Transmitted by the experts from The International Automotive Lighting and Light Signalling Expert Group (GTB)

GRE IWG “Simplification of the UN Lighting and Light-Signalling Regulations” (SLR)

Document: SLR-20-07

2017- 09-25

Simplification of Lighting and Light-Signalling Regulations

Stage 2

Fundamentals of a work plan for discussion

Objectives of Simplification

Extracted from from Annex VIII of the official report of GRE-72 (ECE/TRANS/WP.29/GRE/72

"Adopted Terms of Reference and Rules of Procedure for the Informal Working Group "Simplification of the Lighting and Light-Signalling Regulations"

Develop a proposal to:

Provide a structure that limits to a minimum the number of parallel amendments necessary to achieve a regulatory change;	Stage 1
Reduce ambiguity in the provisions to provide **consistent interpretation**	Stage 2
Define the essential requirements in **performance (technology neutral) terms to provide opportunities for innovation.**	
Deter**mine whether the current regulatory text presents barriers to innovation and whether safety considerations are addressed**	
Develop, as far as possible, **performance-based and technology-neutral requirements to ensure freedom for technical innovation within a framework of safety principles.**	

Definition – “Performance Based”

A definition of “Performance Based” specifically drafted to be **suitable for Lighting & Light Signalling** is required* ; i.e. :

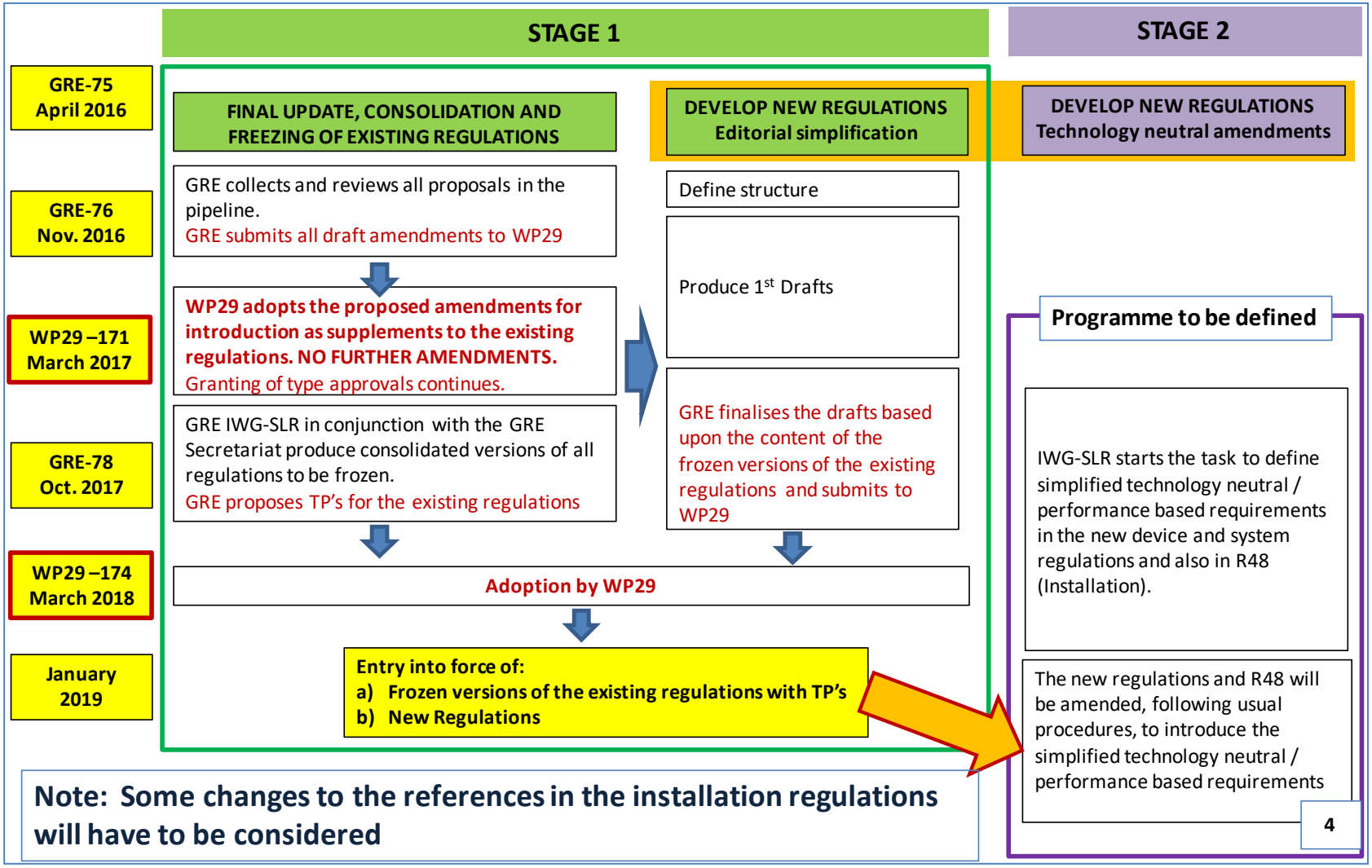
- Technology Neutral
- Clearly defined objective and repeatable testing procedures (in the technical specifications for devices that are related to the required performance produced when installed on the vehicle.

