

## **Future Revision of the SI**

# **Brand Book**

## Director's Introduction

I am delighted to bring you this Brand Book, which will help the whole metrology community mark the occasion of the redefinition of the International System of Units (SI). At the time of writing, we are anticipating that this will happen when the General Conference on Weights and Measures (CGPM) meets in November 2018.

The work needed to reach this point has taken many years, and has been a truly international effort. The universality of access that it will afford has been a goal for the "metric system" that dates back more than 200 years.

Such an important event will provide a unique opportunity to promote the work of metrology. We hope that the material in this Brand Book will enable individual National Metrology Institutes to make the most of this chance. The use of the same logo and key messages worldwide will ensure that activities by different organisations will be consistent and combine together to raise the profile of the SI and metrology internationally.

This book and additional resources can be downloaded from our website:

<http://www.bipm.org/en/si-download-area/>

I am extremely grateful to Fiona Auty (NPL), Valérie Morazzani (LNE), Gail Porter (NIST) and Jens Simon (PTB) for their work in creating this book and its content.

I look forward to working with you all to promote the work of metrology and the revision of the SI.

Martin J.T. Milton,  
Director of the BIPM, Pavillon de Breteuil, Sèvres, France.

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## Aspirations for 2018

### **To provide a unique opportunity to talk about the SI**

The SI is used extremely widely, but its full impact is rarely recognised or appreciated. There will be audiences that will be interested and those that should be interested. We wish to exploit this and further raise awareness about the important role of measurement and metrology.

### **To facilitate universality of access to the agreed basis for worldwide measurements**

This has been an ambition for the “metric system” that goes back more than 200 years. From 2018 it will be possible to realise all the definitions universally for the first time.

### **To underpin future requirements for increases in accuracy**

As science and technology advances, the demands for the accuracy of measurements will continue to increase. The 2018 definitions will enable these to be met for many years to come.

*Our aspiration is to encourage NMIs to use this opportunity to create an awareness campaign around the SI in their country.*

## Approach and principles of the awareness campaign

A CIPM Task Group for Promotion of the SI has been set up. The Task Group will:

- Provide a focus for this opportunity
- Create resources to support in this endeavour
- Encourage NMIs to undertake their own awareness campaigns
- Facilitate the sharing of resources

The principles of engagement by NMIs:

- Try to use this event to talk about the SI in general terms
- Use the provided resources or create your own
- Share information freely via the Task Group
- Ensure all materials are fit for purpose, and have appropriate copyright and approval
- Take responsibility for translation and light editing or bringing local context
- Take responsibility for implementation in your own country (noting some with close links may wish to join forces)
- Use the key messages and timelines outlined in this Brand Book
- Look for opportunity for joint communications programmes beyond this campaign

More information about this Task Group can be found at [www.bipm.org/en/committees/cc/wg/cipm-tgsi.html](http://www.bipm.org/en/committees/cc/wg/cipm-tgsi.html)

## What is the revision to the SI

In the revised SI, four of the base units – namely the kilogram, the ampere, the kelvin and the mole – will be redefined in terms of constants; the new definitions will be based on fixed numerical values of the Planck constant ( $h$ ), the elementary charge ( $e$ ), the Boltzmann constant ( $k$ ), and the Avogadro constant ( $N_A$ ), respectively.

Further, the definitions of all seven base units of the SI will also be uniformly expressed using the explicit-constant formulation, and specific *mises en pratique* will be drawn up to explain the realisation of the definitions of each of the base units in a practical way.

This results in a simpler and more fundamental definition of the entire SI, and dispenses with the last of the definitions based on a material artefact – the international prototype of the kilogram.

From the redefinition the SI will be the system of units in which:

- the unperturbed ground state hyperfine transition frequency of the caesium-133 atom  $\Delta\nu_{\text{Cs}}$  is 9 192 631 770 hertz
- the speed of light in vacuum  $c$  is exactly 299 792 458 metres per second
- the Planck constant  $h$  is exactly  $6.626\ 06X \times 10^{-34}$  joule seconds
- the elementary charge  $e$  is exactly  $1.602\ 17X \times 10^{-19}$  coulombs
- the Boltzmann constant  $k$  is exactly  $1.380\ 6X \times 10^{-23}$  joules per kelvin
- the Avogadro constant  $N_A$  is exactly  $6.022\ 14X \times 10^{23}$  reciprocal moles
- the luminous efficacy  $K_{\text{cd}}$  of monochromatic radiation of frequency  $540 \times 10^{12}$  Hz is exactly 683 lumens per watt

Note X represents the yet unknown final digit(s).

More information at [www.bipm.org/en/measurement-units/rev-si/](http://www.bipm.org/en/measurement-units/rev-si/)

## Audiences

The range of audiences that have an interest in the SI is broad. We suggest that you consider the following groups in your awareness campaigns beyond your own scientific and technical communities.

