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1.1 Dissemination Level

| Dissemination Level | | |
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| PU | Public | X |
| PP | Restricted to other programme participants (including the Commission Services) | |
| RE | Restricted to a group specified by the consortium (including the Commission Services) | |
| CO | Confidential, only for members of the consortium (including the Commission Services) | |

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2. Summary Report of the 56th Meeting of CRAF

2.1 ESF Expert Committee on Radio Astronomy Frequencies

The 56th CRAF meeting organized by the ASTRON took place on 21-23 May 2014 in Dwingeloo (the Netherlands). A guided visit to the Westerbork Synthesis Radio Telescope (WSRT) and the LOFAR telescope was organized for interested participants during the afternoon Wednesday - 21 May, 2014.

2.2 Participants

The CRAF meeting was opened at 9.00 on May 22, 2014 by Dr René Vermeulen (Director of the Radio Observatory of ASTRON), who welcomes the participants.

The following CRAF members¹ attended the meeting: V. BEZRUKOV, P. BOLLI, G. BUTIN, W. VAN DRIEL, A. FAULKNER, H. HASE, T. HEZAREH, A. JESSNER, K. JIRICKA, J. KALLUNKI, M. LINDQVIST, H. VAN DER MAREL, C. MARQUÉ, C. MONSTEIN, J. SEIRADAKIS, I. THOMAS, P. THOMASSON, V. TORNATORE.

Apologies for not participating the meeting were received from: A. TIPLADY.

The following participants were invited, as CRAF Observers, to the whole meeting: R. Millenaar (ASTRON), J. McCauley (Trinity College, Ireland) and J. Urban (Chalmers Univ. of Technology). The following participants joined the meeting during closed morning session of 22 May 2014 by video-link: R. AMBROSINI (IRA-INAf- Italian Representative) and Jean-Claude Worms (ESF liaison).

Representing "sister organizations": David Deboer (CORF), Tasso Tzioumis (RAFCAP) and Masatoshi Ohishi (IUCAF) joined the meeting by video-link during the morning session of 23 May 2014.

One guest joined only the open session of the meeting on 22 May 2014: J. Blokzijl (Dutch Telecom Administration).

Nine CRAF members asked for support from RadioNet3 funds to participate in this meeting. The local organizer's costs and the conference dinner were paid for via RadioNet3 funds.

2.3 Communications about ESF and future host organizations

At the last ESF Governing Council meeting in April 2014 Member Organisations were told that it was essential for ESF to continue to apply for certain external contracts whilst avoiding any final commitment beyond 2015.

Concerning the future of ESF there is hope that effective services such as peer-review and evaluation can continue to be provided to the European scientific community, separately from the policy work of Science Europe. This can be accomplished either with or without the support of ESF Member Organisations (MOs). The vote in the November 2014 Assembly could therefore be articulated around two options, one where ESF would be dissolved, and another option where the organisation would transition to a science services based entity with the support of some MOs. In both cases, Expert Boards and Committees (EBCs) would continue to exist, in

¹ The names of CRAF members are written in capitals

line with the positive outcome of the 2011 statutory review. In the dissolution option, the Executive has the mandate to host the EBCs until the end of 2015 and help create a legal entity for the EBCs to operate from after that date. In the resignation and transitioning option the EBCs could if they wish continue to operate from the successor organisation.

Science Europe has indicated that it would seek to ensure fruitful dialogue with the EBCs with a view to successful collaboration (albeit no hosting) where appropriate. CRAF is encouraged to initiate such a dialogue if it wishes, e.g. by inviting Science Europe at a future plenary meeting.

CRAF has explored alternatives for being hosted. It was concluded that JIVE would be a feasible host for CRAF. The JIVE board was requested to investigate the possibility of hosting CRAF, but the JIVE board replied that CRAF should at first make a deeper investigation of the possible hosts and especially of the possibilities that a successor organisation of ESF could provide. JIVE should be seen as a last resort for hosting CRAF.

2.4 Communications about CRAF

New Frequency Manager

The meeting was very pleased to present the new CRAF Frequency Manager (FM), Talayeh Hezareh. She has been working as a postdoc at Max Planck Institute for Radio Astronomy (MPIfR) in Bonn, Germany. She started her work as the CRAF FM on 15 March 2014 and she is based at MPIfR, who seconded her to CRAF. *Thus, this open issue since the CRAF meeting in Zurich 2013 has been resolved.*

New secretary

In August 2014 the position of CRAF secretary was moved from Pietro BOLLI to Vincenza TORNATORE. The position of CRAF secretary includes the membership of CRAF. TORNATORE introduced herself shortly to the meeting.

New members

The new CRAF members Juha KALLUNKI from Finland and Ivan THOMAS from France introduced themselves to the meeting. The other CRAF members welcomed them.

2.5 RadioNet3 budget

The meeting discussed and decided not to change the priorities for the RadioNet3/WP7 budget, which are as follows:

- Payment of costs for the organisers of CRAF meetings,
- Travel support for CRAF members to ECC and ITU meetings,
- Travel support for CRAF members to CRAF meetings.