Note, in the context of the work of GRE, the use of the term “Performance based” does NOT imply that photometric and other test requirements shall be added into the installation regulation. It is equally acceptable and more logical to refer to requirements in the device regulations because assessing photometric performance of the complete vehicle is not economically feasible.

*****_There is a definition of “Performance Based” produced by the United States Nuclear Regulatory Commission that may be helpful. www.nrc.gov/reading-rm/basic-ref/glossary/performance-based-regulation.html_

Simplification delivered in two stages

Informal document GRE-75-05
75th GRE, 5-8 April 2016 (Page 5)



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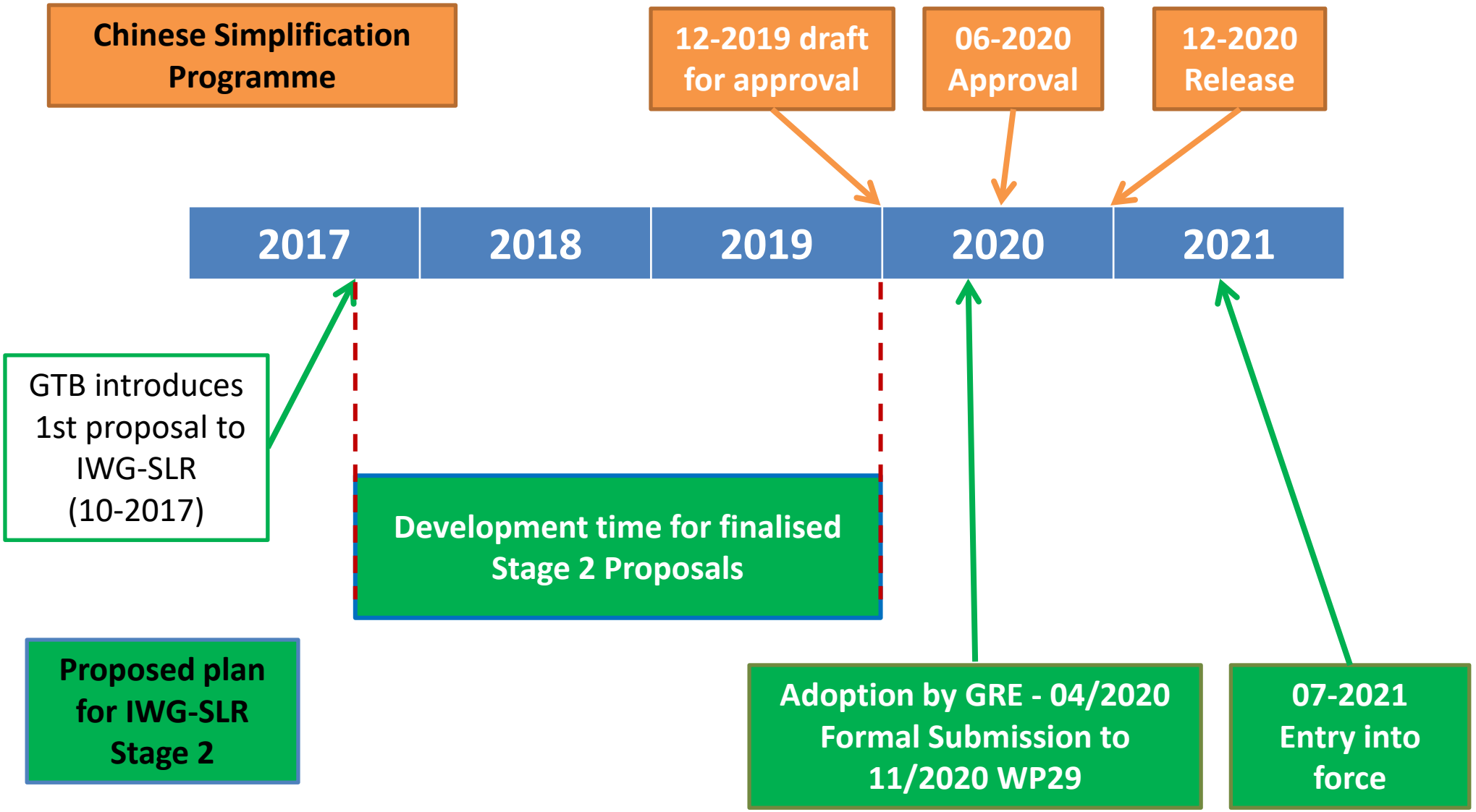
In addition to simplifying the UN Regulations and removing unnecessary barriers to innovation there are wider benefits to be exploited

