

INTERMAGNET Meeting Minutes

Public Edition

27 September – 01 October 2021

On-Line



Participants:

ExCon:

David Boteler (DB) NRCan, Canada
Alan Thomson (AT), BGS, UK
Kristen Lewis (KL) USGS, US

Not present during the meeting:

Gauthier Hulot (GH), IPGP, France

OpsCom:

Charles Blais (CB), NRCan, Canada
Stephan Bracke (SB), IRM, Belgium
Simon Flower (SF), BGS, UK
Benoît Heumez (BH), IPGP, France
Andrew Lewis (AL) GA, Australia
Roman Leonhardt (RL), ZAMG, Austria
Jürgen Matzka (JM), GFZ, Germany
Tero Raita (TR), U. Oulu, Sodankylä Obs, Finland
Jan Reda (JRD), IoG PAS, Poland
Benoît St-Louis (BSL), NRCan, Canada
Chris Turbitt (CT), BGS, UK
Sergey Khomutov, (SK), IKIR, Russia

Not present during the meeting:

Achim Morschhauser (AM), GFZ, Germany
Hiroaki Toh, (HT), KU, Japan
Virginie Maury (VM), IPGP, France

Guest:

Shun Imajo (SI), KU, Japan

Institute Abbreviations:

BGS – British Geological Survey
GA – Geoscience Australia
GFZ – German Research Centre for Geosciences
IAGA – International Association of
Geomagnetism and Aeronomy
IKIR – Institute of Cosmophysical Research and
Radio Wave Propagation FEB RAS, Russia
IoG PAS – Institute of Geophysics, Polish
Academy of Science
IPGP – Institut de physique du globe de Paris,
France
IRM – Institut Royal Météorologique, Belgium
KU – Kyoto University, Japan
NRCan – Natural Resources Canada
SGO – Sodankylä Geophysical Observatory,
Finland
USGS – United States Geological Survey
ZAMG – Zentralanstalt für Meteorologie und
Geodynamik, Austria

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INTERMAGNET Meeting Minutes

This public edition of the minutes has been edited to remove some material relating to individuals, observatories or institutes. Throughout these minutes, references to subcommittees and committee members are identified using the abbreviations shown in section 2 below and initials included in the list of participants. Text shown in *italics* represents comments from participants taken from meeting documents. These comments may have been paraphrased by the secretary.

1 Meeting format

This was an on-line meeting structured primarily as a document meeting with individual sub-committees holding live on-line video meetings as required. The dates for the meeting were agreed via an on-line poll. In order to achieve outcomes in the time available all participants were requested to follow the published agenda as closely as possible over the period of the meeting while working in the time-zone best suited to their needs.

Documents for the meeting were hosted by GFZ on their NextCloud productivity platform within the “Meeting_2021_2” folder:

<https://nextcloud.gfz-potsdam.de/s/yLdpcGiaFtFqFm2>

Password:

Additional publicly accessible document discussions were available as “issues” within some subcommittee repositories on GitHub.

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues>

<https://github.com/INTERMAGNET/wg-definitive-data/issues>

<https://github.com/INTERMAGNET/wg-tech-man/issues>

The INTERMAGNET email lists hosted by GFZ and a slack channel were also available throughout the meeting for real-time messaging and general announcements.

opscom_intermagnet@gfz-potsdam.de

excon_intermagnet@gfz-potsdam.de

<https://intermagnetworkspace.slack.com/archives/C01RMAH763S>

Plenary presentations were available on the NextCloud document server as documents or PowerPoint files, some with pre-recorded commentary. The presentations have been transferred to the INTERMAGNET web site; links are available below.

While the password protected NextCloud document server is not open to guests it is possible for guests to contribute to public-access GitHub “Issues” discussions.

The format of this meeting is generally not suitable to accommodate guests but Shun Imajo attended Technical Manual on-line sessions on the invitation of outgoing committee member HT.

2 Committee structure and membership

2.1 Executive Council (ExCon)

Alan Thomson*
David Boteler
Gauthier Hulot
Kristen Lewis

2.2 Operations Committee (OpsCom)

Chair Simon Flower*
 Secretary Andrew Lewis

Subcommittees

Definitive Data (DD)	GINs/WWW/Data Format (GWD)	IMO Applications and Standards (IMO)	Technical Manual (TM)	Instruments and Data Acquisition (IDA)
Jan Reda* (P)	Charles Blais* (P)	Chris Turbitt* (P)	Benoît St Louis* (P)	
Achim Morshhauser (S)	Achim Morshhauser (P)	Andrew Lewis^ (P)	Andrew Lewis (P)	Achim Morshhauser (S)
Andrew Lewis (S)	Jan Reda (P)	Benoît Heumez (S)	Chris Turbitt^ (P)	Benoît Heumez (S)
Benoît Heumez^ (P)	Roman Leonhardt (P)	Benoît St-Louis (P)	Jürgen Matzka (P)	Benoît St Louis (S)
Charles Blais (P)	Simon Flower (P)	Jürgen Matzka (P)	Stephan Bracke (S)	Chris Turbitt (S)
Roman Leonhardt (P)	Stephan Bracke (P)	Sergey Khomutov (P)		Jürgen Matzka (S)
Sergey Khomutov (S)	Virginie Maury (P)	Tero Raita (S)		Sergey Khomutov (S)
Simon Flower (P)		Virginie Maury (S)		
Tero Raita (P)				
Virginie Maury (P)				

* Chair of council/committee/subcommittee; ^ Deputy Chair of subcommittee
 (P) Primary affiliation; (S) secondary affiliation

2.3 Changes to membership

SF gave notice to step down as the OpsCom chair after this meeting. Simon continued in the role of chair for this meeting.

HT resigned from OpsCom before this meeting and did not attend. Hiroaki suggested that Shun Imajo would be a suitable replacement to represent the Kyoto GIN on the committee.

3 Agenda, minutes and membership

3.1 Agenda

The main agenda for the meeting is available in the appendix (section 13.1). Sub committee meeting agendas are included in the sub-committee sections below.

3.2 Approval of minutes from March 2021 on-line meeting

Minutes from the previous on-line meeting held in March 2021 were published in September 2021. The process of publication included review and acceptance of those minutes by the committee so further approval was not required during this meeting.

3.3 Committee membership

SF identified five topics requiring discussion:

- HT indicated he will stand down as an INTERMAGNET officer. Hiroaki suggested Dr Shun Imajo as a suitable new candidate to represent the Kyoto GIN;
- SF announced he has retired from BGS and would like to stand down as an INTERMAGNET officer and OpsCom chair;
- INTERMAGNET requires someone to lead the process of 1-second data checking and publication, there may be a need to recruit someone from outside the committee for this job;
- An update is required on the work at Oulu university to visualise INTERMAGNET data
- Further discussion is required on the idea of emeritus INTERMAGNET officers.

There was general agreement that allowing emeritus officers is a good idea. Various questions and suggestions were raised.

AT asked:

Do emeritus members have specific duties or work like a consultancy -how to manage the risk of tasks being incomplete?

Should emeritus membership be time limited?

Should there be an upper limit on numbers for emeritus membership?

Can emeritus members act as sub committee chairs?

Who can be nominated?

JRD suggested emeritus members should have the opportunity to observe INTERMAGNET operations, except for sensitive topics. To participate in INTERMAGNET work there should be agreement and a decision by the INTERMAGNET committees.

AL noted the importance of maintaining a diverse balance within the committee and suggested limiting numbers and tenure period of emeritus members. Perhaps nominations could be suggested by existing members and considered during the normal membership discussions during meetings; one emeritus member per subcommittee for a period of 3 years with the option of a 3 year extension if warranted. Exact duties could be decided by the relevant sub committee.

JM says he is fine with emeritus officers but if there is a new member from the same institute as an emeritus member that new member should be consulted.

KL noted emeritus membership is a good way to ensure expertise is not lost and asked:

Should the individual have official capacity with their previous organisation, do they represent their prior organisation or are they acting as an individual?

Should there be a limited number of positions for each subcommittee?

Do we consider tasks other than committee participation (eg data checking)

SF suggested policy note 4 (PN4) provides information on current membership processes and could be updated to include procedures for appointing emeritus members.

AT made further comments which are reported in section 8.5.2 below.

3.4 Communications

Discussion on communications is a standing item on the agenda and SF asked if we are doing enough to communicate with the INTERMAGNET community. Completing version 5 of the Technical Manual and publishing records of meetings are both significant steps in communications.

AT noted an AGU EOS paper describing recent developments in INTERMAGNET has been published <https://eos.org/science-updates/modernizing-a-global-magnetic-partnership>

AT also noted that ExCon will consider better use of social and other media to promote INTERMAGNET when there is time for a detailed discussion

4 Progress on plenary actions items

4.1 Action items from March 2021 online meeting

Action	Responsible	Description	Status (Green = completed, Orange = ongoing; Red = not started)
P.A01	chairs/AL	Complete subcommittee reports, decision logs and action item list by 6 weeks after completion of the meeting	Done
P.A02	chairs	Supply a report on subcommittee activities for inclusion in the "Report to IMOs" by 6 weeks after completion of the meeting	Done
P.A03	SF	Complete a report to IMOs and distribute to IMOContacts, WorldObs and the INTERMAGNET web site by 12 weeks after completion of the meeting	Not started
P.A04	AL	Complete draft minutes, including reports from subcommittees by 12 weeks after completion of the meeting	Done, but not within the 12 week deadline
P.A05	committee members	Review the draft minutes within 14 weeks after meeting	Done but not within the deadline
P.A06	AL	Complete corrections and amendments to the minutes with 16 weeks	Done but not within the deadline
P.A07	AL/SF	Review minutes for publication within 20 weeks after meeting	Done but not within the deadline
P.A08	committee members	Review draft "public" minutes within 22 weeks	Done

P.A09	AL	Upload minutes to INTERMAGNET document archive, publish the “public” minutes on INTERMAGNET web site and notify IMO-Contacts by 24 weeks after completion of the meeting	Minutes uploaded to archive and web site. IMO-Contacts not notified
P.A10	chairs	Arrange an online subcommittee meeting or document meeting before the next face to face meeting	Not required for most sub committees – replaced by 6 monthly on-line meetings
P.A11	SF	Request committee members for agenda items for inclusion at the next meeting and request chairs to create subcommittee agendas	Done
P.A12	SF	Include item on next meeting agenda to seek views on effectiveness of INTERMAGNET’s communication with community	Done
P.A13	SF	Publish draft agendas 2 weeks before the next INTERMAGNET meeting	Done
P.A14	SF	Arrange another online meeting in September 2021	Done
P.A15	AL	OpsCom requests ExCon to consider the idea of “emeritus” INTERMAGNET officers. There may be some retired INTERMAGNET officers who have much experience and possibly time available to contribute to aspects INTERMAGNET	On the ExCon agenda for this meeting
P.A16	TR/ExCon	Provide a letter of support to U. Oulu for development of web application visualisation	Tero: SF sent this Aug 2020 to Eija Tanskanen, so it should be: Done,

4.2 Outstanding items from previous meetings

Action	Responsible	Description	Status (Green = completed, Orange = ongoing; Red = not started)
P.A18	AT	Arrange an INTERMAGNET discussion session during the next IAGA observatories workshop	Not done. Workshop postponed to 2022. The 2022 and 2024 meeting venues have been decided and we can be represented at these.
P.A20	SF	Publish new version of IMCDView and data conversion software onto GitHub	Not started
P.A21	SF	Generate metadata reports and provide via email to IMOs (in WDC call-for-data) asking for correction and feedback	In progress. Work has been done to generate database views for the reports.
P.A24	SF/K.Elger/BH/JRD	Commence preparation on metadata and DOI for 2016	Done, completed 2016, 2017, 2018

		INTERMAGNET Reference Data Set (IRDS-2016) 1991 – 2016	
P.A26	BH/SB/E.Clarke/J.Fee/SF	Prepare a DOI discussion document suggesting best practice and offering advice to IMO's on using DOIs – carried over from Vienna	No longer required
P.A28	SF	Investigate inclusion of metadata from “readme” files into DOI information (and definitive data IAGA2002 file headers) to describe known issues with definitive data	Not started

4.3 Secretary Correspondence

There has been no correspondence to the secretary since the March 2021 on-line meeting.