### **Policy makers and opinion leaders**

Key contacts from government, academia, industry and beyond, who are influential opinion formers in your country in the science community. You are likely to know who these people are and can inform them directly.

### **Teachers and lecturers**

All educators in the science community will need to understand the change at some level to ensure they can share this with their students – probably from 14+ years. Teachers often look to Professional Bodies for their resources – which may already include the NMI. If you do not have close links in place, talk to your Professional Science Bodies.

### **General and science-interested public**

There will be a broad audience of science-interested public, who actively read science news. They will look to popular media for information, so ensure you inform the appropriate press. Specialist agencies can help with this if you do not have this support within your NMI or government organisation.

### **Users of the SI**

All NMIs will have a community of known users – either directly as they work with yourselves or indirectly via testing laboratories or standards. You are likely to have lists of customers or partners and can work with the providers of traceability services in the country to talk to this community.

## Key messages

### **“The SI is a world-wide endeavour and approach”**

The SI provides a universal language for measurement.

The proposed changes to the SI are the result of a worldwide agreement at the General Conference (CGPM) in 2018. Metrology is a field where the states and economies of the world work together.

### **“The SI will use the rules of nature to create the rules of measurement”**

Using the constants in nature to define international measurement units allows the scientific and industrial community to accurately scale their measurements from the smallest to the largest quantities in several areas.

It will tie key measurements at the atomic (and quantum) scales to those at the macroscopic level in areas such as mass and temperature, where previously it has been done using less accurate indirect methods. This is the appeal of the changes.

### **“The changes to the SI will provide a springboard for future innovation”**

The changes will mark an important and historic step forward. Just as the redefinition of the second helped enable GPS navigation, the redefined SI is expected, over time, to enable new technologies we have yet to imagine, whilst maintaining continuity for practical users.

*Speaking with one voice using the same messages will increase the impact of our worldwide messages.*

*We encourage all NMIs to use these three key messages when you are introducing the redefinition of the SI.*



We have listed the types of messages that might be important for each audience group – this is not exhaustive.

### **Policy makers and opinion leaders**

- How does this contribute to the health and the wealth of the nation?
- How will it enable new technology and innovation?
- What is its role in trading and globalisation?

### **Teachers and lecturers**

- Introducing the measurement system
- Basic understanding of the physics behind the measurement system
- Changes in the SI and the rules of nature
- Unified theory of measurement
- Completing the metrological jigsaw

### **General and science-interested public**

- How does the SI affect me?
- The worldwide nature of this work
- Springboard for future innovation – what might this look like?
- The use of quantum physics
- The retirement of the physical kilogram

### **Users of the SI**

- Stability in the current system remains – it is not broken
- The new system provides improved stability and precision
- The changes could enable new technologies and lead to many interesting developments

*We encourage NMIs to think about the important audiences and messages in their own countries.*

## 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.

It is expected that at this meeting the SI redefinition will be formally recommended to the CIPM.

**20 May 2018 – World Metrology Day**

Focus upon the SI redefinition with webpages, 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

It is expected that 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.

