

# 16<sup>th</sup> Meeting of the CCM

## Report of the President of the Consultative Committee for the Units

**Prof. Dr. Joachim Ullrich**



Le Système  
international d'unités  
The International  
System  
of Units



# CCU President's Report

- 22<sup>nd</sup> CCU meeting: June 2016

- Timeline for 2017

- Promotion FG: January 2017



# CIPM Decisions concerning CCU

5. That the number of digits to be chosen for the defining constants should be according to case 3 (provided that this brings the TPW temperature to 273.16 K).

Constant	Case I; digits	Case II; digits	Case III; digits
$h$	$6.626\ 070\ 039\ 6 \times 10^{-34}$ ; <b>11</b>	$6.626\ 070\ 04 \times 10^{-34}$ ; <b>9</b>	$6.626\ 070\ 04 \times 10^{-34}$ ; <b>9</b>
$e$	$1.602\ 176\ 620\ 77 \times 10^{-19}$ ; <b>12</b>	$1.602\ 176\ 620\ 8 \times 10^{-19}$ ; <b>11</b>	$1.602\ 176\ 621 \times 10^{-19}$ ; <b>10</b>
$k$	$1.380\ 648\ 52 \times 10^{-23}$ ; <b>9</b>	$1.380\ 648\ 52 \times 10^{-23}$ ; <b>9</b>	$1.380\ 649 \times 10^{-23}$ ; <b>7</b>
$N_A$	$6.022\ 140\ 857\ 46 \times 10^{23}$ ; <b>12</b>	$6.022\ 140\ 857 \times 10^{23}$ ; <b>10</b>	$6.022\ 140\ 857 \times 10^{23}$ ; <b>10</b>

“New” SI to “old” SI consistency factor	Case I	Case II	Case III
$m(\mathcal{K})/\text{kg}$	1.000 000 000(12)	1.000 000 000(12)	1.000 000 000(12)
$\mu_0/(4\pi \times 10^{-7} \text{ H m}^{-1})$	1.000 000 000 00(23)	1.000 000 000 02(23)	0.999 999 999 77(23)
$T_{\text{TPW}}/(273.16 \text{ K})$	1.000 000 00(57)	1.000 000 00(57)	0.999 999 65(57)
$M(^{12}\text{C})/(0.012 \text{ kg/mol})$	1.000 000 000 00(45)	0.999 999 999 98(45)	0.999 999 999 98(45)

# CIPM Decisions concerning CCU

## Decision CIPM/105-17

The CIPM agreed to treat the radian and the cycle in the 9th Edition of the *SI Brochure* in compliance with the CGPM resolutions in force (Resolution 12 of the 11th CGPM (1960) and Resolution 8 of the 20th CGPM (1995)).

## Decision CIPM/105-18

The CIPM requested the CCPR to prepare a few concise sentences to be added into the main text of the *SI Brochure* that clearly address the photochemical and photo-biological quantities on a general level and refer to an online Appendix (corresponding to Appendix 3 in the 8th edition of the *SI Brochure*) for details. The sentences should be forwarded to the CCU Executive Secretary before 1 January 2017.

## Decision CIPM/105-19

Appendix 1 of the 8th *SI Brochure* shall be updated by the BIPM and maintained online in the 9th *SI Brochure*.

## Decision CIPM/105-20

The CIPM decided that the definitions in the draft of the 9th *SI Brochure* and in the Draft Resolution 1 shall not contain the term “implicitly”.

## Appendix 3. The base units of the SI

Starting from the definition of the SI adopted above in terms of fixed numerical values of the defining constants, definitions of each of the seven base units are deduced by taking, as appropriate, one or more of these defining constants to give the following set of definitions:

### implicitly

- The second, symbol s, is the SI unit of time. It is defined by taking the fixed numerical value of the caesium frequency  $\Delta\nu_{\text{Cs}}$ , the unperturbed ground-state hyperfine transition frequency of the caesium 133 atom, to be 9 192 631 770 when expressed in the unit Hz, which is equal to  $\text{s}^{-1}$  for periodic phenomena.

