

Part 5

Outreach

Saving Our Skies: Communicating the Issues to the Media

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Abstract. We discuss possible mechanisms for setting up a global outreach campaign centred on the main theme of this meeting: **save our skies!** Effective communication of this message to the world's media and the wide public is a prerequisite for successful sensitisation of decision-makers in different countries to the crucial issues at stake. We emphasise the need for careful planning of such a programme, especially in terms of definition of the key issues, the way they are presented, as well as the communication channels to be employed. It is important to differentiate the arguments used in connection with different types of pollution (light, radio, space debris). It will be necessary to identify clear and forceful messages that convincingly stress that these problems are of ultimate concern, not just a small group of astronomers, but to all of humanity. With their extremely sensitive instruments, astronomers constitute an avant-garde that is the first to detect the adverse effects, but as these intensify, increasingly broader sectors of society will be affected. It appears feasible, within the limited means available to the IAU and IDA, to initiate such an outreach effort with a comprehensive web-based campaign that highlights astronomical "pollution". This may also serve as a useful test-bench for subsequent campaigns based on more communication vehicles and with a wider spectrum of associated activities.

1. Introduction

Astronomers all over the world have become seriously concerned about increasing "pollution" in space and in the atmosphere. They sense a global deterioration of observing conditions that may become a real dilemma in the future. Today, few locations on the Earth enjoy the privileged situation of a truly unperturbed view of the sky. ESO's observatories at La Silla and Paranal in the Chilean Atacama desert, as well as the high-altitude Chajnantor site for the future ALMA facility in the same region, are far from inhabited places and belong to this rare class of 'last resorts' for astronomical observations from Earth. However, even though these near-pristine sites are still reasonably well protected against ground-based pollution, they are of course exposed to space-based effects like all others.

Most causes of *sky pollution* that adversely influence astronomical observations have been identified and analysed and various technical remedies are known. However, it is not possible for astronomers alone to implement these

and to change the situation. They need the help and support from other agencies and individuals. There are many examples of interactions with local authorities with a happy outcome, but this is not so in all cases. At the global level, scientists act primarily through the immediately concerned inter-governmental committees and commissions, e.g. COPUOS and IUCAF, so far with a reasonable degree of success.

But astronomers are worried about the future, and rightly so. The members of these international committees are delegates from different countries and organisations and rarely have a background in astronomy or space science. Not all will show understanding for astronomers' problems and many will mostly follow instructions from their bases. They are also, to a greater or lesser extent, subject to pressures and lobbying from influential interest groups.

There is thus a need for astronomers to exert some pressure. They have to inform others about their problem in such a way and on such a scale that the odds increase that they will obtain the support they ask for. In short, *they must call attention to their problems and do this in a way that is sufficiently convincing and persuasive that they will be heard by the decision-makers. Only then is there some hope that effective solutions to the mentioned pollution problems will be earnestly considered, perhaps even implemented.*

That is the current situation in a nutshell. It is not unlike what is experienced by other groups, in other contexts - it is in fact a recurrent scenario in a complex society where a multitude of often-conflicting interests confront each other. It is therefore reasonable to assume that communicative means and methods similar to those used by other groups may be employed to achieve the desired results, with the ultimate goal of halting or even reversing the present deterioration of the natural conditions of astronomical observations.

The astronomical community is geographically dispersed and it is not very large, especially when compared to the big environmentally oriented groupings. Nevertheless, it has certain prerogatives that, if used properly, may achieve effects that are quite powerful. The world's astronomers constitute a rather tight-knit, well-organised group of individuals with an inspiring mission and a generally positive image in the public mind, an advantage that cannot be overestimated in today's global village.

This paper will analyse the current situation in a somewhat unorthodox way and propose some specific remedies that may be applied at relatively short notice and which are compatible with the means of astronomers and their representative organs, in particular IDA and IAU and the associated commissions and committees. It goes without saying that a positive outcome can be expected only if proper collaboration is established from the outset with the national bodies and if vertical lines of communication to local communities are kept open and active.

Although activities at the local and national levels are both necessary and valuable, **we will focus on more global aspects** in what follows. The problems of sky pollution have now reached a stage where it is desirable to develop a global view, both of the issues themselves and of their possible solutions. However, some of these considerations may of course also have local applications.

