

CRAF report (highlights):

The 54th CRAF meeting organized by the INAF – Astronomical Observatory of Cagliari took place on 31 May and 1 June 2012 in Cagliari (Italy). It included a visit to the newly finished Sardinia Radio Telescope. Most of the discussions centred around internal matters: the adaptation of CRAF working practises to the significantly reduced RadioNet travel funding for CRAF members, the question of CRAF's representation at conferences and the modes of cooperation with other organisations. Of wider concern were:

IRIDIUM

The draft reviewed ECC/DEC(09)02 is currently under the public consultation process. The FM44 working group (maybe at a single topic 'web-meeting') will consider the responses received during that consultation so that WGFm sees a finalized document for consideration and adoption in September. The decision will make the license for the use of IRIDIUM ground equipment within CEPT countries dependent on the verified fulfilment of the protection criteria (RA 769 and RA 1513) for RAS from 2016 onwards. IRIDIUM is seen by the ECC to currently cause 90-100% data loss over a 2000 second integration time (EPFD method). It has been acknowledged by the ECC that this causes severe restrictions to the RAS. The new generation of satellites must not cause any interference that will exceed the (RA 769 and 1513 specs.), or the use of IRIDIUM equipment will become illegal within CEPT countries.

Methanol Line at 6.7 GHz

JESSNER reported on progress concerning the regulation of ultra wideband communications on aircraft which could affect the 6.7 GHz band. The methodology and analysis provided by CRAF has been approved by CEPT SE24, SRD/MG and WG-FM. It is now part of an ECC decision (ECC/DEC/(12)CC) requiring an additional 21 dB suppression of emissions (a 'notch') in the band 6.650 -6.6752 GHz for the protection of radio astronomy. The decision is in the public consultation stage.

SKA site selection procedure

Millenaar described the final decision from the Members of the SKA Organization which agreed on a dual site solution for the Square Kilometre Array telescope. The members noted the report from the SKA Site Advisory Committee that both sites were well suited to hosting the SKA and that the report provided justification for the relative advantages and disadvantages of both locations. The report in its final form was generally welcomed.

Windmills

A prescription for compatibility studies for the operation of wind power devices near radio observatories has been developed and has been used in many instances. A mathematical procedure has been devised to evaluate the radio interference by *thermal* radio emission from windmills which are close to the antenna.

ECO Frequency Information System

42 CEPT countries (incl. all EU member states) are represented in EFIS and there is information on ITU and European Common Allocations (ECA); the old ECA database has now been merged into EFIS and is currently under revision for amendment in Sept. 2012. EFIS contains the following data types of regulatory information:

- Allocations
- Applications
- Radio interfaces
- Documents
- Right of use info
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The CRAF FM is currently providing a revised, simpler and more homogeneous set of descriptions which make the obvious corrections to radio astronomical ECAdb entries and will allow ECAdb users a better understanding of the RAS use of these bands and CRAF cooperates with the ECC in order to introduce these edits into the ECAdb.

UTC/leap second issue

CRAF decided that its position should be aligned to the one of the IAU.

76 - 77 GHz Automotive Radars

The updated ETSI TR 102 704 “Radar sensors for non-automotive; ground based vehicular applications in the 76 - 77 GHz frequency range” has now had outdoor fixed applications removed from it and therefore the document was deemed acceptable. **See also my Email on the primary allocation issue.**

Broadcast Wireless Systems (BWS) at 2.3 GHz

CRAF has contributed extensively to the draft ECC Report 172 on BWS to which . Although the RAS compatibility requirements as supplied evolved into a differently organised and presented form than in the original CRAF document, the core of the protection text submitted by CRAF still remains. The draft ECC Report 172 was placed under public consultation by WGSE shortly after its meeting in October 2011. Comments via the public consultation did not produce a dilution of the RAS related text and Report 172 was approved by WGSE in its March meeting.

