

SWWT SWE Space Weather Roadmap Consultation Exercise

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The Roadmaps



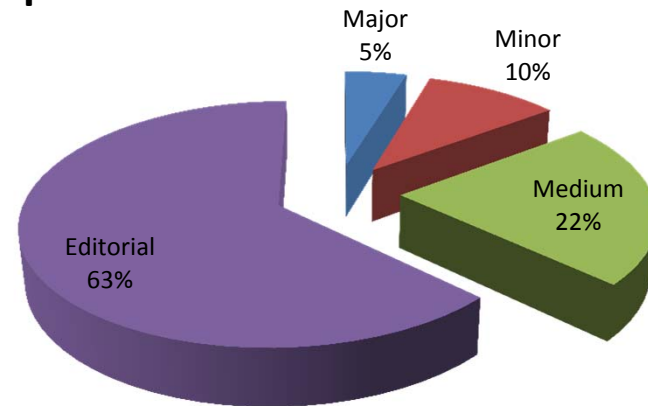
- 1 per SWE Service -> 37 separate documents
- Study output from SN-1 aiming to provide a first estimate of how existing assets could be combined towards SWE service provision
- Mature asset review
- Comparison with CRD, requirement by requirement basis
- Gap analysis
- Development priorities
- Critical items

- Will form one of the primary inputs into defining service development priorities in SSA-SWE Period 2.

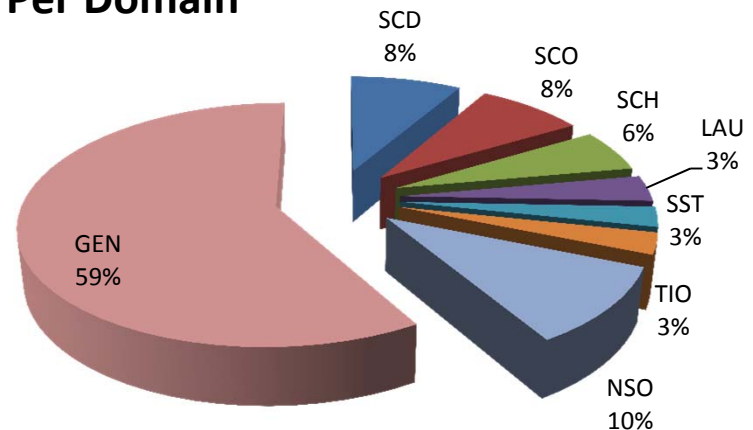
- Following conclusion of SN-1 and before start of P2 activities, opportunity for SWWT community to review the roadmaps & point out any missing/mis-represented or outdated items
 - The asset selection and attributed maturity level
 - Review of current level of service provision possible based on existing assets identified
 - Gap analysis
 - Roadmap recommendations towards a full service
 - List of critical items
- 2 month review period Dec/Jan
- Coordinated through SWWT Chairman and Topical Group leaders

- >600 RIDS submitted
- 28 major
- 61 minor
- 133 medium
- Remainder unmarked or editorial

RID Importance



RIDs Per Domain



- Roadmaps refer to affect of the space environment on human bodies
 - It should be recognised that different organs respond differently to radiation
 - Services treating nowcast as a function of time and location and also overall dosimetry will need to take this into account.
- Proposed response
 - Agreed although tools to provide this information are not currently available to SSA. Will be raised for discussion with service users during P2.

Major RIDs 2: GEN/SPM



- Government agencies should be well informed in order to support further funding of research and service development
 - Recommended to identify whether this refers to national and/or international agencies and how they should exchange information.
- Solar storms as a natural hazard
 - Include discussion of space weather in this context in both educational material for schools and for government agencies
- Educational material for schools should be prepared in own language and with non-scientific vocabulary
 - Use appropriate vocabulary for the level of study: middle and high school will have some scientific background
- Proposed response
 - state that material should be suitable for both national and international agencies to support decision making
 - Means for coordination and exchange of timely information addressed by SSA but not as part of the roadmaps currently.
 - Points 2 and 3 agreed

- The requirements elaborated in this service are behind current practice in mitigating GIC.
- Timescales and the need to tailor the forecast to a specific grid do not reflect current understanding of how the power industry works with space weather information.
- Proposed Update
 - The comment is applicable to the CRD, on which the roadmaps are based.
 - CRD update will be scheduled during Period 2, NSO/POW will be identified as a priority
 - ESC activities will support CRD and roadmap update as part of P2-SWE-1 activity.

- Major problems identified with the communications aspect of this roadmap and the needs of the aviation industry.
- The communications methods identified as being used by airlines are incorrect, and the potential contribution of several assets e.g. EISCAT_3D is misrepresented
- Recommend reworking this aspect of the roadmap
- Proposed updates
 - Section review and update as priority within P2-SWE-1 activities, together with aviation sector users.

- Data requirements
 - Noted that the roadmap may give the impression that there are more than sufficient data sources, whereas in practice more data is needed in some areas.
 - Recommends assessing ESPAS project outcomes
 - The roadmap states that more GNSS stations are required but does not include the accuracy or who would be responsible
- Proposed update
 - Clarify the data needs for this domain
 - Roadmaps (SSA) take ICTSW document into account?

- Critical items
 - General comment: Lack of quantitative requirements means that identification of critical items can be difficult.
 - Provision of 3D electron density grids, can be achieved currently with EDAM and MIDAS which aren't considered.
 - TEC Maps produced by UPC as part of IGS should be considered.
 - Noted that GMV are providing quality assessment for EGNOS through MONITOR programme
- Proposed update
 - Requirements refers to the CRD. These will be refined during period 2 in discussion with service users
 - Methods for producing 3D electron grids will be re-assessed
 - Other identified missing assets will be included in future roadmap update

- Use of SWARM data
 - SWARM could be used for SSA/SST services. What are ESA SSA's plans for using this?
- Proposed response
 - SWARM data is of considerable interest, but not available currently in real-time so application as part of the SWE service network is likely to be in the context of service demonstration

- General comments
 - Format of the documents: background material and analysis dominates the roadmap
 - Concern that the roadmaps are already out of date for an evolving field
 - Formulation of requirements should be formalised. Note the inclusion of data requirements alongside user requirements.
 - Requirements lack an accuracy specification
 - Some requirements appear unfeasible (e.g. 1x1 degree grid or 7 day forecast), unless the required accuracy is very low
 - Definition of operations ready is very loose
 - Missing assets were not considered?
 - Multiple provision of the same parameter (now/forecast). Guidance for users in selecting the best?

Finding 5 (from Precursor Service Review): Data Quality/Conflicting Guidelines



- The Panel noted that a situation where there is a substantial discrepancy between the information available from different sources is extremely difficult and frustrating for the end users.
- The users should have clear indications about the data and service quality in order to be able to decide what information to use to support their decision making.
- **Recommendation:**
 - The Panel recommends that SSA-SWE Segment identifies means by which forecasts can be compared with other international notifications in case of conflicting outputs
 - All SSA-SWE data and products need to be accompanied by the necessary confidence level information.

- Roadmaps will be updated as part of P2-SWE-1 activity (ESC development)
- Major and medium RIDs will be addressed as an annex to the roadmaps and taken into account as needed in activity preparation.
 - First ITTs to be issued (ideally) before summer.
- All RIDs (including minor and editorial) will be considered as part of the next roadmap update.