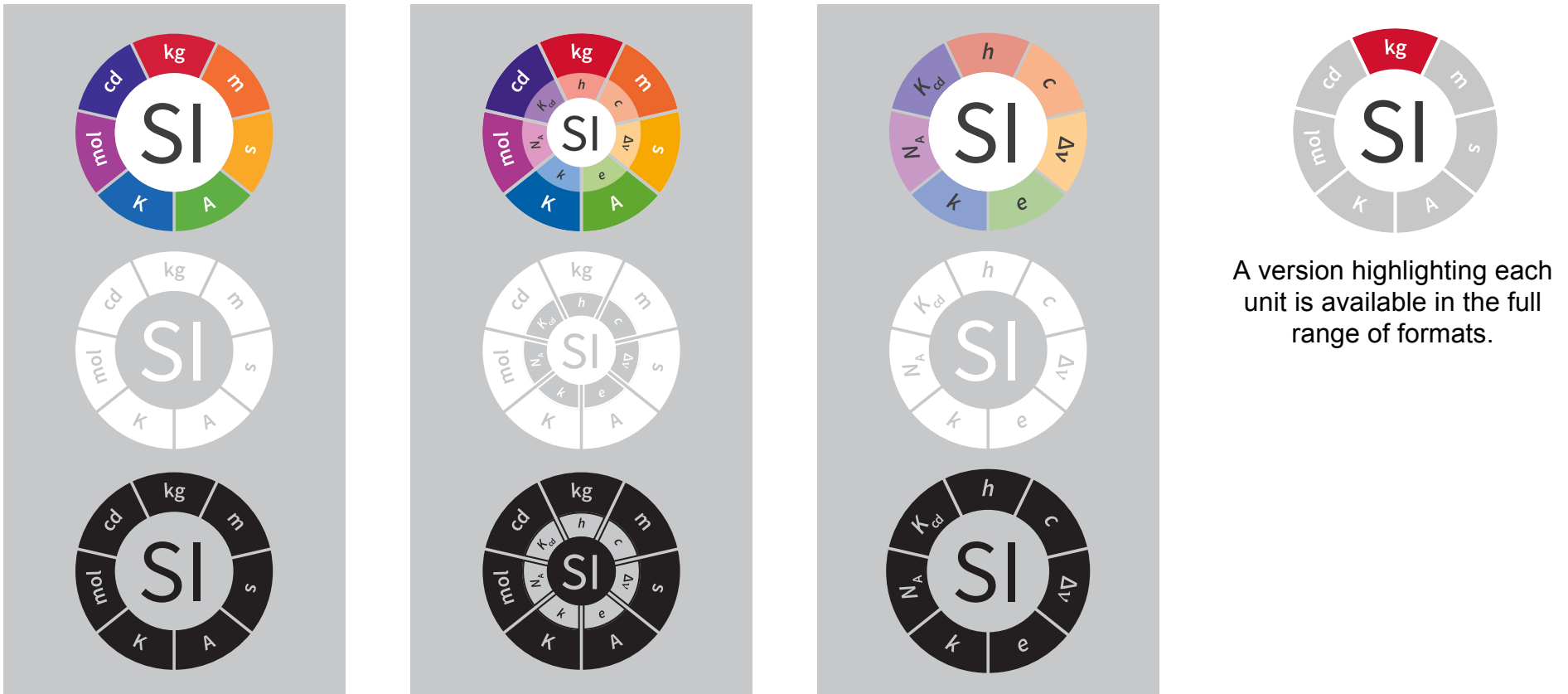
**20 May 2019 – World Metrology Day**

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.*

## SI 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. This is not a logo or an explanation of the SI. The illustration is available in three formats and these colourways:

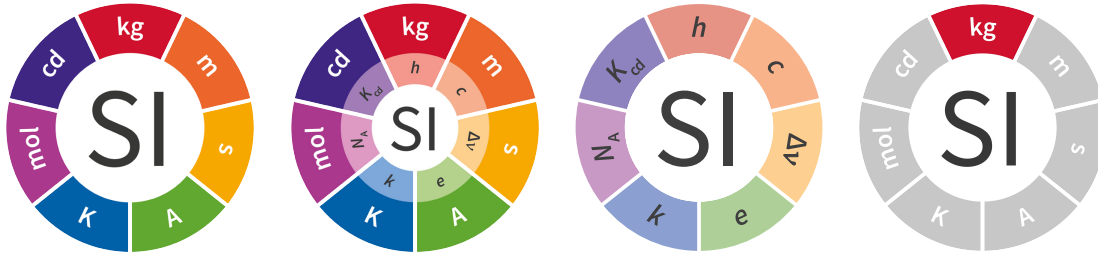


The full range of formats can be downloaded at [www.bipm.org/en/si-download-area/](http://www.bipm.org/en/si-download-area/)

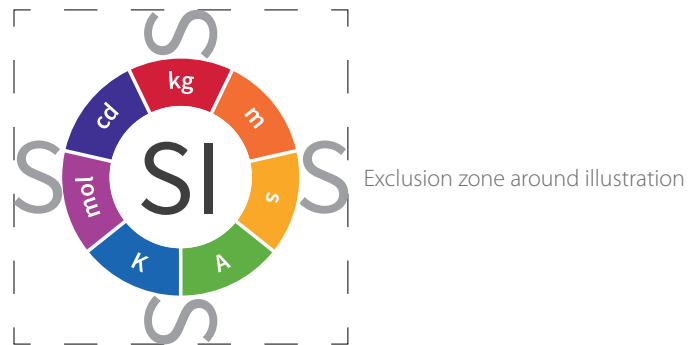
*We encourage all NMIs to use this illustration as part of your own materials alongside your own branding.*

## SI illustration guidelines

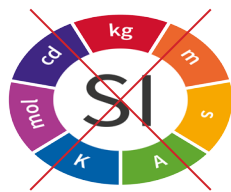
Our illustration should never be distorted or altered in any way. Always make sure you are using the correct version.



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



**DO NOT SQUASH**



**DO NOT STRETCH**



**DO NOT SHEAR**



**DO NOT RECOLOUR**



**DO NOT REPLACE TEXT**

## 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). If you require an EPS version of the illustration please contact: [revised.si@bipm.org](mailto:revised.si@bipm.org)

## SI illustration colour palette

The seven SI units lend themselves to a colour palette based upon the visible spectrum. This is the portion of the electromagnetic spectrum that is visible to the human eye.