## A definition, in terms of mathematics, can only be

## Decision CIPM/105-22

The CIPM requested from all Consultative Committees an update of the *mises en pratique* (current online Appendix 2) to be ready on 31 July 2017. This Appendix will continue to be an online Appendix in the context of the new Brochure.

MeP-kg, v.10.1, 2017.05.10

## *Mise en pratique* of the definition of the kilogram

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### **Consultative Committee for Mass and Related Quantities (CCM) Working Group on the Realization of the Kilogram (WGR-kg)**

*(Editor's note 0.1: In the following text, all digits in red are meant to be place holders for the final digits to be inserted at the time of approval of the redefinition.)*

#### **1. Introduction**

##### *1.1. Definition of the kilogram*

The kilogram, the unit of mass in the International System of Units, SI, is defined in Resolution **XX** adopted by the XXth CGPM in 20**XX** [1.1]. It reads:

The kilogram, symbol kg, is the SI unit of mass. It is defined by taking the fixed numerical value of the Planck constant  $h$  to be 6.626 070 **XX**  $\times 10^{-34}$  when expressed in the unit J s, which is equal to  $\text{kg m}^2 \text{s}^{-1}$ , where the metre and the second are defined in terms of  $c$  and  $\Delta\nu_{\text{Cs}}$ .

# CIPM Decisions concerning CCU

*The kilogram* will be defined with relation to a fixed numerical value in terms of the Planck constant, guaranteeing long-term stability of the SI mass scale. Mass The kilogram can then be ~~realised~~ realized by any suitable experiment method, (e.g. the Kibble (watt) balance or the Avogadro (X-ray crystal density) method). ~~End-u~~ Users will be able to obtain traceability to the SI from the BIPM or from national metrology institutes operating such experiments. Key comparisons will ensure their consistency. The ~~numerical~~ value of the Planck constant will be chosen to ensure that there will be no change in the SI kilogram at the ~~point~~ time of redefinition. The uncertainties quoted offered by NMIs to their calibration customers will also be broadly unaffected.

## Decision CIPM/105-26

The CIPM decided to revise the Rules for Membership of the Consultative Committees as follows; all Member States will have the right for one national laboratory charged with establishing national standards in the field to be an Observer at the applicable Consultative Committee and to send one person (only) and following their request for each meeting. Document CIPM-D-01 will be updated accordingly.

## Decision CIPM/105-28

The CIPM decided that the CCU will adopt the same criteria for participation as the other CCs for all meetings in 2018 and beyond. Document CIPM-D-01 will be updated accordingly.

## Decision CIPM/105 -31

The CIPM accepted the following changes to the membership and observership of the Consultative Committees:

.....

- CCU
  - NRC (Canada): Member
  - KRISS (Republic of Korea): Member
  - METAS (Switzerland): Member.



# CCU President's Report

- 22<sup>nd</sup> CCU meeting: June 2016
- 105<sup>th</sup> CIPM meeting: October 2016
- **Timeline for 2017**

Promotion TG: January 2017

A large, semi-transparent watermark of the SI logo is centered on the right side of the slide. It features the same circular emblem and text as the top right logo, but with a much larger 'SI' to its right.

**Le Système  
international d'unités**  
The International  
System  
of Units

**SI**

# Timeline: writing & editing the Brochure

consultation

**March 2014:** Suggest to the CIPM to invite CCs to read and comment on the present version of the first three chapters of the *SI Brochure* by **March 2015**.

**February 25/26, 2015:** Meeting of CCU WG on angles and “dimensionless quantities”.

drafting

**June 14/15, 2015:** Comments and CCU WG suggestions are considered during a meeting of the *Brochure* Drafting Team (DT). The Resolution is drafted.