2. Laying the Ground for a Media Campaign

Modern society has furthered the development of very powerful media on which we are all dependent, whether as citizens, scientists or decision-makers. There is no doubt that a major road towards alleviation of the current environmental problems in astronomy passes through them. To achieve the desired results, certain rules must be followed.

As in other media campaigns, it is necessary to identify the main issues in advance and to perform an evaluation of how the different instruments shall be played to achieve the best possible effect. Standard procedures can then be brought into action.

The first phase is the definition of the problem. This may seem trivial for astronomers, but not so for bystanders. What are the real *key issues* and who are the main players? Can you explain to somebody who is not necessarily interested in astronomy, what this science really is? Can you describe the types of pollution in a simple way? Can you condense the problems into easily comprehensible issues that can be transmitted to the public, the media, the politicians and other relevant groups?

What are the *consequences of the current situation* and the projections into the future? Not just for astronomy as a science, but for the individual, for other branches of human endeavours, for the individual town and country, for the world and for mankind as a whole?

Is it clear that something must be done at all? Will the *nuisance of this problem ultimately be greater than the expense of alleviating or eliminating it?* (If not, why bother at all?) Can you convincingly explain why the free view of the skies is so important that this must be guaranteed for future generations? Not just in the usual, idealistic or philosophical-cultural sense, but also from a more “applied”, not to say “business” point-of-view?

Whilst bringing the problem to the fore is indeed the goal of a communication plan, there are associated risks which must not be overlooked. Thus a possible confrontation between the needs of science and commercial interests, if not well controlled, could in principle lead to the conclusion that short-term commercial considerations are more important than long-term scientific investigations. Such a situation must clearly be avoided.

Assuming that it is possible to analyse these questions in depth and to come up with satisfying, not to say promising answers and formulations, the next step will then follow - that of preparing the media campaign.

3. Understanding the Media and How They Work

The increasing sky pollution is closely linked to the development of our modern society on which we all depend and the progress of which is considered basically beneficial by most citizens. Why, then, should the common citizen be worried about side effects like light or radio pollution?

Any attempt to disseminate an answer that is supportive of the astronomers' point of view means getting access to the media by presenting it in the proper way. The issue must be dealt with, not only from the scientist's point of view, but also primarily from the perspective of the public that may not even realise that

there is a problem. Of course, this does not mean that the scientific concerns should remain in the background. What it does imply, however, is that the presentation must be geared to take the specific requirements of the media into account.

It is in this context useful to consider some of key features of 'science items that are likely to 'succeed' as news stories', as listed by BBC producer Jana Bennett (1997):

- Science for the human race
- Could affect us all
- Viewer already knows enough to be able to integrate new information
- Focuses on one clear issue
- Shows awareness of viewers' concerns

While this short list is certainly not exhaustive, it already contains the seeds of success of a large-scale media campaign. Much thought should therefore be given to the integration of these and related considerations into the planning.

Successful communication in public mass media requires the use of clear language, striking analogies and/or good metaphors. It is important, though, only to use comparisons that can stand close scrutiny. At the same time, it must never be forgotten that there will be large differences in cultural background and perception within a global audience - what may be a great way of presenting the problem in one country could utterly fail in another.

4. A Media-Campaign, Step-by-Step

In practical terms, the steps towards a successful media campaign are:

- Define problem and relate to media requirements
- Set communication goal(s)
- Consider possible risks
- Develop communication strategy:
 - identify core issue (from a media perspective)
 - consider terminology/key expressions of language (including analogies, metaphors)
 - identify communication interfaces
 - * scientists/audiences
 - * communication/media
- Determine operational approach
 - top-down ('big' events)

- bottom-up ('grass roots')
- an organised network (?)
- Select communication channels
 - the World-Wide Web
 - public mass media (TV, radio, newspapers) meetings/conferences/public events
 - performances (public lectures, planetaria, science theatre)
 - special opportunities (science festivals, others)
- Produce communication materials
 - texts (press releases, exhibition panels, leaflets)
 - video (video news reels for TV, information video for public)
 - images (photos of natural phenomena, explanatory graphics)
 - “gadgets” (buttons, stickers, T-shirts, memorabilia)

