Report

The public communication at the IAU GA 2006

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Despite a substantial number of (more) scientifically interesting topics at the 2006 General Assembly, the planet definition process hit the significant “above-the-fold” headlines of all major newspapers in the world. The topic was so explosive that public resistance resulted in demonstrations and numerous cartoons. The second most reported story: the discovery with the Hubble Space Telescope by Harvey Richer (University of British Columbia) of the final stage of the white dwarf sequence in a globular cluster is also represented.

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Abstract

The IAU Executive Committee requested a full written report on the public communication activities at the 2006 General Assembly (GA) because of their relatively high importance. The purpose of this document is to deliver a comprehensive account of the activities in the Press Room in Prague and to address some of the implications of the unprecedented public interest in this particular General Assembly. The report will provide sufficient detail to serve as a “cookbook” for coming General Assemblies as well as for similar pressrooms at other meetings. In addition, experiences from the Press Room at GA 2003 in Sydney are included (Appendix G: Lessons learned from the GA XXV 2003 by Helen Sim, CSIRO), in order to transfer as much knowledge from this as possible.

The most important chapters in the report are the Chapters “Executive summary”, “Results and deliverables” and “Lessons learned”.

Executive summary

This was a General Assembly like no other.

Personally, I have only participated in three other General Assemblies but the planet definition debate that took place in 2006 was clearly the “hottest topic” in many years – both internally within the walls of the Congress Center, as well as outside in the “real world” – if not in the entire history of the IAU.

Although the planet definition debate occupied the most prominent place in the press coverage by far, it is fair to say that without it, the other stories and their corresponding media coverage would still have made for a satisfying outcome in terms of public communication. It is naturally unfortunate that the other pieces of interesting science, made public at press briefings and through press releases, drowned somewhat in the planet definition coverage, but it is – as we all know – not possible to control the media.

Many interesting lessons were learned, especially about the practicalities of setting up a well-functioning pressroom in response to a crisis, but also about the complex ways that information is transmitted from scientists to the press.

The new definition of a planet has provoked strong reactions that still persist weeks after the GA from both the public and the astronomical community. Any decision on a topic of this magnitude and importance will inevitably generate a barrage of negative reactions. The current opposition is, in other words, unavoidable, and I recommend that the EC stays firmly on the course taken and maintains its position. Judging from the ongoing public and internal communication the main part of the resistance against IAU XXVI Resolutions 5 and 6 seems to stem from a vocal minority of astronomers.

I anticipate a continuation of the debate by the public and within the community in the coming months and perhaps years, and recommend commend the establishment of a mechanism – such as a permanent or semi-permanent IAU press office – to help deal with the public communication regarding these issues. This is important and will help to maintain the image of the IAU as a serious and open organisation. Work preparing a pressroom for the GA in 2009 should start in the next few months (Chapter Lessons learned).

Before the conference we had to choose just how open to be with the press and public through the process of deciding on the new definition of a planet. I believe that we hit the right balance. In some ways, the whole issue was like two “bombs” waiting to explode. The first bomb was the public reaction to changes in the worldview – adding or subtracting planets in the Solar System – and the second was the internal tension within the community – due to difference of opinion and the appointment of selected experts to work on the definition. It was the job of the EC and the Press Officer to try to minimise the negative effects for the IAU and for astronomy, and to maximise the benefits of the two explosions. In a sense one can say that the explosions could not be prevented, but the bombs could at least be thrown in a certain direction instead of letting it explode between our hands.

With regard to the first “explosion” – the public “bomb” – damage control consisted of keeping the process as open as possible and informing the press about each step of the process as it took place – including the first Resolution draft and the ongoing debate. As many as thirty journalists had already signed up weeks before the meeting and it was well known among science journalists that the definition of a planet was going to be discussed, suggesting a strong outside interest that spoke forcibly for an open communication strategy. It would not have been possible to keep the planet definition debate out of the press. By
issuing press releases all the relevant information was delivered, and press and public speculation was minimised, although not completely eliminated for instance by NPR before the GA, and by others in between Press Releases iau0601 and iau0602 (see Appendix C: IAU Press releases issued during the GA).

