadcast mix	Broadcast mix. We are planning on receiver mix in the near future.	-	Broadcast mix	
Available on live streaming?	Yes, main service	Yes	Some times.	0	No, possibly within 1-3 years	No
Available on demand?	Dedicated Access services portal	Yes	Yes. https://tv.nrk.no/programmer/synstolk	0	Yes	No
Percent on demand	250 assets per/year, 10%	100%		0	In total 8 hours during 2018	
Plan for future platforms (hbbtv, or other)	No, only OTT	Looking into HbbTV as an AD application		none	Possibly hbbtv within 3 years	No
Other features and regulations, describe	Swedish regulations	None	Norway has 2 official forms of spoken and written norwegian. "bokmål" and "nynorsk". Norway has 3 Sami languages. We may have to deliver audio tracks for these in the future.	none	Audio description per se is not regulated by the state, although Yle is required to provide services for the blind and visually impaired.	

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- ## Spoken Subtitle is used ……

Service B: Spoken subtitles (audio captioning)	TV4 Sweden	SVT Sweden	NRK Norway	TV2 Den-mark	YLE Finland	MTV Finland
Percent on air broadcast prime time	0%	100%	100 % of preproduced broadcast. Working on making it accessible on live broadcast.	0	All foreign language, subtitled programmes are provided with spoken subtitles.	40 % (all international) On MTV3 channel only
Percent on air broadcast not prime time	0,5%	100%	100 % of preproduced broadcast. Working on making it accessible on live broadcast.	0	All foreign language, subtitled programmes are provided with spoken subtitles.	60 % (all international) On MTV3 channel only
How are the spoken subtitles transmitted?	Main service	Separate audio track	Linear-TV: Separate TV-channel. On our player "NRK TV" on web with IOS. And on AppleTV4K.	-	DVB audio component, language code dutch Dutch was chosen because not all receivers read the secondary descriptor for the right parameters. Dutch was included in the first receivers.	Extra audio channel, speech generator over program sound
Why is this method chosen?	We have not developed separate service		Easy accessibility for our audience.	-	A familiar technical implementation, when already using several audio components in different languages	Used by state broadcaster (Yle)
Broadcast or receiver mixed?	NA	Broadcast mix	Linear-TV: broadcast mix. Internet player: broadcast mix.	-	Broadcast mix	Broadcast
Available on live streaming?	Yes	Yes	No. We are working on a soloution.	0	No, possibly within 1-3 years	No
Available on demand?	Yes	No	Yes. On web and on AppleTV4K. We are planning to expand this service to other platforms.	0	Yes	No
Percent on demand	0,5%	-	100 % accessible.	0	Varies depending on operation system. E.g. iOs supports spoken subtitles for Yle Areena programmes, whereas Android does not.	
Plan for future platforms (hbbtv, or other)	No	Same as AD		none	Possibly HbbTv within 3 years	No
Other features and regulations, describe	Swedish regulations	No	Norway has 2 official forms of spoken and writen norwegian. "bokmål" and "nynorsk". Norway has 3 Sami languages. We may have to deliver audio tracks for these in the future.	none	100% spoken subtitles is a state requirement.	Required by law

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Same Language Subtitling

- Same language subtitles (for Hard of Hearing) are …..

Service C: Same-language Subtitles (captioning) / Hard-of-Hearing Subtitles (HoH or HHS)	TV4 Sweden	SVT Sweden	NRK Norway	TV2 Denmark	YLE Finland	MTV Finland
Percent on air broadcast prime time	95%	Pre recorded 100% Live 70%	100 %	100 %. For TV2DK and TV 2 Charlie only. 100% HoH for pre-recorded programs, Live HoH 50% for TV 2 DK only	Appr. 80% of all native language programmes are provided with same language subtitles.	75 % On MTV3 channel only
Percent on air broadcast not prime time	95%	Pre recorded Live	Close to 100 %	100 %. For TV2DK and TV 2 Charlie only. 100% HoH for prerecorded program, Live HoH 80 % for TV 2 DK only	Appr. 80% of all native language programmes are provided with same language subtitles.	75 % On MTV3 channel only
On separate service? (No if it transmitted only live on the main service. If Yes explain why)	No	No	Yes. On internett player NRK TV.	No	No	No
What format of broadcast subtitles are transmitted?	Tele-text	Teletext	DVB-text.	Teletext. With HOH signalised in some Distributors encoder No plan for TTML	DVB component, language code - DUT / DUT Inside Cavena FIH / SWH depending on the program. Headend converts to DUT	DVB subtitling
How do "live written subtitles" behave on broadcast?	Tele-text	One and one word added to a fixed subtitle without any scroll up.	They appear word for word.	One and one word added to the bottom line and this line scrolls up when full	Live news and occasional live events are subtitled. We currently mainly write the subtitles manually, but tests with automatic speech recognition are being made.	N.A.
Does "live written subtitles" have any timing advantages?	No	No	We manipulate the subtitles PCR-delay in DVB to have live written subtitles to occur 6 seconds earlier.	No	No. They are published at the same moment as "enter" is pushed. Live or near live is used as the visual reference	
Available on live streaming?	No	Yes	No.	Yes	No	No
Available on demand?	Yes	Yes	Yes.	Yes	live is recorded and "live" -subtitles are included	Yes
Percent on demand	95%	100%	About 90 %.	Same as Broadcast Channels		75 %
What format of streaming subtitles are transmitted on live streaming?	webvtt	WebWTT & WebSRT	Working on a soloution.	For HLS (ios) WEBWTT For DASH, (smoth,): TTML	----	
How do "live written subtitles" behave on streaming?	NA	Same as broadcast	Working on a soloution.	One and one word added to the bottom line and this line scrolls up when full	----	
Plan for future platforms (hbbtv, or other)	No only OTT	No		none	----	
Other type of subtitling service?	No	No		none		