- Encouraging more countries to join the 1958 agreement
- Overcoming the objections of the US NHTSA to the current UN Regulations that are deemed to be unsuitable as a basis for a self certification system and its enforcement. *(note; current work by NHTSA and SAE to introduce ADB into the FMVSS108)*
- Synchronisation of the technical requirements of the individual mandatory national standards with the UN regulations. (e.g. China, Republic of Korea, India, Brazil)
- Development of technical requirements that may provide a firm basis for development of GTR's for lighting and light signalling.

Plan to synchronise UN and Chinese GB standards as part of the GRE Stage 2 activity



- **Follow the disciplines** associated with development of GTR's
- **Fundamental analysis of the existing technical requirements** to identify and remove unnecessary technology barriers
- **Define robust testing regimes**
  (suitable for self certification purposes and not dependent upon interpretations and judgement of the type approval authorities)
- **Identify new functions that shall be regulated** (perhaps associated with external lighting requirements for autonomous vehicles and new driver assistance functions resulting from the development of digitisation of light).
- Priority to **use results of existing research** (CIE TC4-45 & SAE 2829)
- **Identify requirements for new research** to verify any new proposals
- **Cooperation with research institutes**

Level 1 - The legal act establishing the administrative requirements	
Examples: (New UN "Top level" Regulation)?? UN R-0 (IWVTA) EU Framework Directive China GB / FMVSS108 /UN R-48? Etc.	Administrative Requirements COP / Markings / Mandatory functions / devices – Signalling – RID – Retro-Reflectors Rules for optional functions / devices (are they only allowed when included in a list?) (Likely to only make direct reference to the installation requirements)
Level 2 - Technical Requirements for Installation	
Examples: R48 / R53 / R74 / R86 China GB / FMVSS108	Definitions References to the performance requirements and objective tests detailed in the device regulations. – Signalling / Forward Visibility according to speed of vehicle / Glare to other road users. Updated requirements for Position, apparent surface, Geometric Visibility, Headlamp aim , etc. ***(Important to be able to verify these requirements at CAD Stage)***
Level 3 - Technical Requirements for devices and systems	
Examples: UN Regulations / FMVSS108 / GB Standards etc.	Technical Requirements for Devices + Light Sources (Mandatory and Optional) Objective testing methods for each device or system. Photometry / Mechanical / Thermal / ---------- [Virtual Testing / Simulation ??]

Issues to be Studied - Installation (R48, R50, R74, R86)

Note: The plan shown on page 4 of this document *(Informal document GRE-75-05 Page 5)* mentioned only Regulation No. 48 but GTB believes that it is also necessary to include Regulations 50, 74 and 86 in the Stage 2 Simplification work.