It is difficult to speculate how the image of the IAU or the astronomical community might have been affected if a more “closed” form of public communication had been chosen. It is more than likely that the — not always very constructive — messages from many prominent and outspoken astronomers would have reached the press. The open communication did avert most of the potential criticism that the planet definition process took place as closed discussions among senior cigar-smoking astronomers in a “closed club”.

With respect to the “second bomb”, the strong reaction from the scientific community was somewhat underestimated by most of the EC and the Press Officer. The majority of us also did not anticipate the significant changes to Resolution 5 that took place during the GA. With 20-20 hindsight, the draft aspect of Resolution 5 could have been stressed more in the initial press release (although it was already fairly prominent, see Appendix C: IAU Press releases issued during the GA). The “inreach” aspect — sharing the draft Resolution earlier with the community (especially Divisions I and III) could perhaps have been given more emphasis, but this was difficult for two reasons:

1) The EC feared that the Resolution text would leak to the entire community and to the public, without the EC and DPC having a chance to add the necessary scientific context, historical background and interpretation (as was printed in GA Newspaper 2, see Appendix I: Excerpts from GA Newspaper ).

2) The Resolution itself was drafted shortly before the GA, and practical considerations made it difficult to initiate discussions with Division I and III (collecting emailing lists etc).

The planet definition affair has definitely had some negative effects. Astronomers, and scientists in general, have been publicly portrayed as being in disagreement, arguing and, at times, even being childish in their discussions. The positive side of this is that astronomers and scientists have appeared as human beings and far from their usual “lab-coat” image. The IAU has also been publicly accused of being a “closed club” that only represents a fraction of astronomers.

In my opinion the positive effects, however, outweigh the negative by far. One of the most important outcomes of the public communication from the GA is that the public today has a much better knowledge of the Union and its mission as the authority on fundamental astronomical issues. This and other, less significant, results are outlined in chapter “Results and deliverables”. The enormous public interest in the planet definition story is perhaps best illustrated by the large number of cartoon jokes/caricatures appearing in the international newspapers. It is the first time in many years to my knowledge that any scientific topic has penetrated so deeply into the public conscience. The effect of this is not to be underestimated. Scientific issues are usually notoriously difficult to get on the front pages (although astronomy usually stands a better chance than most other sciences). The value of this is — despite the unavoidable negative effects described above — enormous.

For once, a large fraction of the demographic segment of people inattentive to science was exposed to science. A small-scale poll among friends and family found that everyone had heard of the “Pluto story” and most even offered an opinion about it. This is an important consequence and should not be underestimated.

The reactions from our journalist colleagues have, without exception, been extremely positive towards the IAU communication strategy during this GA (see examples in Appendix K: Praise
from journalists) and I am, with the exception of negative effects mentioned above, extremely satisfied with the work. The atmosphere in the Press Room in those hours of excitement and tension was unforgettable. Colleagues, collaborators and friends came by to discuss, share opinions, enjoy the atmosphere and have a cup of coffee or water. At times there were more than twenty journalists sitting cheek by jowl, filing stories to their editors.

In closing, I would like to thank the pressroom team (see section 2.4) for their dedication, hard work and good spirits during the GA! I would also like to thank the EC and DPC, especially Richard Binzel, for the incredible amount of hard work they put into the planet definition debate and the various topics dealing with communication. ESO and the ESO Public Affairs Department deserve especial thanks as they partly sponsored the loan of a large fraction of the Press Room equipment and partly sponsored and arranged the transport of the IAU exhibition.

Lars Lindberg Christensen
IAU Press Officer
Porto, 11 September 2006
1 Preparing for the 2006 IAU General Assembly

1.1 What is the International Astronomical Union?
The International Astronomical Union (IAU) is the international astronomical organisation that brings together distinguished astronomers from all nations of the world. It was founded in 1919 and is with almost 10,000 IAU members the world’s largest professional body for astronomers. IAU’s mission is to promote and safeguard the science of astronomy in all its aspects through international cooperation.

The IAU is also the internationally recognized authority for assigning designations to celestial bodies and any surface features on them. The IAU General Assembly is held every three years and is one of the largest and most diverse astronomical meetings.