**October 2015:** The **CIPM** took notice on the status of the *SI Brochure* and the Draft Resolution.

consultation

**January 7<sup>th</sup>, 2016:** Draft Brochure is sent to NMI Directors and CC Presidents for comments.

drafting

**April 6, 2016:** Drafting Team Meeting (via teleconference) to discuss comments to the Draft *Brochure* from NMIs and CCs and redact an updated version.

# Timeline: writing & editing the Brochure



**June 14 - 16, 2016:** the CCU approved a close-to-final version of the draft *SI Brochure*, discussing units for “dimensionless” quantities, the policy for truncating the numerical values of the defining constants, the *mises en pratique*, new developments, etc.

No unanimous conclusion about “dimensionless” quantities: **reappointment of WGADQ.**

**September 26, 2016:** Report of the WGADQ chair and suggestion on how to proceed with the draft of the 9<sup>th</sup> edition.

**September 27, 2016:** The draft 9<sup>th</sup> edition and the two draft resolutions were sent to CCU for approval of until **October 9.**

**October 2016:** Decisions and approval of the close to final versions by the **CIPM**

- Draft of the 9<sup>th</sup> Edition of the *SI Brochure*

## Decision CIPM/105-21

The CIPM endorsed the latest draft of the 9th *SI Brochure* as the close-to-final one .....

The CIPM considered that the consultation among the stakeholders has been completed.

Nevertheless, if matters of substance are raised, the CCU President shall bring them to the CIPM.

# Timeline: writing & editing the Brochure



**Editing by the BIPM:** typewriting corrections.

**President of CCU:** check typewriting corrections and approve.

**June 30, 2017:** corrections implemented.

**September 5 - 7, 2017:** CCU meeting to

- 1) deciding upon the final version of the complete 9<sup>th</sup> *SI Brochure*,
- 2) deciding on the final version of the Draft Resolution to be provided to the CIPM.

**October 2017:** final approval by the **CIPM**

**October 2018:** 9<sup>th</sup> edition of the *SI Brochure* is ready in French and English

# Timeline: numerical value of constants

**July 1, 2017:** closing date. To be considered for use in the “special” CODATA TGFC adjustment, new results must be accepted for publication.

**September 4, 2017:** CODATA TGFC meeting. Special LSA manuscript accepted and publically available online.

**September 5 - 7, 2017:** CCU meeting to

Presidents of  
CCM, CCQM,  
CCEM, CCT,...  
are around  
for advice!

- 1) recommend to the CIPM whether the redefinition should take place in 2018 taking into consideration the recommendations of the Consultative Committees based on their respective criteria,
- 2) decide about the **fixed numerical values** of the defining constants (rounding).

**September 9, 2017:** sent to the members of the CIPM.

**October 17, 2017:** CIPM recommendation to the CGPM.

**November 13 – 24, 2018:** CGPM approves the “Revised SI”.

**December 31, 2018:** Closing date for the 2018 CODATA adjustment of the fundamental constants based on the revised SI.

# CCU President's Report

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- 105<sup>th</sup> CIPM meeting: October 2016

Timeline for 2017

- Promotion TG: January 2017

A large, semi-transparent watermark of the SI logo is centered on the right side of the slide. It features the same circular emblem as the top right logo, with the text 'Le Système international d'unités' and 'The International System of Units' overlaid. The letters 'SI' are prominently displayed in a large, bold, blue font at the bottom right of the watermark.