4.4 Thanks to Retiring offices

SF and HT announced at this meeting they will step-down from the INTERMAGNET committee before or soon after this meeting.

The committee members expressed their thanks and appreciation for the contributions made by SF and HT. In particular AT thanked both, on behalf of INTERMAGNET, for their efforts and hard work over many years and noted in his role as ExCon chair, he could always rely on their advice, knowledge and support.

4.5 OpsCom Chair Election Process

Procedures for electing a new chair of OpsCom have not previously been formally documented, but followed past procedures, most recently in 2016 the process followed the 6 steps listed below.

- 1.) The process will be overseen by the current OpsCom chair.
- 2.) Nominations for OpsCom chair can be made by any current OpsCom member for themselves or for another person. If nominating another person, make sure they know and agree before nominating them.
- 3.) Nominations will be accepted by the current OpsCom chair between the start and end of October.
- 4.) If there are no nominations, this will be communicated to OpsCom members and the nomination process will be rerun throughout November.
- 5.) If one nomination is received, the nominee will take on the role of OpsCom chair, subject to ratification by ExCon.
- 6.) If more than one nomination is received, we will proceed to voting:
 - a. Each member of OpsCom has 1 vote, except for the current OpsCom chair, who does not vote.
 - b. Voting will take place between the start and end of November. Votes will be received from OpsCom members by the current OpsCom Chair.

- c. If there are an equal number of votes for the top two or more candidates, the current OpsCom chair will cast a deciding vote.
- d. The decision will be passed to ExCon to ratify

AL suggested some minor alterations to the above

1) The process will be overseen by a returning officer, normally the current OPSCOM chair, but if unavailable, an OPSCOM member nominated by ExCon. The returning officer must not be standing for the position of OPSCOM chair.

3) Nominations will be accepted by the returning officer for a period of 4 weeks

4) If there are no nominations, this will be communicated to OpsCom members and the nomination process will be rerun for another four weeks.

6)

b. Voting will take place over a four week period immediately following the nomination period. Votes will be received from OPSCOM members by the returning officer.

c. If there are an equal number of votes for the top two or more candidates the ExCon chair will cast the deciding vote.

Both SF and AT noted that the processes should remain internal to OpsCom with only ratification required by ExCon, so the returning office would cast a deciding vote in the case of a tie (6 c)

The procedure will be documented within Policy Note 4.

5 Presentations in Plenary session

5.1 Progress on one-second data (JRD)

A report on the situation with one second definitive data collection from 2014 – 2020

[https://intermagnet.github.io/meetings/2021September-Online/Reda Progress on One Second Data.pptx](https://intermagnet.github.io/meetings/2021September-Online/Reda%20Progress%20on%20One%20Second%20Data.pptx)

Submissions of 1-second definitive data are not obligatory for an IMO, but so far 44 IMO have submitted data and 30 IMOs submit regularly since 2014. All submitted data are not yet publically available due to the lack of agreed formal checking and publishing procedure. Since March 2021 the automatic INTERMAGNET robot (IMBOT) system has been running to check data and provide email reports. Issues still to be resolved include manual checking and acceptance of data and publishing on the web, reference data sets and minting a DOI.

BH asked if IMOs are being asked to provide data in CDF format, and if it is possible to distribute data on line before formal checking but with a warning to indicate data are checked automatically.

JRD responded that 2014 data was IAGA2002 format, but from 2015 data were requested as CDF format.

BH remarked that preparing data is difficult and IMOs may lack motivation if data are not distributed

RL suggested that 1-second data could be handled in a different way to 1-minute data and offered a 2-step process. 1) Every data set that passes automatic checks is provisionally accepted and published. This

process needs approval from DD subcommittee and a process to link or upload such provisionally accepted data from the Paris GIN to the INTERMAGNET web page or data archive needs to be developed. If DOIs are available they need to be added into the CDF metadata. 2) The automatic IMBOT reports provide a comprehensive overview on data submissions and data quality including information on timing accuracy, noise-level, filtering and a comparison to 1-minute data. The automatic checks done so far show most (80%) of the data submissions contain all required information but this report does need to be manually reviewed. RL suggested organising a data-checker discussion sessions, perhaps at the IAGA workshop.

SF noted if provisionally accepted data from Paris GIN are ingested at the Edinburgh GIN those data will become available to users of the new portal (<https://imag-data.bgs.ac.uk/GIN/>) which is replacing the INTERMAGNET data archive in Ottawa. Data need to be marked as definitive. Outstanding Issues include: the volume of data; can EDI-GIN ingest CDF data format; cannot label data as “provisionally definitive”; there will be meta-data loss because the EDI-GIN stores data in a flat file data base, not in the original data format as provided; there will be loss of precision as data are stored as 32 bit floating point values which allows a resolution of 0.1 nT and 0.05 arc-minutes

RL noted in response to SF points: 25 GB of data per year, assuming 40 IMOs; the dominant issue with many data submissions is incomplete metadata information in the CDF data files. RL also asked if it is possible to make the original files available for download and suggested forgoing manual checks for 1-second data. RL suggested skipping manual data checks for 1-second data, but work is still required for those datasets not achieving a pass (level2) from the IMBOT automatic checks.

RL also asked, in response to SF, if the original metadata is lost during ingestion into the EDI-GIN then is the information necessary at all.

TR said that any additional manual 1-second data checking will be too much work and thinks more volunteers outside the existing data checkers group are required to assist some IMOs with their definitive data production. TR asked if it is possible to make training/tutorial material available on the INTERMAGNET web site.

Further discussion is reported in section 9.10 below.

5.2 Report on definitive data, including IRDS and DOIs (JRD)

A summary of definitive data for 2017-2020 and preparations for IRDS-2016 and IRDS-2017. [https://intermagnet.github.io/meetings/2021September Online/Reda Report on Definitive Data Timeliness.pptx](https://intermagnet.github.io/meetings/2021September%20Online/Reda%20Report%20on%20Definitive%20Data%20Timeliness.pptx)

A summary of the amount of definitive 1-minute data at the three stages of checking since 2017 was presented in terms of total number of IMOs.

Year	Step1 -Paris	Step2 -Paris	Step3 – INTERMAGNET web
2017	121	116	116
2018	120	114	112
2019	110	102	102
2020	95	58	57

IRDS-2016 and IRDS-2016 have been completed and published. IRDS-2018 is close to completion, AM is preparing new country/institute maps. The summary of DOI publication to-date is as follows:

Published Year	Address	Number of IMOs All years/last year	Publication year
2013	https://doi.org/10.5880/INTERMAGNET.2013	112/112	2017
2014	https://doi.org/10.5880/INTERMAGNET.2014	112/112	2019
1991-2015	https://doi.org/10.5880/INTERMAGNET.1991.2015	145/117	2020
1991-2016	https://doi.org/10.5880/INTERMAGNET.1991.2016	147/116	2021
1991-2017	https://doi.org/10.5880/INTERMAGNET.1991.2017	148/114	2021
1991-2018	Compiled except for 2018 country/institute files	149/110	

TR noted a few IMOs missing from 2017-2019 and provided details and also asked if there will be a deadline for IRDS 2019

JRD clarified that the summary showed total numbers only and suggested another deadline may be confusing. There is one deadline sent to IMOs in the “Call for data”

SF thanked everyone who contributing to preparing the data set and asked if someone can prepare a letter to send to IMOs announcing the 2016 and 2017 data sets and put a notice on the INTERMAGNET web site or asked colleagues to publicise the data. SF also posed a question about “data journals” and of INTERMAGNET should be using them.

JRD noted there are actions items to prepare a letter and notification on the website

SK asked whom has the responsibility of monitoring the passage of data through the checking process and suggested the IMO should take the responsibility.

JRD said the monthly data statistics created by GFZ make monitoring the data easier and was surprised the IMOs do not monitored the emails more closely.

5.3 Next version of the Technical Reference Manual (integration with GitHub) (SB)

A proposal for collaborative integration and publishing the Technical Reference Manual https://intermagnet.github.io/meetings/2021Mar-Online/Bracke_TMcollaborativeEnvironment.pptx

The aim is to make it possible for the community to contribute to the Technical Manual, have full version control and availability as HTML and downloadable PDF, all as automated as possible. ReStructured Text (.rst) was used for the manual which can be managed by GitHub, similar to Markdown format (.md). However, Markdown is limited to simple web sites and cannot produce tables of contents or referencing. Rst can handle these and also plugin directives. Sphinx is a python system that interprets .rst files to create documents in different formats. It must be installed locally, with the results deployed on a host server. ReadTheDocs provides this hosting and also has hooks into GitHub to automatically update when there are changes to the file repository on GitHub. ReadTheDocs can be configured to build “latest” and “stable” version of documentation as defined by tags in the linked GitHub repository. This system provides a fully integrated and automated chain between GitHub and ReadTheDocs with the full power of version management and on-line control.

An extensive evaluation of the system has been prepared by SB at:

<https://github.com/stephanbracke/test-manual>
<https://test-manual.readthedocs.io/en/stable/>

SF has followed this approach for a documentation project with BGS and plans to do similar with documentation for the Edinburgh GIN and thanked SB for pointing the way.

5.4 Future of the INTERMAGNET data archive and web site (SF)

A summary of progress on preparing the Edinburgh GIN to transfer data and operations for the INTERMAGNET data portal from the Ottawa GIN.

https://intermagnet.github.io/meetings/2021Mar-Online/Flower_ImagPortalProgress.pdf

- Agreement has been received from BGS management to host the data and allow secure data transfers.
- A containerised server design has been implemented using Docker and Kubernetes and has been deployed to a staging location for testing by the four GINs, but work is still required.
- No data has been received from the GINs but the system is ready for testing.
- None of the historic data archive held at NRCAN has been transferred to BGS.
- FTP server has been upgraded and a host machine is ready in the BGS DMZ.
- Web services to download and plot data are ready <https://imag-data.bgs.ac.uk/GIN/>
- Provision for data embargo periods have been provisioned and implemented.
- Plots of recent geomagnetic activity will be prepared by Sodankyla with data access to the GIN using the web service.
- Logs of data usage for IMOS are now available.
- Definitive data in IAF format from Paris can be transferred via NRCAN as IAGA-2002 and so to the Edinburgh GIN via the rsync data stream.