It will be very important to provide travel support for CRAF members to the World Radio Conference 2015 (WRC-15).

2.6 Coordination on RAS positions for WRC-15

The document containing the position of CRAF on the WRC-15 Agenda Items in which CRAF has an interest was discussed (see http://www.craf.eu/CRAF_Posn_JAN13.pdf).

Additionally several Agenda Items (AI) of interest for Radio Astronomy Service (RAS) were discussed, as example:

AI 1.1 – to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution 233 [COM6/8] (WRC-12);

This is likely to be one of the most important AI during WRC-15 not only for the RAS but the whole telecommunications sector. Mobile systems do not usually provide viable co-existence environments for the RAS in shared or even some adjacent bands. Therefore an IMT allocation within a shared or nearby RAS band may imply that an observatory's operational capability is affected. This AI targets as yet undecided frequency ranges from ~470 MHz up to ~6 GHz. Background and receiver noise is at its minimum in this frequency range, as a consequence the sensitivity and range of radio astronomical measurements is at its maximum. This frequency range is therefore extremely important for the RAS, which is reflected in the numerous primary and secondary allocations. One example of this CRAF activity is the protection of radio astronomy observations in the so-called L Band (1300-1518 MHz), specifically on in-band sharing in the 1330-1400 MHz RAS band and on compatibility with unwanted emissions in the 1400-1427 MHz RAS band.

AI 1.18 – to consider a primary allocation to the radiolocation service for automotive applications in the 77.5-78.0 GHz frequency band in accordance with Resolution 654 [COM6/23] (WRC-12);

There are several ideas to use the short-range radar also for other applications, such as taxiing aircraft and low-flying helicopters. There is a strong push from several countries to remove the word automotive from the AI. CEPT (Conférence européenne des administrations des postes et télécommunications) is of the opinion that if this allocation is being made, it needs to be supported by provisions, if needed, to protect the incumbent services, so also the RAS.

2.7 Iridium

VAN DER MAREL reported about the meetings between CRAF and Iridium about the future protection of radio astronomy by the Iridium NEXT satellites and the discussions that took place on this topic at the CEPT WG FM meetings.

At the 78th meeting in Montegrotto, WG FM directed CRAF and Iridium to meet to discuss the technical aspects of the protection of radio astronomy measurements in the band 1610.6 – 1613.8 MHz from out-of-band emissions of the Iridium NEXT satellite constellation. Since that time, CRAF and Iridium have met twice. Iridium NEXT will be able to operate in so-called RASP modes with bandwidths of 8.5 MHz, 6.5 MHz and 4.5 MHz. Simulations performed by Thales Alenia Space for Iridium show that limiting the bandwidth to a maximum of 6.5 MHz reduces the interference in the RAS band to a level below the 2% threshold as required by ECC/DEC/(09)02. However, Iridium claims that during peak hours (between noon and 18:00 hours) the maximum bandwidth of 8.5 MHz is required on a daily base. Moreover, the lower bandwidth during the other hours can only be set after an advance notification of 24 hours by a radio observatory. Based on the information received to date, it appears that Iridium will in practice not be able to protect the RAS as required by ECC/DEC/(09)02.

The discussion will be continued at the 80th WG FM meeting in May 2014.

2.8 Coordination of Inmarsat ground based terminals.

HEZAREH summarized the issue of the coordination of Inmarsat ground based terminals. Inmarsat is having discussions with national administrations about the use of the so-called extended L-band for uplinks. This implies the use of the 1670-1675 MHz by Mobile Earth

Stations and Aeronautical Earth Stations. This band is next to the 1660-1670 MHz primary Radio Astronomy Service (RAS) band. CRAF is of the opinion that it will be better to have these discussions at a European level.

2.9 CRAF Newsletter

The following contents for the next newsletter (issue N° 28) were proposed and agreed upon:

1. Editorial (VAN DER MAREL).
2. The new Frequency Manager (HEZAREH).
3. ERATec Meeting in Bonn 2013 (LINDQVIST).
4. IUCAF Spectrum Management School (HASE).
5. Cognitive Radio and White Space Devices (THOMASSON).

2.10 Interference problems in Europe

The participants gave national reports on the following subjects,

- reports about developments since the last CRAF meeting,
- member activities and interactions with their national administrations,
- status of National WRC-15 preparations.

2.11 Workshop on compatibility and sharing calculations

JESSNER gave a presentation about compatibility and sharing calculations in which he also explained the use of the Matlab software routines that he developed. The presentation and the software will be available for all CRAF members. The CRAF members are requested to use the software and to report any problems, bugs and other comments to JESSNER.

2.12 Next CRAF meeting

The next Annual General Meeting will be held in Dublin (Ireland) in Spring 2015.

2.13 Meeting Photo



Meeting photo taken at the CRAF meeting at ASTRON in Dwingeloo.

2.14 Information of the EC financial contribution

RadioNet3 has sponsored the CRAF Meeting on May 21-23, 2014 in Dwingeloo, The Netherlands. The local organisation asked to be supported by ~3000 EUR, additionally the travel expenses of 9 participants were supported in the total range of ~4500 EUR.

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