**Le Système  
international d'unités**  
The International  
System  
of Units

**SI**

МЕТРО КР

# Structure of the TG



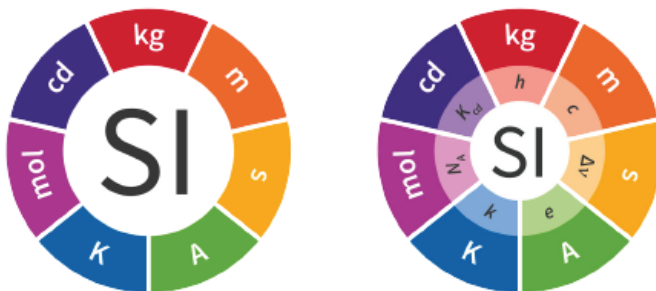
## Decisions

- The SI illustration developed by the PR group is endorsed by the Task group. Its basic concept consists in the word “SI” surrounded by two circles, one depicting the base units and the other depicting the fixed constants. The order of the base units in the outer circle of the illustration is agreed as proposed by the PR group. Variations of this basic concept (as keeping only one of the two circles or highlighting one base unit) will be provided by the PR group. Each user may choose among them depending on the particular application or audience. The SI infographics previously developed by Ian Mills, Terry Quinn and Joachim Ullrich approved by the CCU and CIPM is endorsed to be used for specific audiences.
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- The timeline of the communication campaign as presented by the PR group is approved: it will start on World Metrology Day in 2018 and end on Word Metrology Day in 2019.
- The communication plan for the campaign as proposed by the PR group is approved.



## Our illustration

The use of a common graphic will transcend any language barriers and enable all our campaigns to be recognised as part of this worldwide story. Therefore our illustration should never be distorted or altered in any way. Always make sure you are using the correct version.



Our illustration should have space around it. An exclusion zone can be created by using the width of the letter 'S' of the illustration:



## Illustration artwork

JPEG, PNG and EPS file formats are available:

**JPEG** - compatible with printed items and the web. Available to download from the website.

**PNG** - for use on the web only (raster with transparent background). Available to download from the website.

**EPS** - best used for printed material (vector with transparent background). Contact us to request this file format.

If you require an electronic version of the illustration please contact:

[revised.si@bipm.org](mailto:revised.si@bipm.org)



**DO NOT SQUASH**



**DO NOT STRETCH**



**DO NOT SHEAR**



**DO NOT RECOLOUR**



**DO NOT REPLACE TEXT**

## Our illustrations colours

Our illustration is available in two formats and these colourways:



## Our illustrations colours



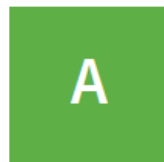
**Pantone 186 C**  
C:11 M:100 Y:82 K:3  
R:207 G:18 B:45



**Pantone 165 C**  
C:0 M:70 Y:89 K:0  
R:236 G:103 B:40



**Pantone 130 C**  
C:0 M:39 Y:95 K:0  
R:248 G:169 B:9



**Pantone 369 C**  
C:67 M:8 Y:100 K:0  
R:98 G:168 B:48



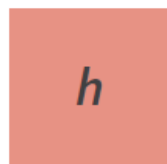
**Pantone 300 C**  
C:91 M:62 Y:0 K:0  
R:25 G:93 B:169



**Pantone 247 C**  
C:38 M:89 Y:0 K:0  
R:171 G:55 B:140



**Pantone Violet C**  
C:93 M:99 Y:0 K:0  
R:65 G:40 B:132



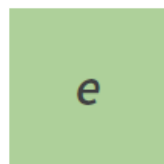
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50% Tint**  
C:5 M:50 Y:41 K:1  
R:231 G:137 B:150



**Pantone 165 C  
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C:0 M:35 Y:44 K:0  
R:246 G:179 B:147



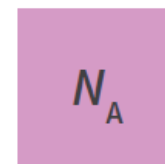
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50% Tint**  
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R:251 G:212 B:132



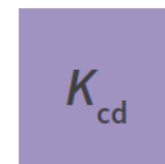
**Pantone 369 C  
50% Tint**  
C:34 M:4 Y:50 K:0  
R:176 G:212 B:152



**Pantone 300 C  
50% Tint**  
C:46 M:31 Y:0 K:0  
R:140 G:174 B:212



**Pantone 247 C  
50% Tint**  
C:19 M:44 Y:0 K:0  
R:213 G:155 B:198



**Pantone Violet C  
50% Tint**  
C:47 M:50 Y:0 K:0  
R:160 G:147 B:194

### White (Paper)

Please note that a 'white' jpeg cannot be provided. If you need a white logo we suggest using a PNG file format.