6 Next meeting

SF intends to step-down as OpsCom chair at the end of this meeting and suggested the new chair should decide on the arrangements for the next meeting, so decisions about the next meeting will best be left until the new chair is in place.

AL agreed

AT agreed and suggested if there is an in-person meeting next northern summer then an on-line meeting in early 2022 may not be required, noting that international travel will remain difficult but not impossible into 2022.

SF suggested there may be reduced interest in supporting international travel by institutions and this should be investigated further across the institute involved before making decisions about meetings.

7 Decisions and action items

7.1 Decisions

No decisions finalised

7.2 Action items

Some action Items considered in plenary sessions have been captured within the council and subcommittee action items in the sections below. Those actions items not fully included in the council and subcommittees lists are included here.

Action	Responsible	Description
P.A01	chairs/AL	Complete subcommittee reports, decision logs and action item list by 6 weeks after completion of the meeting
P.A02	chairs	Supply a report on subcommittee activities for inclusion in the "Report to IMOs" by 6 weeks after completion of the meeting
P.A03	SF	Complete a report to IMOs and distribute to IMOContacts, WorldObs and the INTERMAGNET web site by 12 weeks after completion of the meeting
P.A04	AL	Complete draft minutes, including reports from subcommittees by 12 weeks after completion of the meeting
P.A05	committee members	Review the draft minutes within 14 weeks after meeting
P.A06	AL	Complete corrections and amendments to the minutes with 16 weeks
P.A07	AL/OpsCom chair	Review minutes for publication
P.A08	committee members	Review draft "public" minutes
P.A09	AL	Upload minutes to INTERMAGNET document archive, publish the "public" minutes on INTERMAGNET web site and notify IMO-Contacts before the next scheduled meeting or no later than 24 weeks after completion of the meeting.
P.A10	chairs	Arrange an online subcommittee meeting or document meeting before the next face to face meeting
P.A11	OpCom chair	Request committee members for agenda items for inclusion at the next meeting and request chairs to create subcommittee agendas
P.A12	OpsCom chair	Include item on next meeting agenda to seek views on effectiveness of INTERMAGNET's communication with community
P.A13	OpsCom chair	Publish draft agendas 2 weeks before the next INTERMAGNET meeting
P.A14	OpsCom chair	Decide on format and dates for next meeting
P.A15	SF	Arrange election of new OpsCom chair during October and November 2021 and announce results to the community in Report to IMOs
P.A16	SF	Document procedures for election of OpsCom chair (in PN4)

8 Executive Council

8.1 Meeting overview

The ExCon meeting was held entirely via discussion documents.

8.2 Participants

David Boteler, Krissy Lewis, Alan Thomson

Apologies: Gauthier Hulot

8.3 Agenda

- Report on progress on ExCon 2020/2021 Action Items
- Discussions Potentially Leading to Decision
- General Discussion & Information Exchange
- Review of Action and Decision Items
- AOB

8.4 Progress on ExCon action items

Action	Responsible	Description	Status Green completed, Orange ongoing; Red not started
EXC.AI-1 (2021).	ExCon and SF	ExCon and SF to discuss options around an online public platform or section of the plenary meeting to engage online with the wider IM community, providing an 'outside world' update on activities and inviting questions.	This activity has not yet started. With SF leaving OpsCom Chair we will presumably revisit this with the new chair of OpsCom. Other opinions and ideas are welcome.
EXC.AI-2 (2021).	DB	DB to develop his space weather application ideas involving IMO data and bring for wider discussion	(DB) No progress on this. (AT) Continued to next meeting
EXC.AI-2 (2020)	AT and ExCon	Explore issues and ideas around use of social media to boost INTERMAGNET's profile and engagement with younger scientists, perhaps leading to a specific subcommittee on communications.	This activity has not yet started. Continued through next year with the new OpsCom chair. Other opinions and ideas from OpsCom are welcome

8.5 Discussion potentially leading to decisions

8.5.1 User Survey status

(AT) I would welcome comments on the USGS review of survey responses, e.g. what did we learn and what might we do next, in terms of a role for INTERMAGNET, in relation to other geophysics data?

(KL) I will send out the results to all of ExCon. I think review and interpretation of the results should be done by ExCon not just USGS. **(Results were sent to ExCon on 29 September 2021)**

(AT) Interestingly there seems to be some consensus from the small number of replies so far that additional standards are not particularly necessary. Also, the deployment of new sensors isn't necessarily a big deal for these institutes. Does this mean the need at this time for new standards, e.g. for Electric/telluric fields, is not welcome? Perhaps. However, the results so far may reflect view of only a small group of institutes, so the details need to be checked. Perhaps we need to extend the survey and give other institutes time to respond, i.e. send out a reminder with a new deadline, to get a wider spread of responses.

AI1: Set extended deadline for responses of 1st April 2022 and send reminder to IMOs (OpsCom chair + AT)

8.5.2 Emeritus INTERMAGNET membership idea

(AT) This is a great idea for retaining skills and 'corporate memory'. I think the main issues include things like

- Do emeritus members have specific duties or simply be prepared to offer comments in a consultancy-type way? I am concerned that someone may pick up a specific and important task and then not complete it due to external factors, boredom, etc
- Should emeritus status be time limited, e.g. automatically reviewed or even end after 3 years?
- Should emeritus members be chairs of current committees? Possibly not, due to my first point. Just be committee members.
- I wouldn't necessarily want to see OpsCom ultimately become dominated by emeritus members, i.e. not every retiring member should be offered emeritus status, maybe just the immediately past OpsCom subcommittee chairs (c.f. 'Past President' roles in scientific bodies)
- Who should be nominated (as long as the recipient accepts the nomination)?
- Immediate past chair of OpsCom, retiring OpsCom subcommittee chairs? What about ExCon members?

(KL) I agree with most of AT's comments and have similar questions. I am still relatively new to IM, so I am not sure how some of these things work. Some thoughts I have:

- Should the emeritus members be required to have an official capacity/standing with their previous organization (e.g., official volunteer or emeritus scientist)? Would the individual represent their prior organization or be acting as an individual? Does that fit with the IM bylaws?
- Should we designate a limited number of emeritus positions for each committee/subcommittee? Shouldn't the committees/subcommittees be composed predominantly of active members?
- Are we considering emeritus status for tasks other than committee/subcommittee participation (e.g., data checking)?
- Who will decide who is accepted as an emeritus member? ExCon?

(DB) I think emeritus status should be time limited. It can be renewed if someone is actively contributing, but if not it will automatically expire.

- Emeritus status would be appropriate for people who have played a leadership role, i.e. as committee or sub-committee chairs. This does not stop other people from simply volunteering to help with things like data checking.

- It should not be a requirement for people to have an official role with their organization. It is likely people will do this when they retire. If they choose to contribute their time to INTERMAGNET, why should we hinder that?

(AT) Some additional comments I added on the NextCloud-GFZ:

- EMs within OpsCom should be time limited (e.g. 2 years and then reviewed, not a longer period, in case EMs become completely inactive yet 'block' inclusion of new Ems to committees)
- Open to past (sub)committee chairs (maybe as recognition for having led subcommittees)
- Maybe limited to 1 EM per subcommittee (so there remains a large majority of active members in each subcommittee)
- Not necessarily needing to have institute backing (though there is the open question of whether, if an EM did have institute backing, that they may receive support to travel to meetings)
- EMs otherwise not expected to travel to meetings
- EMs will be proposed by an OpsCom subcommittee and/or OpsCom chair (when an active member either retires or significantly changes their institute role)
- EMs be agreed (or not) by OpsCom as part of the closed part of each INTERMAGNET meeting, in line with an amended Policy Note 4.
- All this to be ratified by ExCon at the same meeting.

Would this be a fair summary? If not ExCon and new OpsCom chair can discuss. What is not clear is whether ExCon members should be included. Also, all the above could be worked in to a revised Policy Note 4 before the next meeting as an AI on ExCon and OpsCom chair.

AI2: ExCon (led by AT) to update Policy Note 4 to define role of Emeritus Members (EM), in line with discussions at this meeting and post-meeting consultation across INTERMAGNET members.

AI3: SF invited as an interim Emeritus Member of OpsCom for the interim period of 1 year, to be reviewed in Autumn/Fall 2022. Role of SF to be agreed with new OpsCom chair.

8.6 General discussion and information exchange

8.6.1 Observations on status of committees and activities

8.6.1.1 ExCon

There were no comments on this item.

8.6.1.2 OpsCom

Progress on definitive 1-minute data

Progress on 1-second data

Progress on the Technical Manual

Progress on DOIs and data licensing

(AT) All seems to be progressing well, given the circumstances. But I can't help but feel that we need to have a face-to-face meeting when it is first possible to do so.

(KL) I agree with AT, but there may be different restrictions on travel dependent on country, organization, vaccination status, etc. I suspect there could be a transition period to full attendance at a face-to-face meeting

8.6.2 Items from ExCon members

8.6.2.1 BGS

(AT) The next meeting will likely be my last, as my role in BGS has changed. For that reason, there will need to be a new ExCon chair. Also BGS has chaired for 7+ years and it is good for INTERMAGNET for this to change and provide new energy.

(AT) Edinburgh GIN contact point will remain Simon for the next few months while a handover to another staff member occurs.

(AT) I believe - Simon can confirm - that the transfer of NRCan -> BGS is progressing OK

(DB) Is it known when this will be completed?

(AT) Simon can advise, but we expect several months more

8.6.2.2 USGS

(KL) USGS thanks AT for his service to IM. While I am relatively new to IM, I have appreciated your leadership.

8.6.2.3 IPGP

No comments from IPGP

8.6.2.4 NRCan

(DB) I echo KL comments about AT's leadership.

8.6.3 Standing Items

8.6.3.1 INTERMAGNET future?

There were no specific comments on this item.

8.6.3.2 New opportunities?

There were no specific comments on this item.

8.6.3.3 Communications Issues?

(AT) the EOS article did appear: <https://eos.org/science-updates/modernizing-a-global-magnetic-partnership>

8.6.3.4 Updates on and links to external organisations

(e.g. IAGA, IUGG, COSPAR, SuperMAG, OSCAR-WMO, UN-COPUOS ...)?

(AT) The UN-COPUOS space weather subcommittee has been quite active recently in promoting international data exchange and cooperation for better monitoring and communication on space weather internationally. The chair of that (Ian Mann, Univ. Alberta) is certainly aware of the role of INTERMAGNET.

(AT) SuperMAG provides only limited acknowledgement of data providers though it is better than before. Also, I believe the scientific steering committee chair is stepping down. We previously proposed

to invite Jesper Gjerloev to a face-to-face INTERMAGNET meeting. I think that is still a good idea at some point.

(KL) I agree with AT's comments regarding SuperMAG. I will need to review the SuperMAG website again.