- Signing across the NorDig region is ……

Service D: Sign Language Description (video)	TV4 Sweden	SVT Sweden	NRK Norway	TV2 Denmark	YLE Finland	MTV Finland
Percent on air broadcast prime time	10%	4% Don't measure Prime/ not Prime	In average 3 hours a day.	0	Daily Sign Language News (duration 5 min) and Weekly Wrap-up on Sundays (duration 10 min). We also broadcast live the Question Hour (debate conducted in a plenary session in which Members of Parliament present questions to ministers orally) on Thursdays round the year. We also have signed Current Affairs Programs approximately 40 hours per year. In national elections there are also signed language programs.	0
Percent on air broadcast not prime time	2%	Don't measure Prime/ not Prime	We seldom transmit sign language exept from prime time.	20		0
On separate service?	Dedicated Access services portal	Simulcast on seperate channel or Online	On a separate linear-TV channel "NRK Tegnspråk". On our internett player NRK TV. https://tv.nrk.no/programmer/tegnspraak	Live on a separate simulcast copy of the original service. A common channel with DR	No	
How is the picture composed?	Croma key overlay of the signer fully original picture		Interpretation made in a separate studio with a green wall. Video from the main channel keyed into the picture in a broadcast mix.	One or two person(s) in front of a TV Set	Live Person	
Available on live streaming?	Yes	Yes	Yes.	no	Yes, Only Daily Sign Language News	
Available on demand?	Yes	Yes	Yes.	no	Yes, Only Daily Sign Language News	
Percent on demand	5%	100%		0		
Plan for future platforms (hbbtv, or other)	No	No		0	-	

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- Overall across the NorDig region is ……

Section E: Common questions	TV4 Sweden	SVT Sweden	NRK Norway	TV2 Denmark	YLE Finland	MTV Finland
Describe if you have program events targeting other types of accessibility services	10%	News in simplified language.	We are looking into the posibility of distributing separate audio with pure speach for audibility.	none	Daily news in plain language.	No
Multiple accessibility services: **Do you have more than one accessibility service at the same time? please write which services**	2%	Yes, all of them could be part of one event.	Some of our programs have subtitling, Sign language, Spoken subtitles and Audio description. Most of these services can only be used separately. For the time beeing it is not posible to look at the sign language version and hear the AD at the same time.	none	Yes, Subtitling & Spoken subtitles	No
- **Do you today produce content for increased speech intelligibility? Possibility for "dialog enhancement" in the form of Clean audio or other type?**	Dedicated Access services portal	No	No. We plan to do this with a small number of our programs in the future.	no	Yes, we have "Plain lanquage news"	No
- **How are translated subtitles transmitted on Live broadcast?**	Croma key overlay of the signer fully original picture	Burnt in	DVB text.	Burned in DVB subtitle stopped some years ago, no distributors wanted DVB	DVB subtitles with language code and descriptors	DVB bitmap
- **How are translated subtitles transmitted on Live streaming?**	Yes	WebWTT & WebSRT	Burnt in.	Burned in	Burnt in on a separate stream HLS Deveplopment for WebWTT, four languages	Burnt in
- **How are translated subtitles transmitted on "On demand" ?**	Yes	See above	In our player both translated subtitles and same language subtitles are visible at the same time.	Burned in	Separate files with timed text	TTML/ WebWTT

The use of accessibility in broadcast services

- More requirements and guidelines for accessibility are expected to be drafted as a result of the EAA and AVMS Directives (EAA = European Accessibility Act and AVMSD = Audio visual media services directive)

- It was identified that in many cases, except "Same Language Subtitles", the provision of Accessibility services was lower than ideal, although always meeting minimum regulations, this may be because of several reasons:

  – Broadcasters want everyone to be able to receive their services, so transmission is done the simplest way which may not always be the most spectrally efficient or the best use of available technology.

  – There is a perception that legacy receivers may cause problems are preventing broadcasters from launching new services or using new features.

The use of accessibility in broadcast services

- Pre-testing of Accessibility features on receivers (typically based upon Nordig testplan) may not always catch all problems and broadcaster use-case. (Some functionality like receiver mix is used outside Nordig area)

- Re-testing of new Accessibility features on legacy receivers is likely to be expensive and broadcasters need to have a simple launch program.

- Broadcasters tends to use other types of broadcast technology than those recommended in Nordig/DVB, like setting up separate services for new accessibility features.

- Broadcasters do-not prioritize informing consumers about their accessibility services and how to find them on different IRDs.

- Conclusion: We have a common spec, but all broadcasters are doing things their own way.

- The Nordig Accessibility group should prepare a short document explaining the work of the group and ask ExCom members to pass this to their internal accessibility teams.

  - Invite them to contribute and ask questions.

  - We propose a to set up a best practice workshop with broadcasters, manufacturers and distributors

  - Broadcasters who are considering to launch a new or modify an existing accessibility service should contact Nordig Accessibility group.

- We should gather information from accessibility groups and broadcasters to understand what their pain points are.

- Collaborate with these accessibility groups so they can inform their members how to find/use the existing services.

  - We propose a question to external accessibility groups: *Should Nordig Broadcasters deliver additional accessibility services even if not all IRDs can receive them initially?*

- Investigate the implications for streaming services on accessibility