### SI GREY Pantone Process Black 90% Tint

C:0 M:0 Y:0 K:90  
R:60 G:60 B:59

## Decisions

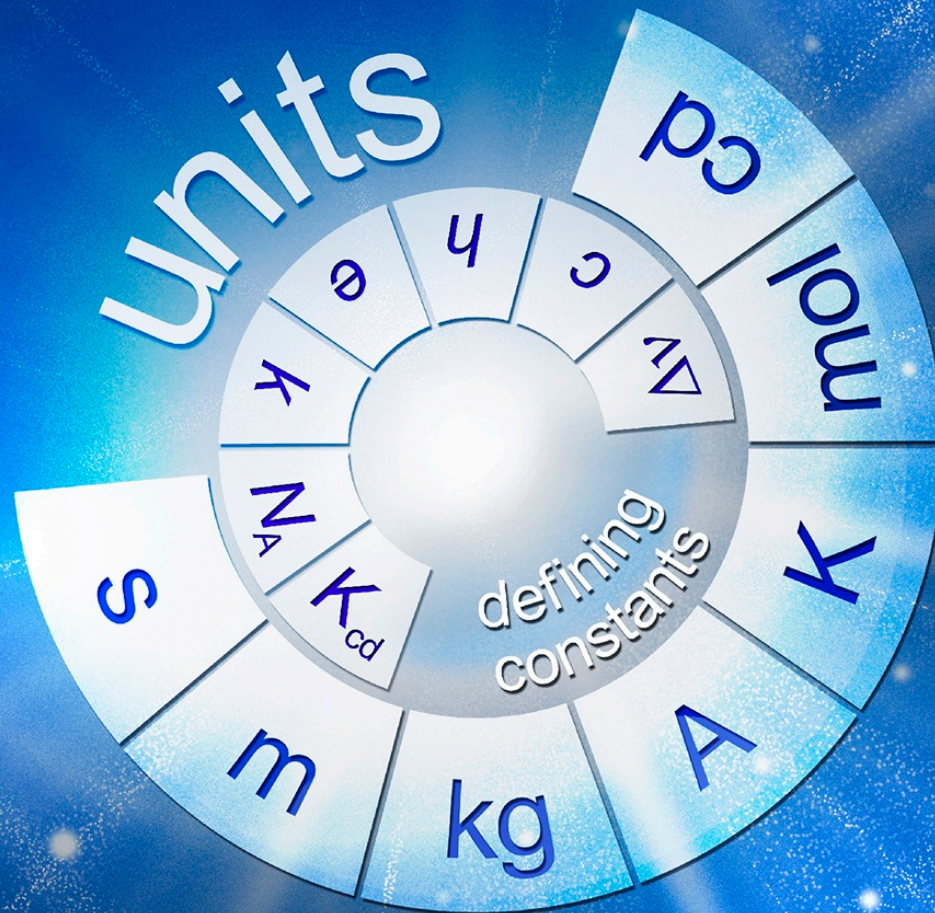
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