8.7 Review of decisions and action items

8.7.1 Action items

Action	Responsible	Description
EXC.AI-1 (Fall 2021)	OpsCom Chair + AT	Set extended deadline for survey responses of 1st April 2022 and send reminder to IMOs
EXC.AI-2 (Fall 2021)	ExCon + AT	Update Policy Note 4 to define role of Emeritus Members (EM), in line with discussions at this meeting and post-meeting consultation across INTERMAGNET members.
EXC.AI-3 (Fall 2021)		SF invited as an interim Emeritus Member of OpsCom for the interim period of 1 year, to be reviewed in Autumn/Fall 2022. Role of SF to be agreed with OpsCom chair.
EXC.AI-1 (Spring 2021).	ExCon + SF	ExCon and SF to discuss options around an online public platform or section of the plenary meeting to engage online with the wider IM community, providing an 'outside world' update on activities and inviting questions
EXC.AI-2 (Spring 2021)	DB	develop space weather application ideas involving IMO data and bring for wider discussion
EXC.AI-2 (2020)	AT	Explore issues and ideas around use of social media to boost INTERMAGNET's profile and engagement with younger scientists, perhaps leading to a specific subcommittee on communications

8.8 Any other business

There was no other business to discuss.

9 Definitive data subcommittee

9.1 Meeting overview

The committee met via discussion documents on NextCloud and also in an on-line video meeting held after the main meeting on Tuesday 12 October, 2021.

9.2 Participants and mentions

Achim Morschhauser (AM), Andrew Lewis (AL), Benoit Heumez (BH), Charles Blais (CB), Chris Turbitt (CT), Jan Reda (JRD), Jürgen Matzka (JM), Roman Leonhardt (RL), Sergey Khomutov (SK), Simon Flower (SF), Tero Raita (TR), Virginie Maury (VM), Susan Macmillan (SM)

9.3 Agenda

- A review of progress on actions items from Internet-March 2021 Online Meetings
- Reports on the 1-min and 1-sec Definitive Data collection.
- 1-minute definitive issues
 - IMBOT for 1 minute
 - Country/institute files – who is responsible for preparation and providing
- 1-sec definitive issues
 - IMBOT for 1sec
 - Procedure after automatic IMBOT checking
- IYFV issues – continuation of work
- 1-minute definitive data checking document – continuation of work
- Other matters for discussion
- Organizational matters

9.4 Review of actions items

9.4.1 Actions items from 2021 March online meeting

Action	Responsible	Description	Status Green completed, Orange ongoing; Red not started
DD.A1	JRD	Compilation IRDS2018, IRDS2019 if possible	The main part of IRDS2018 is done. Country/institute for IRDS 2018 files are advanced. IRDS2019 started
DD.A2	BH, TR, RL	Continuing work on the guide how to check INTERMAGNET 1-minute definitive data and Developing a 1-min checklist for data checkers and IMOs	Ongoing, current version is v.0.7
DD.A3	AM	Rewriting check1min in Java	Not started due to leave However RL suggested alternative solution namely one-minute version IMBOT which uses well tested Windows console application check1min.exe.

			Development of an IMBOT 1min automatic notification and reporting routine started in April 2021 to assist data suppliers and data checkers. Tests of such IMBOT are very encouraging.
DD.A4	RL	Continuing work on IMBOT - the automatic data checker for 1-second submissions to INTERMAGNET	IMBOT 1sec is running with full reporting (and configurable mailing lists) since July 2021. Minor bug fixes in July 2021 related to missing vector data. Suggestions (RL): - Continue test run until end of the year. After this time, provided the system is running stable, activate IMBOT as “official” 1sec data checking routine. Data checkers are the same as for 1min observatories, additional work load however is not large
DD.A5	SK	Information to IMOs with remarks on determining of adopted base values	Ongoing
DD.A6	AL, AM, BH, JRD, SK, Susan Macmillan	Continuing work on IYFV issues, especially concerning “I” incomplete flag	Ongoing
DD.A7	TR	IMO statistics of reporting G-values	Ongoing

9.4.2 Outstanding action items from previous meetings

Action	Responsible	Description	Status Green completed, Orange ongoing; Red not started
DD.1	TR, BH, RL, SK, AL	Preparation of a guide how to prepare, especially how to check, 1-min and 1-sec definitive data	Ongoing Remark: This action can be merged with DD.A2

9.5 Presentations relating to DD Subcommittee

During the meeting members of DD Subcommittee provided the following presentations and documents:

- “IMBOT: report of initial testing phase”, Roman Leonhardt, <https://github.com/INTERMAGNET/wg-definitive-data/issues/5>
- “Report on definitive data timelines”, presenter Jan Reda,
- “Progress on one-second data”, presenter Jan Reda.

9.6 Overview and discussion topics

The meeting was of a working nature, and progress has been made in some aspects of our activity. Below are some more important excerpts from our agenda.

9.7 Reports on 1-minute and 1-second definitive data collection

Detailed reports on the status of 1-minute and 1-second definitive data were presented in plenary (see sections 5.1 for details and a link to the presentation.)

9.8 Current state of IRDS/DOI publication of 1-minute definite data

A detailed report on the current state of publishing IRDS data sets was presented in plenary (see section 5.2 for details and a link to the presentation.)

9.9 1-minute definitive issues

The compilation IRDS2018 is very close to completion. The country/institute metadata files are yet to be completed. New country/institute maps for IRDS2018 have been prepared by AM. These maps, like the previous ones, have no boundary lines. IRDS2017 and IRDS2018 have no global maps. However a global map with all IMOs is published on Web page (URL) associated with given DOI. eg.

<https://doi.org/10.5880/INTERMAGNET.1991.2017>

Institute/country metadata files are required for the compilation of a given year. Institute/country .cty.png maps are prepared by INTERMAGNET; readme.cty and ctysrn.png files are provided by IMOs. Rather often these files are not provided together with IAF data files. Usually, they are delivered later after an additional request. But there are also situations that only partial information is provided concerning some IMOs. Sometimes separate components of srncty.png (institute logos + text) are provided. In such cases, IMOs expect that will be prepared by INTERMAGNET. The reason for the confusion is probably the fact that at the beginning of INTERMAGNET, USGS helped some IMOs to prepare graphic files. But it was the beginning of the computer era and observatories often had no way to prepare such files. Some time ago I promised that this issue will be addressed at the INTERMAGNET meeting.

Further comments are reported in section 5.2 above.

9.10 1-second definitive issues

Parts of this section have been removed from this public copy of the minutes as it contained discussion about individuals, observatories or institutes.

IMBOT 1-sec is fully active now, IMOs and other persons receive appropriate reports after providing 1-sec definitive data. Tests were performed on newly uploaded 1-second data for 2018, 2019, and 2020. Thanks and congratulations to Roman.

There is still an open question regarding the part of a control system performed manually eg Sometimes it is necessary for more careful hand-checking, correspondence with IMOs, final acceptance for INTERMAGNET web, 1-second compilation for DOI publication, and so on.

RL: Just to add a few words on compilation and publication. Every data set, which is successfully analyzed by IMBOT 1sec is automatically transferred into monthly files of the current CDF version. This CDF

contains all meta information originally provided, plus meta information from the data suppliers meta_OBSCODE.txt file. It would be easily possible to automatically add a DOI identifier directly to the CDF as well. This however needs to be created and reserved and I don't know how.

The newly generated "homogeneous" CDF archives are then stored in a separate storage section of the GIN, including the analysis report. One could deviate from the 1min treatment: just publish data sets as soon as they are accepted on the INTERMAGNET webpage (making use of this CDF archives). Thus we would not produce a full compilation, but just produce a slim one second data report of which data sets have been accepted since the last deadline and where this data is accessible, plus a reference to the 1min product containing country info, etc.

Problem: with time we will accumulate a huge amount of data on the IM server.

By-the-way, the new CDF archive files generated by IMBOT are read-only. The information content is identical to the submitted data. End-users will have to deal with a single data format only. Data suppliers can submit whatever they want (cdfs, IAGA2002, different packing routines). Until acceptance, I would keep both data sets (original submission and transformed CDFs). Suppliers can thus verify themselves.

The storage for the "final" CDFs can be accessed here:

<ftp://par-qin.ipgp.fr>

Anyway, this is just a suggestion for publication and compilation. One essential step is still missing human control and acceptance...

I personally would suggest that data checkers for one-minute data are asked to finally accept 1sec submission reports. The IMBOT reports will need some improvement. For the beginning, it might be possible, that I will communicate with the observatories if any problems need to be clarified (with data checker and DD in cc). This is also helpful to locate any remaining bugs in the software.

Finally..... IMBOT has some additional features which might be useful for DD, data checkers and cross-checkers. You can actually communicate with the IMBOT routine and the machine using standard chat applications.

JRD asked how to encourage members of Data Checking Task Team (DCTT) to commit to the additional obligations? Is this supposed to be email to DCTT or maybe something more? I know that in many cases DCTT colleagues do not have enough time to check 1-min data.

AL: as a first step, I think it would be appropriate to send an email to all members of the data checking task team to get their views about contributing to the 1-sec manual data checking. I am sure some will say yes. We must remember there are much fewer IMOs with 1-sec data than for 1-minute data and the IMBOT checks are very comprehensive so, in many cases, the manual checking may not be so much work once the back-log of data from 2014 – 2019 has been cleared.

SK (10/01/21 09:08:13 A12/P12): As I understand, the minute data checkers are people with extensive experience working with magnetic data from observatories. They, for the most part, prepare the final files themselves, work a lot with these datasets and feel all the problem areas. For example, for me, 1-second data is a fairly new subject, I work with them only at my observatory, so in many ways, the checking will require learning. This is time. :(If I am not an expert in this subject - how convincingly can I argue my requirements for problematic places in the data?

Additional discussion is reported in sections 5.1 above and also 9.15 below.

9.11 IYVF issues – continuation of work

JRD: Maybe it would be good to arrange common work during the actual online meeting on this document? I mean common work on GFZ NextCloud.

As take-off version we can use put on Meeting_2021_2/Discussion/DD/IYFV/IYFV_2021_Sep.docx
In my opinion, the biggest problem is that sometimes it is unknown whether a given line applies to All, Quiet or Disturbed days.

One of a possible solution is "Introduce restriction that A Q D annual means are grouped in 3 sections: section A, section Q, section D. Introduce restriction that order of sections is: A Q D"

AL: I think there will be problems with existing software (IMCdView + others?) which reads yearmean.imo if "I" and "J" are moved from "A" field to "NNN" field.

I think proposal 2 will work best. The format description should specify the order of data blocks "A" followed by "Q" followed by "D" with each block of data separated by one or more empty lines. The file must contain "A" block of data - if the IMO provides only "A" there is no problem, if only "A" and "Q" there is no problem if only "A" and "D" then empty "Q" block must be filled with lines of no data flag "999999"

The question about when to use "I" and when to use "999999" (no data) remains. I suggest 90% to 100% "A", "Q", "D" ; 50% to 89.9999 % "I" ; < 50% "999999"

JRD: Andrew, thanks for the constructive notes. I agree with them. Some format changes could cause serious software changes (IMCDView, check1min, others).