Pseudolites

Work in this period has consisted mainly of a number of drafting sessions to edit and finalize a new ECC Report ‘128’ in which CRAF participated extensively. The FM stressed that the conclusions were highly dependent on the PLs power output being limited to that stated and that the specification for suppression of the unwanted emissions into the adjacent RA band was met. The draft report was approved for consideration for public consultation by WGSE in March. On the regulatory side, the draft ECC Report 128 on GNSS pseudolites was then used as the basis to derive information from which to develop a report which is aimed at providing guidance on producing a regulatory structure for outdoor PLs within CEPT; the objective being to submit it to WGFM in September 2012 for subsequent public consultation.

3GOBA (now renamed ‘Mobile Communications on Aircraft (MCA)’)

This topic has been formally adopted as a work item for SE7. It was renamed Mobile Communications on Aircraft (MCA). Three frequency bands are being considered, but the RAS is only sensitive to the 2.6 GHz proposal (the other two bands are at ~1.8 GHz and ~2.1 GHz). Operation of these mobile systems on board aircraft in the band up to 2690 MHz is clearly a significant issue for RAS. The adjacent band 2690 – 2700 MHz is a 5.340 protected, primary allocation RAS band. There will inevitably be OOB & spurious emissions from the transmitters falling into the RAS band and since these will be from airborne I.o.s. sources, very large protection distances are likely to be required in order to prevent interference to ground-based telescope operations. This issue, together with future IMT (WRC-15) is thought by the FM to present the main workload to be dealt with by CRAF in the coming year or two. WGSE requires that studies should specifically consider interference in the adjacent RAS band above 2690 MHz and to radars above 2700 MHz. CRAF has recently contributed such a preliminary study.

Broadband Direct Air-Ground Communication Systems at 3.4 – 3.6 GHz

At its meeting in Bern at the end of April, WGFM decided to remove this band as a candidate for studies for this service. This effectively removes the concern of CRAF relating to possible interference from the unwanted emissions of these systems to CH molecular observations at ~9 cm (3.3 GHz) that CRAF had highlighted via a technical contribution to PT SE44. However, this band may still be considered for use by similar applications in the future.

EC consultation: “Call to Stakeholders for their views on the introduction of harmonized technical conditions for the terrestrial 2 GHz band”

Although the questionnaire relates primarily to the use of the 1920-1980 MHz and 2110 – 2170 MHz band, scenarios under study also relate to possible use of 1452-1492 MHz (Helios Rep. 3.4.5), 2500-2690 MHz and 3400 – 3800 MHz (CEPT Rep. 39) which are adjacent to bands used by radio astronomy and other scientific services. CRAF has provided a written response from the RAS perspective on issues relating to these bands.

Future UHF spectrum for SRD

This includes automotive, RFID, Smart Metering and Smart Grids as single unit and network applications, Alarm and Social Alarm applications. There is a search on-going for other frequency use ‘opportunities’ below 3 GHz in which to place SRDs. Fortunately at this stage there appear to be no further threats emerging in relation to RAS bands, although this may not continue for long. Representatives from manufacturers have recently made statements about the likely levels of deployment of utility metering services; figures of 25,000/km² in urban areas and 2000/km² in rural areas were suggested within the next 15 years. If such an increase in use of these devices occurs allocated near to RAS bands, then there will be significant interference issues for the RAS. It may be of value to reassess the deployment densities used in future CRAF studies on these applications.

Recent Reports and Decisions quoting CRAF Expert Opinion

- Report ITU-R F.2240 HAPS compatibility → 680 km protection radius for 6.7 GHz
- Draft ECC Decision on Airborne UWB → additional 21 dB Notch at 6.7 GHz
- Finally agreed text of a revised ECC DEC/(04)10 on 24 GHz SRR → strict emission limits
- ERC Recommendation 70-03 → no fixed 77 GHz surveillance radars
- Draft ECC Report 128 on Pseudolites → 1.6 GHz: 33 km coordination zone + 30dB Notch
- Approved ECC Report 171 on IRIDIUM interference → Proof of high levels of RFI
- Revised ECC/DEC/(09)02 on the IRIDIUM interference issue → License for IRIDIUM ground stations will be revoked if RFI doesn't cease from 2016 !
- Square Kilometre Array Expert Panel on Radio Frequency Interference:
Report on the Strengths and Weaknesses of the Current Radio Frequency Interference Environment as Measured at the SKA Candidate Sites