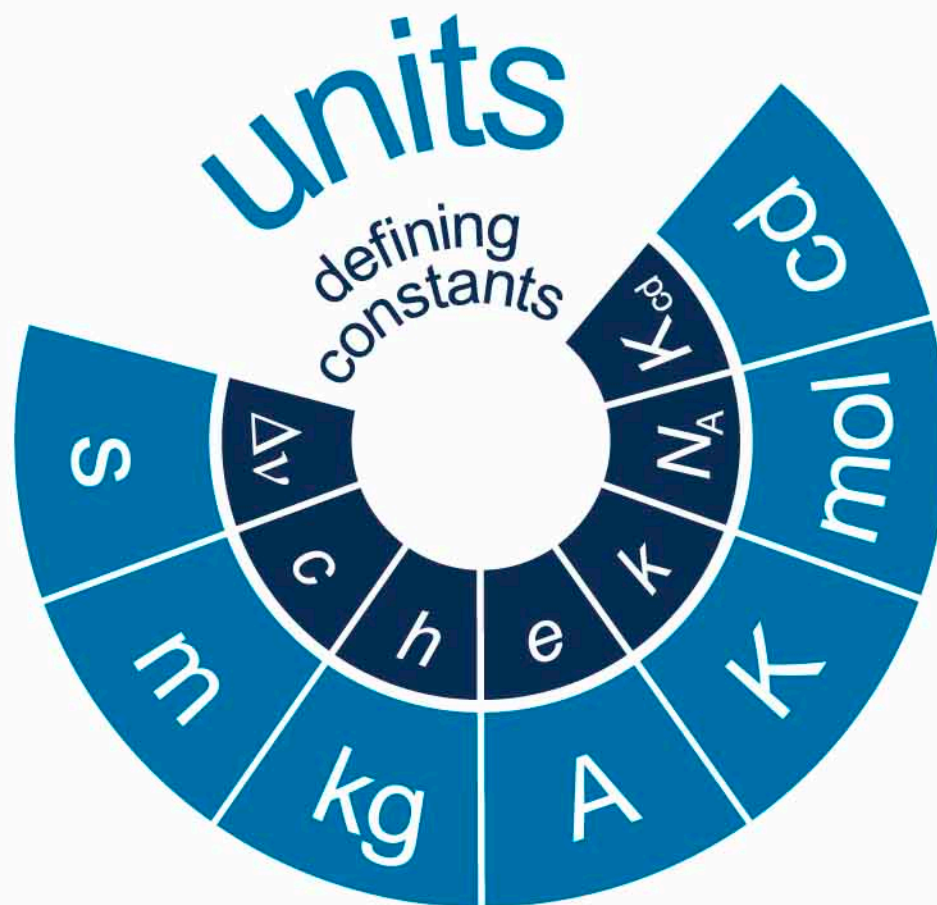
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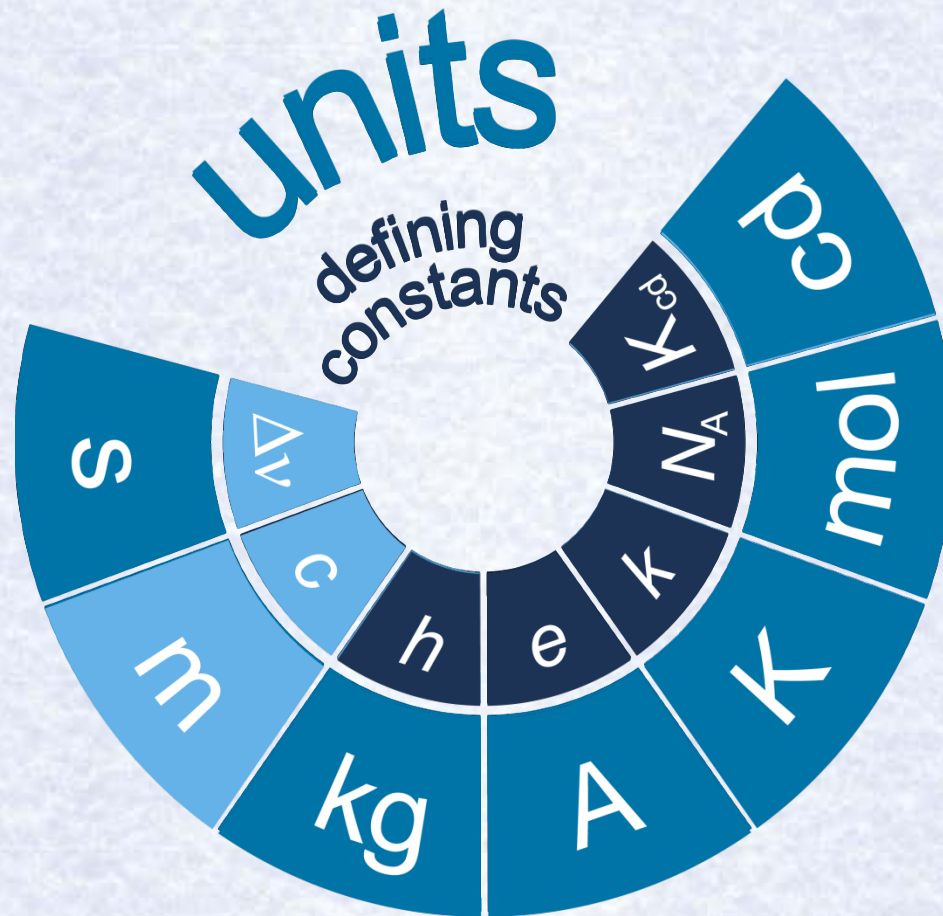
# SI International System of Units