One more issue concerning IYFV: other epoch than 0.500 used sometimes by IMOs, eg. 2004.440, 2005.839 in yearmean.pst. I think this matter should be mention in IYFV description.

JRD: Who knows, where some reliable scientific information is available regarding epoch term in referring to geomagnetic means (quasi annual means). I mean scientific paper, guide and so on. It is intuitively understandable, but it would be good to have reference.

9.12 1-minute definitive data checking document – continuation of work

BH: last versions were v0.7 for the word file and v2 for the table (excel). So, yes they are the most recent.

TR: there is now cleaned version 0.8, which has made on more general form. Also, the GitHub space is done for the data checking issues. It will be open for data checkers and OPSCOM, not for public and IMOs.

We have list of items to communicate: Code of conduct. Here is the present version from the document:

"Code of conduct"

In 2010, a team of experts in magnetic data was gathered to verify that 1-min data provided by INTERMAGNET Magnetic Observatories (IMO) were complying with INTERMAGNET standards. As today, 14 Data-checkers volunteered to this task. Each were given a list of 2 to 16 IMOs from the total of 124 in 2021.

It is important to state that the data provider (IMO) remains the owner of its own data. The data checker role is to make sure the definitive data provided reaches INTERMAGNET standards (in format and quality) or to give recommendations to reach the standards. Therefore, the data checker does not modify any file provided by IMOs.

In very rare cases, data-checkers reach a disagreement with the data provider. This can significantly delay the data acceptance. Some advices and discussion are encouraged within the data checkers

community. The matter should be declared to both chairs of the definitive data and IMO applications subcommittees who, if needed can refer to the chairman of the operation committee for final arbitration.

To be developed and discussed... add max delay for checking data (8 weeks?)

JRD: I agree that the max delay for cross-checking should be defined. A time limit 8 weeks is reasonable because the reaction will not be probably the next day after 8 weeks, but let's say about 1 month after 8 weeks.

9.13 Other matters for discussion

No proposals

9.14 Organisational matters

Parts of this section have been removed from this public copy of the minutes as it contained discussion about individuals, observatories or institutes.

AL: With the retirement from INTERMAGNET of HT perhaps we will need more data checkers? I would like to propose Matthew Gard as a candidate for the Data Checking Task Team. Matthew works with me at Geoscience Australia. He has been working in observatory operations and data preparations for several years.

JRD: This is very good news for us, that Matthew Gard will work in the Data Checking Task Team.

9.15 Definitive 1-second data: on-line meeting 2021-10-12

The DD committee held an additional on-line video meeting on 2021-10-12 to discuss unresolved details for checking and publishing 1-second definitive data.

Participants: JRD, SF, RL, TR, AL, SK

9.15.1 Agenda

- Discuss publication of 1-second data. Possibilities include:
 - Publication via the Edinburgh GIN (with loss of metadata and data precision)
 - Creation of a file/folder structure for publication of the CDF data files as a DOI
- Checking of 1-second data

SF reported that he has retired from BGS and now contributes as a volunteer. In his role as volunteer he will continue to work on some INTERMAGNET projects, including development of "gm_convert" and transferring the INTERMAGNET data archive and associated systems from NRCAN to BGS. He is interested in becoming an INTERMAGNET emeritus officer, if emeritus positions are accepted by the committee.

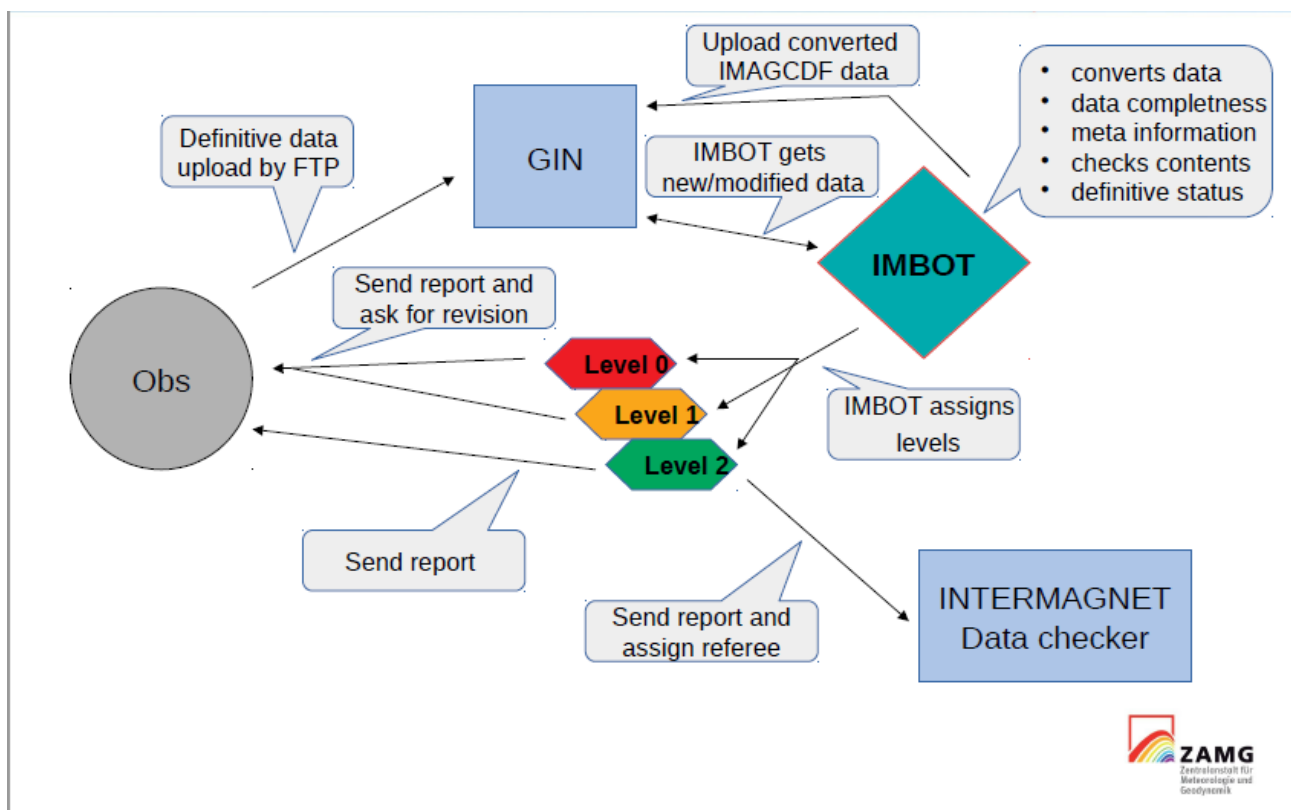
9.15.2 Publication of 1-second data:

Definitive 1-second data has been submitted by some IMOs since 2014, but there is no established system of data checking and hence data have not yet been published. This is a source of frustration for INTERMAGNET and also the IMOs who contribute data and needs to be addressed as soon as possible. SF suggested two data options for publishing:

- Published via the Edinburgh GIN. The nature of data storage at the GIN means there will be some loss of precision and the original meta-data will not be available.
- Alternatively, or additional, data could be published as ImagCDF files in a suitable folder structure with an associated DOI. This would retain all aspects of the original data and provide an established method of citation for researchers using the data.

It was agreed that establishing a DOI is required. INTERMAGNET already follow this practice for publishing 1-minute definitive data.

RL presented details of the IMBOT automated 1-second definitive data checking process, including the process flow chart (below) and several example IMBOT checking reports. A “step2imagcdf” account on the Paris GIN has been established to accept 1-second data checked by IMBOT. During the initial testing phase IMBOT uploads data only from selected IMOs (the French IMOs and a few others) to this directory, in consideration of limitation on disk storage. In the future IMBOT will be updated to upload only finally accepted “Level-3” data into the directory.



JRD requested confirmation on the source of the 1-minute data used for the IMBOT checking.

RL will check the 1-minute data source used by IMBOT. The importance of using data from step-2 was noted. IMBOT analyses may need to be re-run if “step-1” data were used. IMBOT requires about 2 days to complete a full year of checks.

It was confirmed after the meeting that “step-1” is currently used at the data source for 1-minute data.

9.15.3 Discussion on when data should be published

- Immediately after a successful IMBOT check,
- After a successful IMBOT check followed by manual confirmation.

RL suggested data could be published immediately after a successful IMBOT check with a proviso that manual checking was pending.

SF Asked if INTERMAGNET was taking-on too much work if detailed manual checking was required

RL Noted that it is important data are published as soon as possible.

TR questioned the issue of data embargo periods. It was noted this was not a significant issue for definitive data as IMO's can submit data at a time of their choosing.

AL noted that reported, adjusted and quasi-definitive 1-second data are available for those users who need the data in quick time, and advocated for manual checks before publishing, noting that the IMBOT checks do much of the detailed checking work, so manual checking may not be so difficult.

RL noted that disk space on the PAR-GIN may be an issue if there are multiple version of the data
It was decided that manual data checking is required before publishing.

9.15.4 Manual data checking

Data checkers will be asked if they are willing to do 1-second data checks.

The draft email (below) was accepted and will be sent to the data checkers email list next week by JRD. A suggested work flow and general guidance for data checkers on how to interpret the IMBOT reports will be required.

It was agreed that the most recent data should be checked and published first.

9.15.5 Draft Email to Data Checkers

SUBJECT: "Checking 1-second definitive data for INTERMAGNET"

Dear Data Checking Task Team,

Every year since 2014 about 30% of the INTERMAGNET magnetic observatories (IMOs) have submitted definitive 1-second data.

INTERMAGNET now requires expert volunteers to check and approve these data for publication.

Would you be willing to contribute to the task of checking 1-second definitive data, in addition to your existing responsibilities for checking 1-minute definitive data?

If you can help with this important task please contact Jan Reda (jreda@igf.edu.pl) before 2021-??-?? (allow two weeks for the replies?)

More information:

The INTERMAGNET data checking system "IMBOT" has already completed detailed automatic checks on definitive 1-second data. IMBOT has checked for compliance against data formats and compared against 1-minute definitive data. Many 1-second data sets have received the highest level of IMBOT compliance, "Level-2". These data sets require a final manual check to confirm data quality before the data are accepted and published.

Some data sets with IMBOT "Level-1" or "Level-0" compliance may require further input from IMOs to address issues and finalise data.

More information will be provided to volunteers when the 1-second data checkers have been identified.

The table below shows the list of IMOs and responsible members of the Data Checking Task Team for 1-minute definitive data.

