

IVS Technology Coordinator Report

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Abstract The main activities of the IVS Technology Coordinator can be summarized as follows: organization and support of VTC teleconferences, technical support of IVS stations, maintaining the VGOS Equipment Tables for improving technical compatibility, distributed correlation, and communication with the EVN. The report relates to the period 2019–2020 which was affected by the Coronavirus pandemic in the last year; in spite of this, a number of initiatives have been carried out.

1 Organization of VTC Teleconferences

The organization and support of VGOS Technical Committee (VTC) teleconferences occupied a large part of the Technology Coordinator activities. Indeed, due to the pandemic, it was felt useful to concentrate the efforts of many colleagues forced to operate from home on those elements for too long a time expected but, often due to the lack of time, not actually put on the bench to be taken to an operative level.

The nominally monthly teleconferences have been based on the Zoom platform, which allows talking and seeing a large number of interested colleagues. This simplified the communication and hopefully improved the level of collaboration.

The main tasks in the agenda have been a short report about the activities and status in the main VGOS components, including stations, correlators, and devel-

opment teams, as well as different themes which were of general interest. It is worth mentioning the two most prominent items that were discussed, as demonstrated by the large audience, and resulted in the creation of two working sub-groups:

- a) the study of shorter integration periods, and thus scans, from 30 seconds to 10 seconds (proposer and sub-group leader B. Petrachenko), and
- b) the effects of source structure and possible correction (proposer J. Anderson, sub-group leader P. Charlot).

Recently an additional item was considered (proposed by H. Hase): starting from the need to protect frequency slots in the full VGOS band dedicated to the radioastronomy service stimulated the evaluation of new observing frequency schemes. Moreover, a number of additional items of general interest are to be introduced at the proper time in order to promote any possible useful actions to study and implement improvements to achieve the IVS goals.

2 IVS Station Support

One of the most relevant items for the Technology Coordinator is considered to be the support of the IVS stations. In this respect, a frequent communication has been maintained with those stations that were asking for assistance, for instance, with new stations to be implemented or with existing quasi-operative or operative stations.

The coordinator visited in person the Kashima and Ishioka teams in 2019 and discussed the implementation of VGOS observations at the Ishioka station.

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A particular consideration was the RFI estimation to define the observing band as well as possible mitigation methods. Ishioka additionally asked for support with the realization of a digital linear-to-circular-polarization converter. This task became part of the DBBC3 development and could be adopted by interested stations making use of this backend.

A second in-person visit was made to the Irbene station, where more radio astronomy activities are underway. In particular, the Irbene team showed interest in contributing VGOS observations using their RT-16, which is a fast antenna at present under consideration for a BRAND receiver (which includes the entire VGOS broadband).

In 2020, no visit was possible due to the pandemic. A planned visit to the VGOS Shanghai station had to be cancelled.

3 VGOS Equipment Tables

The VGOS tables compile detailed information about relevant equipment of existing VGOS stations and those that are under construction. This is relevant for promoting compatibility within the IVS network and as a guide for new and upcoming stations. The great amount of information and the format formerly used, and represented as an EXCEL spreadsheet, proved to be inappropriate for a fast consultation and in particular for an easy and useful comparison.

A study was undertaken with the help of a student to compare different methods of database management and visualization. This topic was planned to be completed in 2020; but, again due to the pandemic, the work was greatly slowed down, and it is not expected to be completed before the summer of 2021.

An important functionality when consulting the database would be the possibility of implementing an advanced search capability in order to be able to select a number of parameters and stations to view and then to compare them. Such a functionality is, in principle, rather complex to be performed under a web site belonging to a research institution, for many reasons, where the most important is web site security. So a dedicated server was envisaged to be appropriate, with then links indicated in relevant web pages where this information needs to be easily found.

As soon as it will be proven valid, the database will be placed in the dedicated Technology Coordinator web pages. The next step is now to collect the most recent data from the VGOS stations, widely modified in the last years.

4 Distributed Correlation

Distributed correlation is considered an important task to be explored in the perspective of having an always increasing amount of data to be correlated. A couple of tests have been organized involving a number of small and big correlators. A new test run has to be performed inviting all the correlators interested to join the experiment, which now is under the coordination of the Bonn VLBI correlator team. The correlators involved in this effort so far are Bonn (S. Bernhart), Onsala (R. Haas), Warkworth (S. Weston), Vienna (J. Gruber), Hobart (J. McCallum), and Shanghai (F. Shu). It is expected that a meeting will be held to evaluate possible future experiments.

5 Liaison with the EVN

Periodic meetings have been performed on a regular basis with the European VLBI Network (EVN) chairman, in order to maintain an exchange of information about any technical element worth being shared between the two networks. Furthermore, it was possible to have an almost regular informal exchange with the current lead of the EVN Technical and Operations Group (TOG) Uwe Bach.