# The New International System of Units



# The international System of the Units



An infographics not a logo!

## Timeline

These are the key international dates that we know about at this point in time.

### **5-7 September 2017: 23rd meeting of the CCU - Consultative Committee on Units**

At this meeting the SI redefinition will be formally recommended to CIPM.

### **20 May 2018 – World Metrology Day**

Focus upon the SI redefinition with web pages, a poster, social media, and other messages from BIPM – This should be the main launch date of your awareness campaign.

### **13-16 November 2018 – 26th meeting of the CGPM - General Conference on Weights and Measures**

This meeting will agree the redefinition of the SI. As part of this Conference, BIPM will be organising a number of activities, including a press conference to mark the occasion and are looking to broadcast the event live. We will keep all NMIs informed of the plans as they develop.

### **20 May 2019 – World Metrology Day**

The anticipated date for the redefined SI to come into practice. This date will mark the end of the celebrations outlining the redefinition of the SI. From this point onwards there will be no reference to the redefinition apart from in an historic context.

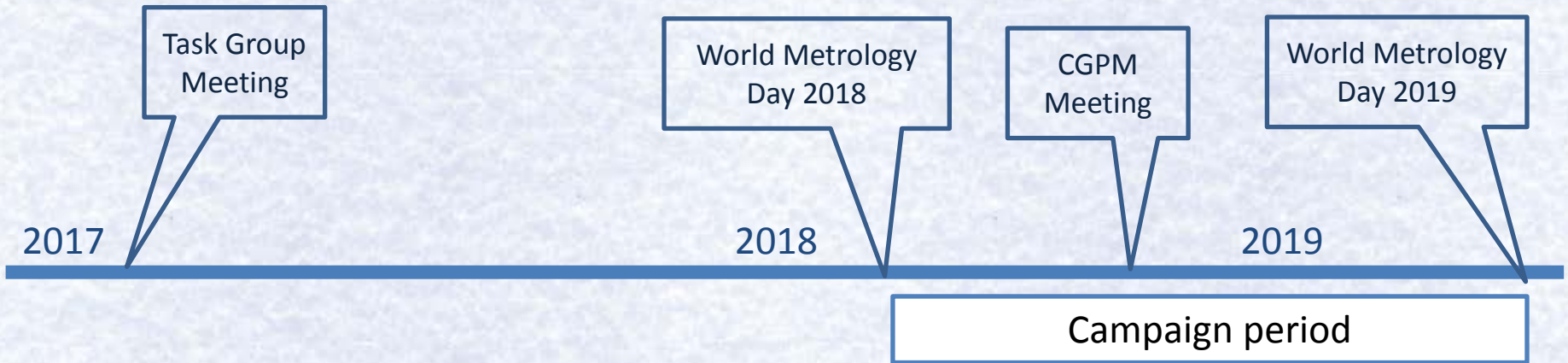
*We would like NMIs, where possible, to use World Metrology Day in 2018 and 2019 to mark the beginning and the end of the year-long celebration. Critical mass of news will create greater impact.*