**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



**Pantone 186 C  
50% Tint**  
C:5 M:50 Y:41 K:1  
R:231 G:137 B:150



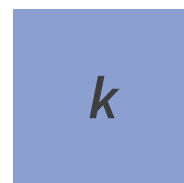
**Pantone 165 C  
50% Tint**  
C:0 M:35 Y:44 K:0  
R:246 G:179 B:147



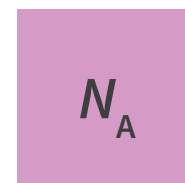
**Pantone 130 C  
50% Tint**  
C:0 M:19 Y:47 K:0  
R:251 G:212 B:132



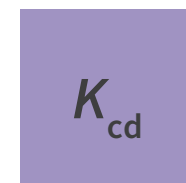
**Pantone 369 C  
50% Tint**  
C:34 M:4 Y:50 K:0  
R:176 G:212 B:152



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



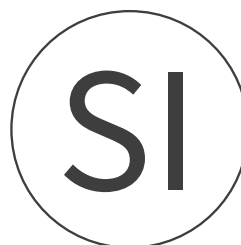
**Pantone 247 C  
50% Tint**  
C:19 M:44 Y:0 K:0  
R:213 G:155 B:198



**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

These colours are detailed in the Brand Book and the SI Illustration guidelines, which can be downloaded at [www.bipm.org/en/si-download-area/](http://www.bipm.org/en/si-download-area/)

*This colour palette is a suggestion for NMIs to use – this might be especially useful in highlighting one unit or commissioning commemorative items.*

## Planning

In 2017, we recommend that you consider the following activities to plan your awareness campaign:

### **Agree the scale of your own campaign**

- Define your approach and what success would look like
- Define your audiences and agree their messages
- Identify resources requiring both people and materials
- Secure appropriate support and budgets

### **Prepare staff to support this**

- Identify and prepare key spokespeople
- Ensure all staff know about the redefinition and key messages
- Brief appropriate external agencies, which might include your government, owner or press

### **Prepare materials**

- Writing, filming, photography, graphics, etc. – ensure plenty of time for any translation and approval processes
- Commission commemorative gifts or activities

### **Preparing for activities**

- Identify any key national events or conferences that you wish to speak at or ensure some presence of the SI
- Book any proposed events
- Agree guest lists and send out “Save the date” notices
- Secure any important visitors or spokespeople to support the campaign from either government or within your media

*We encourage NMI's to share their plans when they are in place and any resources with the Task Group.*

## Examples of tactical ideas

This is a list of ideas that the Task Group will be undertaking from their own NMIs to help talk about the SI changes to their chosen audiences. Where possible, they will be sharing resources.

### Materials

- Webpages on the changes designed for different audiences
- Educational materials to support the teaching of the changes
- Posters and leaflets on the SI designed for different audiences
- Commemorative gifts – using the SI palette to create mugs, pens and socks!
- A book celebrating the SI and its achievements
- Monuments to mark the occasion
- Commissioning of art pieces
- Press materials such as news releases, research contacts, quotes from metrology experts backgrounders, digital photographs, video b-roll, and video/audio actualities

### Activities

- Open days at NMI facilities focusing upon the work around maintaining the SI
- Talks at key national conferences and institutions
- Exhibitions within national museums and science fairs
- PR campaigns briefing key national and science specialist publications
- A social media campaign
- School- or education-related competition focused around the SI
- Films or TV programmes about the SI

## Task Group

Chairperson: Prof. Joachim Ullrich [President of the CCU, Vice-President of the CIPM]

Secretary: Dr Estefanía de Mirandés [CCU Executive Secretary, BIPM]

Members: BIPM, CENAM, INMETRO, KRISS, LNE, NIM, NIST, NMIJ/AIST, NMISA, NPL, PTB, VNIIM, CCEM, CCM, CCT, CCQM and CCU.

Observers: ILAC, ISO, OIML, IEC and CIE.

PR Expert Group: Mrs Fiona Auty, NPL [rapporteur]

Dr Valérie Morazzani, LNE

Mrs Gail Porter, NIST

Dr Jens Simon, PTB

The Task Group will identify and develop key tools to support all Member States to promote the new SI among a wide range of different audiences. The Group will share communication tools and messages through this webpage. The messages and tools will be available for Member States to use as they find appropriate.

The Group meets annually, with a PR Expert Group undertaking activities between meetings.

If you would like to contact the Task Group, you can do so by emailing [revised.si@bipm.org](mailto:revised.si@bipm.org)

More information about this Task Group can be found at [www.bipm.org/en/committees/cc/wg/cipm-tgsi.html](http://www.bipm.org/en/committees/cc/wg/cipm-tgsi.html)