1. Functions allowed to be installed on the vehicle (Including anticipated future trends)
2. Other technical requirements in installation regulations
3. Performance requirements in installation regulations
4. Single lamp
5. Apparent surface

1. Light Signalling (detailed review of the LSD Regulation) and review of photometric requirements

2. Retro- Reflective Devices (detailed review of the RRD Regulation)

3. Road Scene Illumination (detailed review of RID Regulation and new approach to photmetric requirements)

4. AFS and ADB (should these be integrated into the standard photometric requirements?)

Installation - Functions allowed to be installed on the vehicle

1. Refer to **functions**, not devices.
2. Produce a list of mandatory functions *(These are mandated because of their positive impact upon safety)*
   - ➢ Produce a list of optional functions
   - ➢ Do not forbid functions that may assist the driver
3. Produce a definition/requirement to determine whether a function has negative impact on safety/environment (e.g. the “impairment rule” in the US FMVSS108)
4. Review basic principles, e.g. should a parked car have different requirements to those in operating in traffic?
5. Adapt the installation provisions to facilitate the introduction of:
   - o new “digital technologies”
   - o road scene illumination and light signalling for autonomous vehicles

1. Review of Section 5 of R48, paragraph by paragraph, to identify opportunities to amend requirements to become performance based / technology neutral
2. Reconsider positioning rules and geometric visibility in the context of the function and a new approach to the definition of “single lamp”
3. Vertical inclination of the passing beam cut-off – Incorporate the outcome of the work of IWG-VGL

1. In the context of the work of GRE, the use of the term “Performance based” does NOT imply that photometric and other test requirements shall be validated at the installation level. In particular, assessment of photometric performance of the complete vehicle is not economically viable. It is more logical to make references to the photometric and other test requirements of the devices (functions).
2. Develop objective requirements to determine and verify the maximum permitted intensities of red light to the front and white light to the rear; research is required.
3. Consider whether it is necessary to introduce objective requirements to manage the issue of reflections from the surfaces of the car

1. Is a definition of “Single lamp” still appropriate? “Single Lamp” is not performance oriented.
2. Consider redefining “Single Lamp” as “Single function”, “single system”, “single function lamp”, …
3. The function may be produced by a single “device” or a cluster of “devices”. Both should be required to satisfy maximum and minimum photometry.
4. The important requirement is to provide an acceptable visual appearance that is not confusing to other road users. This shall include the topic of symmetry of functions and not devices.
5. Is it necessary to specify the detailed requirements for all classes and modes of AFS? Should AFS be treated as a cluster?

1. A new approach to define means of determining what is really seen (the apparent surface) is required.
2. Develop objective requirements to be based upon a new definition of light emitting surface that can be applied to all measurements?
3. These objective requirements must be capable of being validated at the design stage to avoid uncertainty of compliance before final “off-tool” production parts are available.
4. Need to develop a means of determining the effective visible light emitting surface, possible based upon SAE J2999-201706 *(Determination of the Effective Projected Luminous Lens Area (EPLLA) by Design Analysis).*
5. The requirements concerning the separation of distinct visible light emitting surfaces should be reviewed with regard to experience of type approved configurations that are currently in use.

1. The current light-signalling photometric requirements are performance based and technology neutral. *However a good rationale is required to explain the link between the "real-world on vehicle conditions" and the objective testing procedures defined in the technical requirements for the device.*
2. Detailed paragraph–by-paragraph analysis of the LSD Regulation is required to identify areas where simplification can be achieved (Ref: GTBWGSL294)
3. Are the current photometric requirements still adequate?
4. How to address concerns regarding glare from Light Signalling functions? Luminance or luminous intensity?
5. Is the "apparent surface" of the DRL still required?
6. Should the category 5 and 6 Direction Indicators be merged?
7. How to treat Adaptive Light Signalling?

1. The current RID photometric requirements are performance based and technology neutral. However, there are concerns about the adequacy of the photometric requirements in the context of modern traffic conditions.
2. How to specify improved objective test requirements for road scene illumination
    - consider a categorisation of headlamps according to the maximum speed of the vehicles they are intended to be installed upon *(See Annex 2 of ECE-TRANS-WP29-1045 and its amendments 1&2 for the applicable vehicle categories)*
    - possible convergence with the approach proposed by Dr. Targosinski
    - visibility distance proportional to speed?
    - how to manage glare from RID?
3. Consider existing research and literature

1. The current AFS and ADB requirements are over prescribed and are not technology neutral.
2. To avoid unnecessary barriers to innovation it is necessary to **re-classify AFS and ADB as adaptive versions of RID** with performance requirements and objective tests regarding minimum visibility and maximum glare under all conditions of adaptation.
3. This will require a major study supported by a literature review of existing research and the possible need for further studies.