1.2 The general need for public science communication
Today we live in an era of unprecedented scientific progress and the growing impact of technology has brought science ever more into our daily lives. Science directly influences the quality of people’s lives and in order to make informed decisions, knowledge of science is increasingly important. Science communication provides this crucial information and underlines in a continuous fashion the long-lasting effects of science on our society.

The IAU has a vital role to play in science communication as a global coordinator of, and catalyst for, science communication projects such as the International Year of Astronomy 2009.

1.3 IAU’s strategy for public communication
IAU’s public communication has to play a coordinating and facilitating role (in contrast to a role as producer) by connecting IAU executives and scientists with media, hobbyists, educators, outreach professionals and laypeople. IAU’s role as the global astronomical authority and clearing house for nomenclature and scientific standards naturally has to be visible.

IAU’s efforts for the global collaboration within the public communication community fall naturally within the responsibility of the IAU Press Officer and of Commission 55 Communicating Astronomy with the Public.

1.4 Preparing for the 2006 General Assembly
The general need for public communication was clear before GA 2006. An effort had to be made to enable a flow of information from the IAU during the meeting. The question was which strategy to apply in terms of style and amount of information.

Over the past few years the media landscape has changed along with the ever-growing flatness of the world. With powerful web search engines such as Google it is today easier for curious journalists to conduct a thorough research and the access to information is easier than ever before.

Before the GA we wrote in internal working papers: “The “planet” issue has the potential to become a historic event of epic proportions. It may become the hottest astronomy story of the year, or even the decade. It has the potential to change history. Seeing this a potential historic event, do we fulfil our “public duty” and inform..."
“openly about the process and the decisions, or do we keep quiet to protect the slow and thoughtful scientific work process?”

It was in already then clear that we were dealing with a very special situation.

1.5 Crisis communication

Shortly thereafter the situation around the “planet definition” was declared a “crisis” due to the possible negative effects that an improper public communication could have.

In crisis communication there are some general rules (see Christensen, 2006 for more on crisis communication):

The main thing to avoid in a crisis situation is not to react and let the outside world dominate your decisions! Be proactive rather than reactive. Some guidelines apply:

- Communicate internally first to avoid internal confusion and enable all involved to work towards the global goal
- Plan ahead as early as possible
- React as quickly as possible – the timescale is usually counted in minutes and hours
- Be available via cell phones, e-mail etc.
- Be credible and fact-based in your external communication
- Apply analytic working methods
- Be transparent, open and honest
- Be ready to compromise several times along the way in order to achieve the global goal at the end of the process. This point is notoriously difficult to accept as it goes against normal management practice and what is normally preached in an operational workflow (excellence …!)

1.5.1 Worst case scenarios

As we were planning for the “planet-crisis” we wrote a series of worst case scenarios

1. Lack of communication
   - A polarised “Them and Us” situation in the media: The press (and public) are largely held outside of the process and are not properly informed. => A public outcry over the secrecy of discussions among senior cigar-smoking astronomers in a “closed club”.
   - Leading opinion-makers from cultural, art and religious backgrounds will speak publicly against “this lab-coat nonsense”, and create a global surge of protests. Political intervention? Demonstrations? Violence?

2. Too simplistic communication
   - The issues around the Resolution are communicated widely, but its tentative/draft character is omitted in the public communication. In the end a Resolution is not passed and the press and public feels led astray. IAU comes out looking bad.