*IMOs which have submitted at least one year of 1-second definitive data are highlighted in **RED**.*

Andrew Lewis, GA	BRD EBR FUR JCO KHB MAB NGK PIL PST SUA VAL VSS
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Benoit Heumez, IPGP	BOU BRW BSL CMO DED FRD FRN GUA HON NEW SFS SHU SIT SJG TUC
David Calp, NRCAN	API ASP CSY CTA EYR GDH KDU LRM MAW MCQ SBL TDC THL
Kusumita Arora, NGRI	ESK HAD TSU
Achim Morschhauser, GFZ	CPL HUA LER
Ellen Clarke, BGS	BEL HLP
Jake Morris, Bill Worthington, USGS	CLF DLT KOU PHU PPT SHE TAN WNG
Sergey Y. Khomutov, PET	AIA ARS ASC BOX HBK IRT KIV LON LVV PAG SPG UPS VOS
Hiroaki Toh, Kyoto U.	ABG BMT HER HYB IPM LYC SBA VNA
Seiki Asari, KAK	ABK BLC CBB HRN MGD NUR SOD TTB
Anca Isac, SUA	FCC GUI IQA KAK KEP KNY MMB NAQ NVS TAM WIC YAK
Jan Reda, IGF PAN .	BDV BFO DOU DUR GCK HRB IZN KMH MEA NCK OTT RES SPT STJ THY VIC
Tero Raita, SOD	CKI CNB CYG GAN GNG JAI ORC PEG PET SON YKC

9.15.6 Data Checking Work Flow

Trigger	Task	Responsible
IMBOT level 0	Contact IMO, explain and help	IMBOT manager
IMBOT level 1	IMO receives report with instructions Eventually contact IMO to explain and discuss issues Request updated data until IMBOT reports “Level-2” or issues are resolved Plot CDF daily data using AutoPlot or MagPy (check for metadata, contamination, spikes, issues or problems) If no other issues : Inform IMBOT manager of acceptance *	Data Checker
IMBOT level 2	If no other issues : Inform IMBOT manager of acceptance *	Data Checker
	* IMBOT manager will assign level3→triggers an upload to GIN and a final e-mail of acceptance	

9.15.7 Yet to be finalised

The details of actually publishing the data are yet to be defined.

Following the model of 1-minute data, the 1-second data could be published on the EDI-GIN as quickly as possible after checking (accepting the loss the precision and meta-data). Then annually as a collated volume of yearly data in ImagCDF format which will include full precision, meta-data and a DOI. The location of the annual archive and the exact folder structure of the data set needs to be decided. *RL will speak with GFZ to seek their views on publishing annual 1-second data sets and minting the required DOI.*

9.16 Decisions and action items

9.16.1 Decisions

DD.D01	A DOI is required to publish 1-second definitive data.
DD.D02	Manual data checking is required before publishing 1-second definitive data and the most recent data should be checked first

9.16.2 Action Items

Action	Responsible	Description
DD.1	JRD	Sending CALL FOR ONE-MINUTE DEFINITIVE DATA FOR 2021 by end of January 2022. Deadline for data submission is July 1st, 2022
DD.2	JRD	Sending CALL FOR ONE-SECOND DEFINITIVE DATA FOR 2020 – February 2022. Deadline for data submission is October 1st, 2022.
DD.3	JRD	Completion IRDS2018 and cooperation with GFZ to publish as DOI
DD.4	JRD	Continue compilation IRDS2019 and publication if possible
DD.5	BH	Prepare a letter to IMOs and parent institutes regarding DOI publications (2016, 2017) with formal acknowledgment of their contribution.
DD.6	CB	Put a notice on the INTERMAGNET web site regarding DOI publications
DD.7	BH, TR, RL, SK, AL	Continuing work on the guide how to check INTERMAGNET 1-minute definitive data and Developing a 1-min checklist for data checkers and IMOs
DD.8	AL, AM, BH, JRD, SK, Susan Macmillan	Continuing work on IYFV issues
DD.9	RL	Continuing work on IMBOT - the automatic data checker for 1-sec and 1-min submissions to INTERMAGNET
DD.10	RL	Creating a pilot list of 1-sec definitive data sets qualified for publication on INTERMAGNET web
DD.11	TR	IMO statistics of reporting G-values
DD.12	SK	Information to IMOs with remarks on determining of adopted base values
DD.13	AL,JRD	Send an email to all members of the data checking task team to get their views about contributing to the 1-sec manual data checking

10 GINS/WWW and Data Formats Subcommittee

10.1 Meeting overview

Committee members were encouraged to contribute to the GitHub “issues” topics available at: <https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues>

10.2 Discussion Topics

- [Proposed workflow for INTERMAGNET WWW/Gins/Data Format Working Group discussions.](#)
- [Data transfer upgrade from RSYNC](#)
- [A Coverage JSON format for INTERMAGNET](#)
- [Steps for deprecation of the intermagnet.org website to intermagnet.github.io](#)
- [How to encourage/support change in the community](#)
- [CDF leap second correction](#)
- [Correcting non-IMO and former-IMO on the FTP](#)
- [Metadata information at BGS](#)
- [Licensing of our publications](#)
- [Flagging geomagnetic data and how to include that into data formats](#)
- [Track data license with IAGA-2002 and ImagCDF formats.](#)

10.3 Review of Action Items from previous meetings

Action items from the previous meeting were not reviewed.

10.4 Summary of discussion topics

10.4.1 Proposed Workflow for INTERMAGNET

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues/2>

A discussion on proposed workflows and discussions within the INTERMAGNET committee and sub-committees

There were no additional comments on this topic during this meeting.

10.4.2 Data transfer upgrade from RSYNC

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues/6>

A discussion on data transfer protocols between the GINs and the INTERMAGNET data archive.

CB presented an example Docker ringserver/slarchive (<https://github.com/CharlesBlais/docker-intermagnet-example>) and an example tool for converting IAGA-2002 to miniSEED format (<https://github.com/CharlesBlais/pyiaga2002>)

10.4.3 A Coverage JSON format for INTERMAGNET

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues/7>

A discussion on implementing coverage JSON for geomagnetic data. CovJSON is a standard JSON schema which may open up several interesting web application developments.

There were no additional comments on this topic during this meeting.

10.4.4 Steps for deprecation of the intermagnet.org website to intermagnet.github.io

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues/8>

BGS is still undergoing several developments in preparation for GIN data transfer from Ottawa. Some initial applications have been distributed to the committee members for beta testing. More progress to happen before a full move to intermagnet.github.io and move to BGS as the main source of approved INTERMAGNET data.

There were no additional discussions during this meeting.

10.4.5 How to encourage/support change in the community

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues/10>

Some initial exchange between a few members regarding support to the community. We encourage all members to participate in the exchange.

There were no additional comments on this topic during this meeting.

10.4.6 CDF leap second correction

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues/5>

The ImagCDF format can correctly handle leap seconds via the data type “CDF_TIME_TT2000” but requires access to the most recent version of the leap second information in the form of a text file. This file must be updated after every new leap second and if ImagCDF data files are created using out-dated leap second information the timestamps can contain steps.

There were no additional comments on this topic during this meeting.

10.4.7 Correction non-IMO and former -IMO on the ftp server

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues/4>

There are data from non IMO and former IMOs still available on the ftp data archive – these should be tidied up.

There were no additional comments on this topic during this meeting.

10.4.8 Metadata information at BGS

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues/11>

Metadata comments in IAGA-2002 data files inserted by IMOs are eventually lost from the files when downloaded from the INTERMAGNET data archive by end users. Can these comments be preserved for access by data users?

There were no additional comments on this topic during this meeting.

10.4.9 Licensing our publications

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues/9>

BGS wanted to use images from the 2014 DVD but were unable to as there is no licence information. Should INTERMAGNET licence the non-data components of INTERMAGNET publications, such as images from DVD compilation, or else explicitly include these non data components in the licence we use for data? What is the status of licences given INTERMAGNET is not a legal entity? Do we need an institute to host publications? Can INTERMAGNET, as a non-legal entity, even set out licence conditions?

There were no additional comments on this topic during this meeting.

10.4.10 Flagging geomagnetic data and how to include that into data formats

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues/3>

Rather than removing data it is proposed that data should be flagged so decisions on data quality are transparent.

There were no additional discussions during this meeting.

10.4.11 Tracking data licences with IAGA-2002 and ImagCDF formats

<https://github.com/INTERMAGNET/wg-www-gins-data-formats/issues/1>

A discussion on included optional licensing information in the metadata of IAGA-2002 and ImagCDF data files.

There were no additional comments on this topic during this meeting.

10.5 Decisions and action items

10.5.1 Action Items

“on-going” and “not-yet-started” action items from the previous meeting.

Action	Responsible	Description
Online2020 GWD.A1	SF, CB, JF, VM, HT	GINs to continue investigation on the ability to use SeedLink for real-time data transfer wg-www-gins-data-formats/issues/6
Online2020 GWD.A2	SF	Complete the setup at BGS to receive data via RSYNC from NRCAN and GINs
Online2020 GWD.A3	CB	Continue working with BGS to transfer all data from NRCAN archive to BGS archive.
Online2020 GWD.A4	CB, JF, VM, HT	Change all data transfer to BGS. All GINs will then change (or add a) destination of rsync transfer to BGS
Online2020 GWD.A5	CB, All	Continue work on intermagnet.github.io to remove all reference to intermagnet.org
Online2020 GWD.A6	CB, SF	NRCAN to advertise the change to data archive on intermagnet.org . NRCAN will create a page that will indicate the new source of data, website, and tools in English only and remove all previous pages.

Online2020 GWD.A7	CB	Point intermagnet.org to intermagnet.github.io NRCan to eventually follow up with SSC (central IT service) to change DNS CNAME of intermagnet.github.io so that the domain is still valid
Online2020 GWD.A8	TR, SF	Continue work on new data visualisation tool accessing BGS data archive web service through SGO wg-www-gins-data-formats/issues/8
Online2020 GWD.A9	SF, JF	Discussion to continue on the future of a web friendly format (JSON) for distributing data Initial proposal of CovJSON needs a few adjustments. wg-www-gins-data-formats/issues/7
Online2020 GWD.A10	CB, GWD	Start a guideline for doing technical notes in markdown on GitHub wg-www-gins-data-formats/issues/2
Online2020 GWD.A12	SF	Correct CDF files for leap second wg-www-gins-data-formats/issues/5 Once INTERMAGNET data is transferred from NRCan to BGS, BGS will correct CDF files for leap seconds.
Online2020 GWD.A13	GWD	Add license information to IAGA2002 header and CDF. wg-www-gins-data-formats/issues/1
Online2020 GWD.A14	GWD	Continue the discussion on flagging geomagnetic data wg-www-gins-data-formats/issues/3

11 IMO Applications and Standards Subcommittee

11.1 Meeting overview

The subcommittee met in an on-line video meeting on Wednesday 29 September, 10UT and also contributed to on-line documentation.

11.2 Participants

Subcommittee Members: Chris Turbitt (chair), Benoit Heumez, Sergey Khomutov, Andrew Lewis, Jürgen Matzka, Virginie Maury, Tero Raita, Benoît St-Louis

11.3 IMO Subcommittee agenda, September 2021

1. IMO action Items from the March 2021 meeting
2. IMO Applications
 - a. IMOs closed or withdrawn since the March 2021 meeting
 - b. Update on previous applications
 - c. New and re-applications
 - d. Prospective IMOs
3. IMOs of concern
 - a. Resolved IMO issues since last meeting
 - b. IMOs currently listed as non-compliant
 - c. Lists of IMOs of concern and IMOs awaiting checking
 - d. Status of the discussion document on the IMO one-minute data checking procedure
4. Standards
 - a. Points of note from the IAGA WG V-OBS Business Meeting
 - b. Handling leap-seconds in one-second data
 - c. Current status of instrumentation meeting the one-second standard
5. IMO Subcommittee Action Items following the 2021 September Online Meeting

11.4 Action Items from the 2021 March online meeting

Parts of this section have been removed from this public copy of the minutes as it contained discussion about individuals, observatories or institutes.