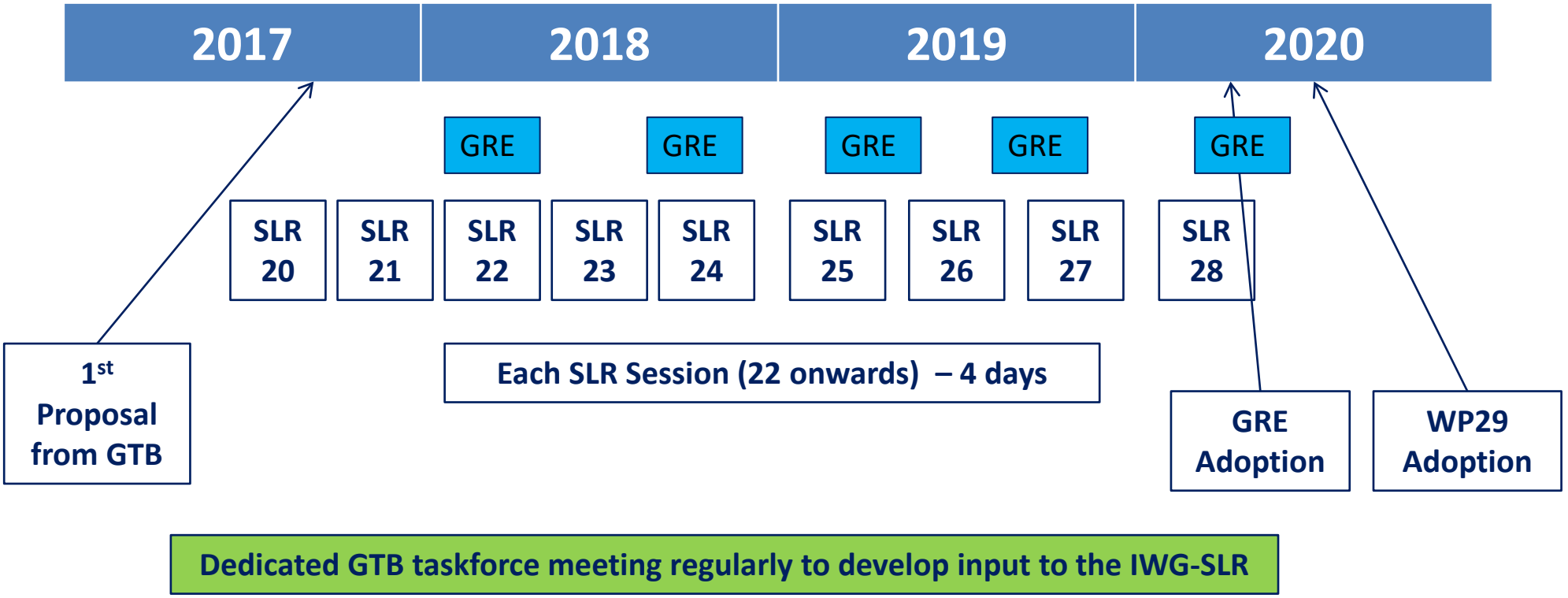
In addition to providing the secretariat, GTB is ready to actively support the technical work of the IWG-SLR in the Stage 2.

A GTB taskforce has been established to develop draft proposals for consideration by the IWG-SLR. This taskforce is led by the GTB-RCNC Working Group (*Regulatory Cooperation and National Coordination Working Group*), coordinating the input of experts from China, European Union, Japan, Republic of Korea, Taiwan and USA. These experts contribute to the GTB Working Groups focussed on:

Installation
Front Lighting
Light Signalling
Photometry (experts from technical services)
Light Source
Safety and Visual Performance (Cooperating with universities)
Strategy (Company leaders responsible for technical budget and innovation priorities)

Many GTB experts are also members of other NGO's and Contracting Parties that will also be providing input to the work of the Informal Group.

Development time for finalised Stage 2 Proposals



Dedicated GTB taskforce meeting regularly to develop input to the IWG-SLR