WRC-12

WRC – 12 Results

AGENDA ITEM	Outcome for CRAF	Comments
1.3 – UAS near 5 & 15.4 GHz RAS bands	Unsatisfactory	Adjacent to 5 GHz, some satellite – UAS allowed limited to internationally standardized aeronautical systems. No allocations adjacent to 15.4 GHz
1.4 – AM(R)S adjacent to 5 GHz RAS band	Acceptable	No allocations immediately adjacent to 5 GHz RAS band & resolution suppressed; in line with CRAF's position.
1.6 – Revision of RR FN 5.565 (Frequencies above 275 GHz)	Satisfactory	The text of the agreed revision was supported by CRAF
1.8 – Protection of EESS at 86 - 92 GHz from FSS	Satisfactory	'Recommended' emission limits adopted in line with EESS requirements. Res 731 & 732 slightly modified and retained. Some limited improvement from the RAS perspective.
1.16 – METAIDS 8.3 -11.3 kHz	N/A	Allocation made in line with WMO requirements. Not a RAS/CRAF issue as such, but CRAF formally supported the allocation.
1.19 – SDR & CRS	Satisfactory	SDR: no change to RR. CRS: no change to RR. Suppression of resolution. All in line with CRAF's position. RCC countries generated a weak additional WRC-12 recommendation
1.20 – HAPS near 6.7 GHz	Acceptable	No HAPS to be deployed in most of the world. A country footnote that will allow the operation of HAPS in Australia and a few African countries was agreed. Specific text has been added to the associated resolution to protect radio astronomy.
1.21 – Airborne Radar near 15.4 GHz	Unsatisfactory	Allocation to airborne radars adjacent to the 15.4 GHz RAS band from 15.4 -15.7 GHz with 2% time interference to the RAS permitted.
1.22 – Short Range Devices	Satisfactory	No change to the RR and suppression of resolution 953; in line with CRAF's position.
1.25 – New MSS allocations near 10.6 & 15.4 GHz	Satisfactory	No allocations/Changes to RR & resolution suppressed; in line with CRAF's position

CRAF presence

Although CRAF had a reasonable presence at the conference it was not large enough at the beginning to cover all of the agenda items of interest being dealt with in parallel meetings. Agenda items were being resolved daily as the conference progressed and by the last week of the conference it was clear that any CRAF representation was unlikely to have further effect. **Co-ordination with other RAS groups could have been better and overall targeting of personnel to specific AIs was weak.**

‘Wish list’

From the above the FM would simply like to propose the following:

- CRAF should try to increase its attendance at WRC-15 preparation meetings of the ITU-R in the forthcoming cycle.
- CRAF should begin working on a position statement on the WRC 15 agenda items of concern immediately; this should be made visible and allowed to evolve over the coming months as feedback is received from the various national administration contacts.
- CRAF should attempt to initiate a joint development process for an agreed ultimate joint position statement with other RAS regional groups by autumn 2014.
- Whatever the origin of a position statement it should be made known and submitted well in advance of WRC-15 as a formal input document to the conference.
- CRAF should attempt to have a larger number of members present at the WRC-15 from early in the first week up to the end of the second. Individual members should be targeted and well briefed to cover specific agenda items. After the second week the numbers can be tapered down to that of only the FM in the final week of the conference.

New Work Items for WRC – 15(16)

- **77.5 - 78.0 GHz:** automotive radar applications
- **22 - 26 GHz:** Satellite to mobile links (IMT)
- **10 - 17 GHz:** New Satellite links need 250 MHz BW (again!)
- **8.7 – 9.3 GHz and/or 9.9 – 10.5 GHz:**
High power terrain radar satellite
- **7.15-7.25 GHz (space-to-Earth) and 8.4-8.5 GHz (Earth-to-space):**
New satellite links
- **7.375-7.750 GHz and 8.025-8.400 GHz:**
maritime-mobile satellite service
- **15.35-15.4 GHz:** Revision of 2% RFI permission for airborne radar
- Recommendation about data loss for time variable and impulsive interference (RA-1513 ?)
- **Industrial emissions (CISPR) and wind power devices**