Action	Responsible	Description	Status Green completed, Orange ongoing; Red not started
IMO.A8	CT	Send a communication to the Definitive Data Subcommittee that data checkers have the option of referring	Completed

		problematic definitive data sets to the IMO Subcommittee for review	
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11.5 IMO Applications

Parts of this section have been removed from this public copy of the minutes as it contained discussion about individuals, observatories or institutes.

11.5.1 IMOs closed or withdrawn since the March 2021 meeting

11.5.2 Update on applications

11.5.3 New and re-applications

None

11.5.4 Prospective IMOs

11.6 IMOs of concern

Parts of this section have been removed from this public copy of the minutes as it contained discussion about individuals, observatories or institutes.

11.6.1 Resolved IMO issues since last meeting

IMO	Update

11.6.2 IMOs currently listed as non-compliant

IMO	Notice of non-compliance issued	Delivery deadline

11.6.3 IMOs of concern and IMOs awaiting checking

IMO [Data checker]	Year of last	Year of last uploaded data (upload date)	Comments

accepted def. data			

11.6.4 Status of the discussion document on IMO one-minute data checking

TR: Cleaning process going on, new repository in GitHub for issues. After iteration with BH, next step to share it online in GitHub. Comments from other checkers, not in DD.

11.7 Points of note from the IAGA WG V-OBS Business Meeting

JM: nothing specific to report on instruments and standards coming out of the IAGA V-OBS business meeting.

11.7.1 Handling leap-seconds in one-second data

Proposal to adopt the same convention for +1 leap seconds in geomagnetic observatory one-second data sets as has been adopted in other high cadence scientific data sets by allowing the constraint on the value of the time field to include an additional second i.e. hour [0-23]. Minute [0-59], second [0-60]. This would require a change to the [IAGA-2002 format](#) as well as a brief explanation. The CDF format has a convention for handling leap seconds (https://cdf.gsfc.nasa.gov/html/leapseconds_requirements.html), so there is only a minor change required in [INTERMAGNET CDF format](#) (Section 5.2 Format of date/time portion of filename and examples).

AL: noted that the leap second is frequently not applied immediately depending on how an external time correction. (e.g. GPS) manifests as a clock change in the data logger.

JM: following a discussion at a previous observatory workshop, the conclusion was that institutes would need to investigate how their data loggers were currently handling leap seconds.

CT noted, although this is currently a minor issue, this this may become more significant with higher data cadences.

BH: new data loggers developed by IPGP take into account leap seconds and he can share information at the next meeting. Also, BH noted that there may not be a leap second for 10-15 years (according to IERS Bulletin A, measures and predictions, see [plots](#)).

AI: CT to add a request in the next communication to IMOs for information on how loggers developed by institutes are currently handling leap seconds.

A question remains over data from one-second data containing a leap second. One solution would be to allow filtered values to be calculated from an additional second e.g. one minute values calculated using a symmetric 92-point Gaussian filter rather than a 91-point filter. View of the subcommittee is that the way that leap seconds are handled in filtered data is not currently an issue that needs to be discussed further.

11.7.2 Current status of instrumentation meeting the one-second standard

General discussion on the adoption of the one-second definitive data standard by IMOs.

AL: GA uses the partial standard notification in the CDF format to indicate which data sets are fully or partially meeting the standard. Aside from the availability of compatible instruments, there is little control that IMOs have in meeting the standard.

JM: GFZ currently not publishing one-second data, but intend to do so in the near future. In fact, all of the GFZ processing is on one-second data already. Some sites & instruments are known to have noisy data and a decision will have to be made on whether to publish as is or not.

BH: IPGP currently produces one-second data in CDF format, but there is no means to publish these data at present. Quasi-definitive one-second data are being published via the INTERMAGNET web site but not in CDF format and not definitive. As there are so few IMOs publishing quasi-definitive one-second data, is it worth the time spent to produce it?

TR: checking one-second data in addition to the current workload of checking one-minute data would be too much. What needs to be done is to minimise the time required to check one-minute data for some problematic IMOs so that more time could be spent checking one-second data, which would be more motivating.

CT: BGS is mainly operating non-compatible (FGE) magnetometers at most observatories, so are lagging behind in publishing one-second data meeting the one-second standard.

BSL: There are some sites in the Canadian network that are too noisy to meet the one-second standard, but some (northern) sites should be able to publish data meeting the standard shortly.

In summary:

There is nothing in the one-second definitive data format that is preventing IMOs being able to meet these specifications and publish data.

There is a problem for IMOs currently producing one-second definitive data having those data published via the INTERMAGNET web site due to the fact that these data are not currently being checked, which may lead to IMOs not submitting definitive data in the future.

A suggestion to the definitive data subcommittee would be to encourage IMOs producing definitive one-second data to publish this as quasi-definitive while definitive one-second data are not being checked and published.

AI: CT to contact the DD Subcommittee to encourage IMOs to submit one-second data as quasi-definitive data while INTERMAGNET is developing the process of checking and publishing definitive one-second data.

11.8 Decisions and Action Items

Parts of this section have been removed from this public copy of the minutes as it contained discussion about individuals, observatories or institutes.

11.8.1 Action Items following the September 2021 meeting

Action	Responsible	Description

IMO.A6	CT	Ask the DD Subcommittee to encourage IMOs to submit one-second data as quasi-definitive data
IMO.A7	CT	Request information on how data loggers developed by institutes are currently handling leap seconds in the next communication to IMOs.

12 Technical Manual Subcommittee

12.1 Meeting overview

The Technical manual subcommittee met on Tuesday September 28, 2021 11 UT via an online meeting and also through documents on the GFZ NextCloud portal. Note: Hiroaki Toh did not attend the meeting and was represented by Shun Imajo.

12.2 Participants

Benoit St-Louis (chair), Chris Turbitt (deputy), Stephan Bracke, Andrew Lewis, Jürgen Matzka, Shun Imajo

12.3 Agenda

- 1 Review of March 2021 actions items
- 2 Departure of Hiroaki Toh
- 3 Technical Manual
 - a. DOI
 - b. ReStructuredText version
 - i. Conversion progress (presentation from Stephan Bracke)
 - ii. Integration with WEB site and domain name
 - iii. Approval of distribution formats
 - iv. Comparison with V-5.0.0
 - c. Interim version 5.1.0
 - d. Advertisements in ReadTheDocs
- 4 WEB
 - a. Links to data format in the Technical Manual
 - b. Other links to/from the web site
 - c. Policy and Technical notes to be published
 - d. FAQ maintenance
- 5 Round table
- 6 Distribution of actions items
- 7 Mid-term video conference?

12.4 Review of actions items from march 2021 online meeting

Action	Responsible	Description	Status (Green = completed, Orange = ongoing; Red = not started)
TM.1	ExCon	Provide DOI names for the INTERMAGNET technical document series and for the publisher.	ExCon returned the action item to the Technical Manual subcommittee.
TM.2	BSL	Publish TM V-5.1.0 by mid-term with the new information currently available.	Ongoing, decision was made to wait for the new collaborative environment.
TM.3	SB	Configure a dedicated environment to INTERMAGNET for the TM on GitHub.	Not started

TM.4	SB	Configure a dedicated environment to INTERMAGNET for the TM on ReadTheDocs.	Not started
TM.5	SB & TM subcommittee	Convert the current version of the manual to RST.	Ongoing, almost complete.
TM.6	AL	Add INTERMAGNET new licensing description of CC-BY-NC 4.0.	Completed
TM.7	CT	Look at TN and FAQs for QD information to be added to the TM	Not started
TM.8	JM	Description on the use of DOIs for data/metadata publication in INTERMAGNET.	Not started
TM.9	DD subcommittee	Provide text for the TM on the use of flags as a separate metadata field (ref. DD31) if this is to be adopted in CDF format	Not started JRD: Where is DD31 document?
TM.10	BSL	Modify Technical Manual references to the 90% rule to state that this can be interpreted as either 90% of the values or 90% of the weight of the filter	Ongoing, decision was made to wait for the new collaborative environment.
TM.11	GWD subcommittee	Flagging of data – how to preserve data rather than deleting it using a separate flag data field. Is this only for CDF or also for other formats?	Not started
TM.12	SB	Create documentation for TM Subcommittee on the new collaboration tools.	Completed
TM.13	BSL	Page 5 par 2 ... recognized format – could add a pointer to the section in the document that describes that. Section 6.1.1	Ongoing, decision was made to wait for the new collaborative environment.
TM.14	BSL	In Chapter 2 - not clear what the definitions of the data types are – add pointer to definition/relevant text.	Not started, decision was made to wait for the new collaborative environment.
TM.15	JM	Section 2.3.9 – add text describing where the gp ratio is used.	Not started, decision was made to wait for the new collaborative environment.
TM.16	BSL	Page 13 column 1, paragraph 1 – It makes no sense to me to use the examples of means here within a section on one-second data. Replace with filtered values.	Ongoing, decision was made to wait for the new collaborative environment.
TM.17	JM	Data quality: proofread the guide to the process of despiking data.	Not started
TM.18	DD Subcommittee	Section 6.4.3.3 Update to describe the USB structure.	Completed

TM.19	GWD Subcommittee	Validate the following information: “1-second data: Available to users within 30 seconds” != (6.2.3 page 31) at the end “IMO may not make more than 1440 uploads per day”	Not started
TM.20	CB	p 47 part on toolkit used to make website will need to disappear when moving to GitHub.	Not started
TM.21	CT	Incorporate text: INTERMAGNET applicant agrees to Terms & Conditions explicitly. The application document should also be also signed at a legal signatory level for any institute joining INTERMAGNET.	Completed. Note that ExCon removed the requirement for 'legal signatory' at March 2021 meeting. This has been replaced by 'institute representative' (Application form V3.3)
TM.22	CT	Appendix A-1: Many of the definitions are specific to either IMFV1.22 or satellite transmission data formats e.g. “time stamp” and “flags”. Add general terminology definitions.	Not started, decision was made to wait for the new collaborative environment.
TM.23	DD Subcommittee	Issues related the yearmean files and IYFV1.01 data format including the definition of the “I – incomplete” flag. Do we need a new format version? Information to be provided by the DD subcommittee.	Not started
TM.24	BSL	Appendix C-1: Change use of deltaF for “G”	Not started, decision was made to wait for the new collaborative environment.
TM.25	JM	Appendix C-1: Orientation of “UVZ” has no definition in Section 6.1.3	Not started, change AI to generate a table of the various orientations.
TM.26	CT	Appendix C-4: Needs to be updated to reflect this is software supplied on CDs from 1991 and has since been superseded by imcdview (as described in Section 6.4.3.4).	Not started
TM.27	AL	Start a plenary discussion on ReadTheDocs’ advertising.	Completed

12.5 Departure of Hiroaki Toh

Following the departure of Hiroaki Toh, the Technical Manual subcommittee will be left with 5 members. With the new collaborative environment almost completed, it was agreed to wait before filling the vacant position to evaluate the new workload of the Technical Manual subcommittee.