5. Developing Key Messages

Human-induced pollution of the astronomical sky can be divided into at least four distinct areas:

- Light pollution (from the ground, e.g. cities; from space, e.g. satellites)
- Radio interference (from the ground and from space; in the band and spill-over)
- Space debris (light effects in case of extremely sensitive equipment; risk of collision with astronomical and other spacecraft)
- Increasing cloud coverage and amount of absorbing gases and dust in the atmosphere (especially water), due to short-term (e.g. El Niño) and long-term (general greenhouse effect) climatic changes (to be realistic, there may of course both be natural and human causes to these effects)

Each problem obviously requires its own communication approach and specific language use. However, the overall notion of 'pollution' must be kept in mind.

It should be noted that considerable work in the area of *light pollution* has already been done by groups (Mizon 1998) in particular in the USA and in the UK (above all by the International Dark Sky Association and the British Astronomical Association).

The problem about the detrimental effects of man-made *radio noise* to astronomy may be less known to the public.

The other two effects, *space debris* and *climatic effects* are already generally recognised by the media and the public and have much wider impact than what is considered here. Their negative effects on astronomy are in fact only marginal

when compared to their overall implications for mankind. It is not obvious how astronomers may contribute significantly in these areas to further increase the otherwise high level of awareness among the media, the public and the decision-makers.

In all of these contexts, it is important to stress **the central role of astronomy as a pathfinder**. Thanks to front-line technology and extreme sensitivity demands, astronomical instruments are the first to read the warning signals and to provide quantitative estimates of the deteriorating situation. Simple extrapolation then shows how an increased segment of mankind and a variety of its activities will be progressively influenced.

6. Differentiation of Arguments

We now discuss some of the individual characteristics of the current threats to astronomy and provide a few, central considerations in connection with a related, future media campaign.

6.1. Light Pollution

Light pollution can be likened, e.g., to chemical pollution. At low levels, it may not pose a threat to marine life or to surface vegetation, but as the concentration increases, it will produce progressively stronger effects. In the early phase, local street lights and advertisements may only be a nuisance for amateur astronomers in that geographical area, but if global urbanisation continues unabated and without stricter lightning regulations, a growing percentage of mankind will be denied access to a fundamental piece of Nature - the night sky. It concerns us all, the man in the street as well as the scientist.

The night sky is a very basic, natural as well as cultural resource. Throughout the ages, it is referred to in innumerable texts. It is the home of the gods, a display of beauty and serenity, a window to eternity. There are recent examples of its protection being elevated to a national goal, e.g. in Chile, not just to please astronomers, but most certainly also with profitable tourism in mind. Where will future generations go when they want to experience the real night sky? Obviously to those places where it is unaffected as possible!

Sacrificing the dark night sky for commercial interests may be compared to not producing any real books anymore in order to utilise all the paper in the world for supermarket leaflets. We can switch off the advertisements on the TV-set, but is it acceptable that we cannot see the Moon because it is hidden behind an orbiting soft-drink billboard?

It is important to remain truthful to the subject matter and analogies must not be taken too far. On the other hand, messages that are directed towards large sections of the public must be simple and easy to associate with. Thus, while it may be advisable to use softer formulations in front of a highly educated audience and in general, informed members of the public, a more dramatic metaphor may have a better impact and meet with an excellent response elsewhere. Here is one example of a simple message that may hit hard (too hard?) in many places. The ultimate result of global light pollution may be likened by locking up a person in a cell in eternal light, inhibiting the view of the darker surroundings outside

and thus depriving him of any sense of orientation beyond the narrow confines of the cell. Shall this be mankind's future?

6.2. Radio Interference

Astronomers need all available channels to study the Universe. It is not enough to make pretty pictures in the visual part of the spectrum. It is exactly the addition of all the other wavebands during the past decades that has resulted in an information explosion with the associated fundamental discoveries of completely new classes of celestial objects and phenomena.