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# Time line



## Main actions in 2017:

- Issue the Brand Book
- Provide regular updates to BIPM for key meetings
- Engage directly with survey contacts
- Keep NMIs informed
- Develop and share resources
- Encourage NMIs to prepare engagement plans for media, educators and users

## Main actions in 2018:

- Provide PR Launch Pack
- Encourage NMIs to share plans and implement local campaigns
- Prepare for the “one day” celebration within CGPM meeting
- Share and publish PR from throughout the world
- Prepare materials to mark the close of the campaign in 2019

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# Communications plan for project

Audience	Approach	Timing	Actions
Directors of the NMIs and members of the key BIPM committees	Personal updates at meeting via a member of BIPM	As and when meetings occur	Agree a list of the key meetings with BIPM. Provide a written update for each to BIPM to share.
Respondents to the survey (22 NMIs)	They have requested this via email	Look to provide a quarterly update starting this Autumn.	Produce a emailing list of the contact details provided. Draft the first email following the CIPM meeting in October.
All NMIs	BIPM hold an email and postal lists that we can use.	As and when appropriate – first might be the sharing of the Brand Book in early 2017.	Agree approach with BIPM
Regional Metrology Organisations	We will ask the Task Group to take responsibility for keeping the RMOs up to date.	This will be up to individuals	To be agreed at the Task Group meeting in January 2017
Broader audiences	No active approach but information will be held on the BIPM website.		We will look to keep the BIPM website updated quarterly.

## Actions

-The BIPM will develop a new dedicated webpage on the revised SI to host promotional material on the revised SI, and will include the following documents when available:

- The approved Brand Book
- A list of *frequently asked questions* with their answers
- The joint statement from Consultative Committees to all their stakeholders
- The SI illustration with all its variations
- The video on the revised SI developed by the PR group
- A list of the scientific conferences in 2017-2019 where talks on the revised SI may be scheduled.
- A compendium of speakers notes, for speakers on the revised SI to get insight on keypoints
- Talks on the revised SI presented at conferences

-The BIPM will provide an e-mail address for users to address comments on the revised SI. (Note: this address has been created and is **revised.si@bipm.org**).

-A video to celebrate the revised SI will be prepared under the responsibility of the PR expert group and the BIPM.

## Actions

- The list of scientific conferences and talks to come on the revised SI will be continuously updated by the PR group.
- The PR group will elaborate a list of frequently asked questions with suggested answers addressed to the different target audiences of the campaign.
- The PR group will provide several variations of the basic concept of the SI illustration.
- The PR group will explore the idea of developing an SI app for smartphones.
- The BIPM will provide the PR group with a list of meetings (e.g. CC's meetings) that require an update of the Task Group activities.
- The BIPM and the PR group will finish the Brand Book. The BIPM will send it to National Metrology Institutes.
- The PR group will redact a list of recommendations to address the teaching of the revised SI in any country.
- The Task group executive secretary will provide the filmmakers of the documentary “The last artefact” with the full list of contacts of the Task group members (done).

- **Brand book approved, translated, published and circulated to all NMIs**
- **Prepare speaker notes and resources**
- **Commission some expert articles**
- **Pursuing a video featuring every NMI to mark the occasion**
- **Start uploading ideas and resources to the BIPM Portal**
- **Start regular communication with the NMIs**
- **Prepare materials for the launch event – World Metrology Day 2018**
- **Scope the one day event**

**End**