12.6 Technical Manual

12.6.1 Digital Object Identifier (DOI) for the Technical Manual

During the last meeting a DOI for the Technical Manual was requested and Kirsten Elger from GFZ suggested to publish not only the TM but also other documents in a series that could be called “INTERMAGNET Technical Reports” (name also recommended by the TM subcommittee). She also made suggestions for the publisher’s name; “INTERMAGNET and Albert-Einstein Library”, “INTERMAGNET and GFZ” and “INTERMAGNET”. An action item was passed to ExCon to make the decision. ExCon responded by endorsing the idea and asked that OPSCOM itself provides the best way to implement the DOI. Jürgen Matzka will work with Kirsten Elger to generate the DOI for Technical Manual V-5.0.0. **Action Item TM 01 JM**. It was also decided to generate a DOI for all previous version of the Technical Manual. **Decision TM D01**.

12.6.2 ReStructuredText version

12.6.2.1 Conversion progress (presentation from Stephan Bracke)

SB presented the progress of the manual conversion to RestructuredText. The entire manual has been converted and most of it has been formatted with the exception of the appendices. Some decisions will be required to complete the configuration. Big thanks to SB for this huge task! BSL will work with SB to complete the configuration of the appendices. **Action Item TM 27 BSL & SB**. BSL will then proofread the generated HTML **Action Item TM 28 BSL** and PDF **Action Item TM 29 BSL** before SB proceeds with the transfer to the new dedicated environment on GitHub. The index will not be implemented in the first release on the new platform because the documents will be searchable. If required, the index can be added later. The members of the Technical Manual subcommittee will install the development tools locally to experiment with them **Action Item TM 06 TM subcommittee**. They will meet later this fall to discuss their experience, BSL to organize a video conference **Action Item TM 30 BSL**. It was suggested to present the new Technical Manual platform at the next IAGA workshop. Further discussion is reported in section 5.3 above.

12.6.2.2 Integration with WEB site and domain name

Integration of the Technical Manual with the INTERMAGNET WEB site on GitHub will only be possible once the full web site is moved to the GitHub environment. SB will also work with CB to configure the intermagnet.org URL to the new web site and the development tool ReadTheDocs **Action Item TM12 SB & CB**. Intermagnet.org should still be the URL used once redirected to the GitHub environment to stay independent of the hosting platform.

12.6.3 Interim version 5.1.0

Considering the major progress of converting the Technical Manual to RestructuredText an interim version will not be produced.

12.6.4 Advertisements in ReadTheDocs

Advertising at the bottom of the page in ReadTheDocs is considered acceptable by the members of the Technical Manual subcommittee. If the advertising format changes in the future, INTERMAGNET will consider the non-advertised paid membership.

12.7 Web

The subcommittee had very little time to discuss the WEB issues during this meeting and most of the topics have been postponed to the next meeting.

12.7.1 Links to data format in the Technical Manual

Links to the data format in the Technical Manual will only be implemented once the complete web site is transferred to the GitHub environment. In the meantime, AL will prepare a list of pages that need to be removed from the old web site and replaced with a redirection to the web site on GitHub **Action Item TM18 AL.**

12.7.2 Other links to/from the web site

On hold until the new environment is available on GitHub.

12.7.3 Policy and Technical notes to be published

Ongoing updates.

12.7.4 FAQ maintenance

Ongoing updates.

12.8 Round table

No addition to the agenda.

12.9 Decisions and Action Items

12.9.1 Decisions

Decision	Description
TM.D01	Generate a DOI for all previous versions of the Technical manual.

12.9.2 Action Items

Action	Responsible	Description
TM.1	JM	Generate a DOI for Technical Manual V-5.0.0.
TM.2	BSL	Publish TM V-5.1.0 once the new collaboration environment is available on GitHub.
TM.3	SB	Configure a dedicated environment to INTERMAGNET for the TM on GitHub.
TM.4	SB	Configure a dedicated environment to INTERMAGNET for the TM on ReadTheDocs.
TM.5	SB	Complete the conversion of the current version of the manual to RST.
TM.6	TM subcommittee	Install the new development tools locally and experiment with them.
TM.7	CT	Look at TN and FAQs for QD information to be added to the TM
TM.8	JM	Description on the use of DOIs for data/metadata publication in INTERMAGNET.

TM.9	DD subcommittee	Provide text for the TM on the use of flags as a separate metadata field (ref. DD31) if this is to be adopted in CDF format
TM.10	BSL	Modify Technical Manual references to the 90% rule to state that this can be interpreted as either 90% of the values or 90% of the weight of the filter
TM.11	GWD subcommittee	Flagging of data – how to preserve data rather than deleting it using a separate flag data field. Is this only for CDF or also for other formats?
TM.12	SB & CB	Configure URL intermagnet.org for GitHub and ReadTheDocs.
TM.13	BSL	Page 5 par 2 ... recognized format – could add a pointer to the section in the document that describes that. Section 6.1.1
TM.14	BSL	In Chapter 2 - not clear what the definitions of the data types are – add pointer to definition/relevant text.
TM.15	JM	Section 2.3.9 – add text describing where the gp ratio is used.
TM.16	BSL	Page 13 column 1, paragraph 1 – It makes no sense to me to use the examples of means here within a section on one-second data. Replace with filtered values.
TM.17	JM	Data quality: proofread the guide to the process of despiking data.
TM.18	AL	Produce a list of web pages that can be moved to GitHub.
TM.19	GWD Subcommittee	Validate the following information: “1-second data: Available to users within 30 seconds” != (6.2.3 page 31) at the end “IMO may not make more than 1440 uploads per day”
TM.20	CB	p 47 part on toolkit used to make website will need to disappear when moving to GitHub.
TM.21	CT	Incorporate text: INTERMAGNET applicant agrees to Terms & Conditions explicitly. The application document should also be also signed at a legal signatory level for any institute joining INTERMAGNET.
TM.22	CT	Appendix A-1: Many of the definitions are specific to either IMFV1.22 or satellite transmission data formats e.g. “time stamp” and “flags”. Add general terminology definitions.
TM.23	DD Subcommittee	Issues related the yearmean files and IYFV1.01 data format including the definition of the “I – incomplete” flag. Do we need a new format version? Information to be provided by the DD subcommittee.
TM.24	BSL	Appendix C-1: Change use of deltaF for “G”
TM.25	JM	Appendix C-1: Orientation of “UVZ” has no definition in Section 6.1.3 Generate a table of the various orientations for the Technical Manual.
TM.26	CT	Appendix C-4: Needs to be updated to reflect this is software supplied on CDs 1991-???? and has since been superseded by imcdview (as described in Section 6.4.3.4).
TM.27	BSL & SB	Finalize the configuration of the appendices.
TM.28	BSL	Proofread the generated HTML version of the Technical Manual.
TM.29	BSL	Proofread the generated PDF version of the Technical Manual.
TM.30	BSL	Organize a video conference in Nov 2021 for the Technical Manual subcommittee.

12.10 Schedule next video conference

BSL will organize a mid-term video conference in Nov 2021 dedicated to the development tools to generate the Technical Manual **Action Item TM30 BSL**.

13 Appendix

13.1 Agenda

13.1.1 Monday September 27 Plenary session

Topic	Type		Document(s)
Discussion on OpsCom membership	Discussion	S Flower	meeting_2021_2/discussions/membership
Review of plenary action items from previous meeting	Discussion	A Lewis	meeting_2021_2/discussions/Mar2021PlenaryActions
Communication in INTERMAGNET	Discussion	S Flower	meeting_2021_2/discussions/communication
Thank retiring INTERMAGNET officers	Discussion	A Thomson	meeting_2021_2/discussions/Retirements
Progress on one second data	Presentation	J Reda	meeting_2021_2/presentations/Progress_on_one_second_data meeting_2021_2/presentations/Progress_on_one_second_data-Q+A
Report on Definitive Data (including IRDS and DOIs)	Presentation	J Reda	meeting_2021_2/presentations/Report_on_definitive_data_timeliness meeting_2021_2/presentations/Report_on_definitive_data_timeliness-Q+A
Next version of the Technical Manual (integration with GitHub)	Presentation	S Bracke	meeting_2021_2/presentations/ TM Collaborative Environment meeting_2021_2/presentations/ TM Collaborative Environment-Q+A
Future of the INTERMAGNET data archive and web service	Presentation	S Flower	meeting_2021_2/presentations/ImagPortalProgress meeting_2021_2/presentations/ImagPortalProgress-Q+A

13.1.2 Tuesday September 28 Subcommittee and ExCon sessions

Topic	Type	Lead by	Document(s)
ExCon to meet by video conference	Discussion	A Thomson	
Review of Definitive Data Subcommittee actions from previous meeting	Discussion	J Reda	Discussions/Agenda_DD1_Action_Items_status
Review of IMO Applications Subcommittee actions from previous meeting	Discussion	C Turbitt	
Review of Technical Manual actions from previous meeting	Discussion	B St-Louis	
Review of WWW/GINS & Data Formats Subcommittee actions from previous meeting	Discussion	C Blais	

13.1.3 Wednesday September 29 Subcommittee and ExCon sessions

Topic	Type	Lead by	Document(s)
ExCon	Discussion	A Thomson	

Definitive Data Subcommittee	Discussion	J Reda	
IMO Applications Subcommittee	Discussion	C Turbitt	
TM Subcommittee	Discussion	B St-Louis	
WWW/GINS & Data Format Subcommittee	Discussion	C Blais	

13.1.4 Thursday September 30 Free day

Subcommittee chairs summarise their discussions

13.1.5 Friday October 01 Plenary sessions

Topic	Type	Lead by	Document(s)
Report and discussion on IMOs	Discussion	C Turbitt	discussions\IMO2021 September Report and Discussion on IMOs.docx
Report on definitive data timeliness	Presentation	J Reda	presentations\Report_on_definitive_data_timeliness.pptx presentations\Report_on_definitive_data_timeliness-Q+A.docx
Report, decisions and action item list from ExCon	Report	A Thomson	
Report, decisions and action item list from Definitive Data Subcommittee	Report	J Reda	
Report, decisions and action item list from IMO Applications Subcommittee	Report	C Turbitt	reports/2021 September IMO Subcommittee Report
Report, decisions and action item list from Technical Manual Subcommittee	Report	B St-Louis	Reports/Technical Manual Subcommittee Minutes September 2021 - Draft
Report, decisions and action item list from WWW/GINS & Data Formats Subcommittee	Report	C Blais	
Review and agreement on decisions and action items from plenary sessions	Report	A Lewis	reports/Sep2021PlenaryActions reports/ListOfParticipants
Next meeting	Discussion	S Flower	meeting_2021_2/discussions/next_meeting
OpsCom chair election	Discussion	S Flower	meeting_2021_2/discussions/OpsComChairElectionProcess