Radio astronomy is comparatively easy to portray to the public - we "listen" to the Universe, rather than seeing it (visual) or sensing it (infrared). Radio noise is well known to many people, certainly to those living in remote places and especially to short-wave amateurs, and also to the homesick tourist that tries to tune in to a favourite station in his far-away home country.

However, while he or she may accept that there are natural limits to the propagation of radio waves, it really ought to be more difficult to understand and accept that man-made signals need to flood those specific radio bands in which we may receive crucial information from the distant Universe. Let the satellite-based communications organisations carry the load of explaining in a simple and satisfactory way why they cannot manage within the other bands! They would be hard pressed to do so convincingly in front of an inquisitive public!

To further dramatise this effect, we may speak about the pitiable person above, now also being deprived of means of communication with the outside world - all messages from there are drowned in emissions from noise senders. And yet, this is exactly what large populations in countries with totalitarian regimes are being (were) subjected to. Would you then like to live, together with the rest of mankind, under such deplorable circumstances?

And then the tragicomic approach. Imagine that a SETI signal is on its way towards Earth, speeding towards a well-tuned radio telescope pointing in the right direction at the right time. Now is the moment of the greatest discovery mankind will ever make - we are not alone! And exactly at that time, somebody in the neighbourhood calls-a-pizza via his global mobile telephone... Wouldn't that really be too bad!

6.3. Space Debris

The issue of space debris is of course first of all a question of safety. There are clear signs that the space agencies and with them the media, are taking this new form of Russian roulette very seriously - many reports are appearing, dealing with the risk of collisions. For earthlings, the situation can be likened to living in a house surrounded by swarms of killer bees - perhaps a rather strong, but not necessarily misleading, metaphor. In any case, based on recent estimates of the rapidly growing number of orbiting objects and with permanent habitation on the International Space Station now imminent, it is fair to expect that the perception of this problem will soon take on an entirely new dimension.

It is safe to predict that a great media (and political and public) uproar will occur sooner or later, at the latest when an exceedingly costly communications satellite is destroyed by a 5-cent bolt left in space or a peanut-sized part from a

long-abandoned spacecraft. However, in this context, astronomers must concede that their space observatories are only a subgroup of the vast orbital population, dominated by commercial and military satellites. There are equal risks for all, but research spacecraft are of course **unmanned**. Don't ask the public what is perceived as the lesser evil: whether Chandra or the ISS are hit!

The real problem that is specific to astronomers is the pollution caused by reflected sunlight from an increasing number of orbiting objects of all sizes, moving randomly through the fields-of-view of the world's large, expensive telescopes. Already now, a very substantial fraction of all exposures with large-field cameras are contaminated by visible trails from such objects. There are numerous examples, also demonstrated during this conference, of bright trails that overlap faint celestial objects for which the exposure was made, resulting in loss of valuable observing time - sometimes even of epoch-dependent, unique scientific data.

In all known cases, such a loss has been of no great consequence beyond the circle of astronomical observers. But what if sometime in the future, when the density of space debris presumably has become much larger than now, a crucial observation fails that may have wider implications? In a dramatic scenario, it could be an asteroid or comet that happens to be on collision course with the Earth and therefore remains undetected (although this event is of course most unlikely).

6.4. Increasing Cloud Coverage

The current global warming is receiving wide exposure in the media. While doubts have been expressed about the true extent of this effect and its speed of progression, it appears that the media (contrary to some governments) are now quite unison in presenting this as a major challenge to mankind in the next century. Unless something is done, it is said, we will be in for dramatic changes, on a global as well as a local level. The public is being constantly sensitised to these issues. It is thus reasonable to predict that at some moment - perhaps only some decades from now when the related effects have become even more obvious, especially in terms of changing climatic conditions and increased frequency of natural disasters - public opinion will force the enactment of stricter environmental laws in many more regions of the earth than is now the case.

Astronomers suffer from this as all other citizens do, and it is almost certain that most sites of astronomical facilities will ultimately be influenced. In the Pacific area, where some of the prime observatory sites are located, including those of ESO, it is above all the effects of El Niño that will cause concern. If, for instance, this phenomenon began to reappear more frequently than hitherto - or perhaps on a larger scale- with increased temperature excesses and impacting a larger geographical area, astronomical observations in these areas would become increasingly difficult.

Astronomers may contribute to raising the public awareness of these changes, since they have long-term objective records that may provide clear illustrations of what is going on. This is fundamental issue that concerns us all and we will float or sink with the rest of humanity.

7. Communication Tools

Giving the fact that the issue is (or rather should be) of wide concern, mass-media such as TV and the printed press are good channels for raising public awareness about astronomical pollution. Attracting the attention of the press, however, is not easy and will require a variety of approaches, including:

- Events - can be high-level meetings (such as this IAU Symposium), with highly respected scientists and politicians pronouncing statements on the issue - or local events, organised by science centres, societies, astronomy clubs, planetaria, etc. (i.e. 'grass roots' movements). They can be staged around the issue or can be integrated into other events, in particular astronomical events (eclipses, comets, meteor streams, spacecraft fly-bys etc.). Integration into the national science week(s) or day(s), now taking place in an increasing number of countries, may also be considered.
- Well-prepared information material, e.g., press releases on the right occasions, good illustrations, possibly video material in broadcast standard - and quality - is likely to open many media doors.
- Feature articles and letters in leading newspapers and magazines by scientists and lay people
- Using dedicated science programmes on radio and TV as a stepping stone
- Using dedicated youth programmes and youth magazines as a stepping stone to reach the next generation
- Scientists and science agencies may use their media connections to press the issue and possibly undertake co-ordinated efforts in that direction
- International bodies, including the IAU and IDA, are well placed to undertake co-ordinated efforts on a world scale

8. The World-Wide Web

In view of its global reach and ease of use, web-based activities can be extremely efficient in reaching well-defined communities and groups in society. However, although 'the Web' is clearly undergoing a dramatic expansion - and therefore gains in importance for communication - the enormous amount of information now on the Web tends to make it a victim of its own success. Furthermore, obtaining information from the Web requires a dedicated effort by the individual, much more so than being fed by the conventional mass media.

From the point of view of a *producer* of communication, linking with search engines can help, as can any other activity that directs Web users towards the appropriate Web pages. In this context, it should be mentioned that even the most successful internet-based educational activities by ESO, e.g. the 'Astronomy On-Line' programme, were always 'announced' in parallel by means of conventional printed matter. Hence a combination of the tools listed above is called for.

Nevertheless, there is an obvious potential for a dedicated effort to spread the word about a 'Save our Skies' global project via the Web. It should not be too difficult or costly to set up in a relatively short time a concerted action by involving major observatories, planetaria and amateur groups to achieve an efficient media and public sensitisation. This could be done within the IAU framework or via the IDA or, better, in a collaborative effort. It would involve the preparation of convincing, interesting and educational material, including such that is specially prepared for schools, but the main efforts would be in the coordination of the campaign.

It is also important to understand that what is required for such a dedicated, global campaign, as indeed in any other attempt to spread the word about sky pollution, is a *sustained effort*. The public mass media can play a crucial role in moving the issue out of the 'dark' corner, where it resides now (as seen from most countries), and into the public arena. Media attention, though, is short and must be won again and again.

9. Conclusions

From a communication point of view, *sky pollution* is similar to many 'standard' issues of contention that occur in our complex, modern society. Solving/removing the problems for science that arise from sky pollution requires a broader understanding and support than can be generated within the scientific community alone. Hence a broad public discussion about the related issues is highly desirable.

In moving the issue into the public arena, a clear and carefully prepared communication strategy is necessary, both with respect to the formulation of the key texts and the choice and interplay of communication tools.

It appears feasible, within the limited means available to the IAU and IDA, to initiate such an effort at the global level with a comprehensive web-based campaign that highlights astronomical "pollution". This may also serve as a useful test-bench for subsequent campaigns based on more communication vehicles and with a wider spectrum of associated activities.

A close collaboration between local, national and international groupings and organisations over an extended period of time is needed to achieve substantial positive results and an impact that is sufficient to reach decision-makers on a wide scale. This will take some hard work, but we have no doubts that the world's astronomical community is in possession of the dedication, the means and, not least, those structures that are necessary to ensure a successful outcome.

References

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