3. Broad disagreement
   - Majority of the community disagrees. Resentment? Demonstrations?
4. Pluto’s status will change from “planet” to “dwarf planet” creating a feeling of anti-Americanism on the part of the US (as the IAU by some is seen as a predominantly European organisation). Read a detailed account of this scenario in that was very close to being the actual scenario that took place.
- Under political pressure, or spontaneously, NASA or the US planetary science community may develop its own categorisation for objects in the solar system — e.g. developing the “ice dwarf” category using criteria other than those proposed by the IAU.
- The AAS may be asked to develop policies on this and related issues that provide “American” alternatives to the “European” ones of the IAU.
- US astronomers may be lobbied (e.g. by the Planetary Society) to withdraw from the IAU as individual members.
- An individual member or members of Congress (e.g. from Arizona) might be lobbied to move for the US to withdraw from IAU at a national level.
- To generate ammunition for political lobbying, the Planetary Society may conduct a poll of the US public on the status of Pluto.
- The New Horizons team may perceive that a change in Pluto’s status may weaken its funding status, and lobby the IAU Executive or members for any change in Pluto’s status to be delayed (or, if it is changed, reversed).
- The family of Clyde Tombaugh may protest against Pluto’s change in status.
- Flagstaff Observatory is likely to maintain its current displays and materials about Pluto.
- New Mexico State University may continue to refer to Pluto as a planet and Clyde Tombaugh as its discoverer.
- US book publishers, planetariums and generators of online content may be slow to change their current material on Pluto and its discovery, if they change it at all. They may do this spontaneously: they may also be lobbied to do so.
- Individual schools in the US may be slow to change what they teach about Pluto and its discovery, if they change it at all.

Based on these four scenarios the following recommendations for the public communication were put forward to the IAU Executive Committee and agreed upon:
- Having a full openness (or as close to as possible) of the decision-making process that leads to the Resolution.
- Business meetings may be closed to the press if they are followed by a press briefing.
- The press will have free access to speak to all attendees, but will be provided with a comprehensive list of experts on this topic.

The implementation of these recommendations was foreseen as:
- To provide an overview of the decision-making process as early as possible, i.e. in the media invitation e-mail
- To invite the media to participate in the process
- To have press briefings as it becomes necessary
- To issue statements to non-attending media as it becomes necessary

1.5.2 Timeline
An approximate timeline of the events around the “planet decision” look as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>AMNH decision to leave out Pluto of their scaling walk hits the news</td>
</tr>
<tr>
<td>2003-2005</td>
<td>Discovery of large TNOs: Sedna, Eris ..</td>
</tr>
<tr>
<td>2004-2005</td>
<td>First DPC committee</td>
</tr>
</tbody>
</table>
27.06.2006  Appointment of an IAU Press Officer
01.07 2006  Second DPC meets in Paris, decides on a definition
27.07 2006  Recommendation for public communication
01.08.2006  First Resolution draft approved by the EC
14.08.2006  GA starts
15.08 2006  Draft Resolution Press release under embargo to press
16.08.2006 8:00 am  Press release embargo is lifted. Press briefing.
18.08.2006  Division III Business Meeting
22.08.2006  EC plenary discussion
24.08.2006 08:00  Press release: Final Resolution ready for voting
24.08.2006  ~15:40 Resolution 5A is passed, 5B is not passed. Pluto is defined as a “dwarf planet”
04.09.2006  A petition with almost 400 signatures protesting the decision is delivered to the IAU
2 The 2006 General Assembly Press Room

Communicating science with the public is naturally a whole topic on its own. This report will focus on the pressroom at the IAU 2006 General Assembly. A broad overview in cookbook style of science communication in general can be found in Christensen (2006).

2.1 Pressroom functions

A pressroom has three main functions:

1. To connect scientists and media representatives via point-to-point interviews and press briefings.
2. To provide all necessary facilities (power, Internet, coffee, tables, chairs etc) and information (facts, dates, times, locations, finding people, making appointments for interviews) for media representatives and scientists.
3. To communicate its own and external news to the press and public via its own organisational press releases and press releases from others.

In reality, there are many smaller goals and deliverables (see “Results and deliverables”). It requires a great deal of organisation and effort to carry out these functions at such a large meeting.
2.2 Planning and preparing a pressroom

2.2.1 Tactical preparations

There is no “one solution fits all” in planning a pressroom, but there are a few simple principles (Maran, 2003):

1. Offer stories that reporters want to cover, not just stories that organisations and agencies would like to publish.
2. Enlist the aid of the science public relations professionals at the home institutions of your reporting scientists.
3. Make sure that the reporting scientists know in advance:
   - what is needed in a press release;
   - how images should be formatted for the news media;
   - how to prepare for and speak at a press conference.

2.2.2 Practical Preparations

A pressroom will only run smoothly if the venue and the pressroom team has been adequately prepared well in advance.

It is essential to:

1. Liaise with the local key persons per phone as early as possible.
2. Order the rooms and furniture needed at the meeting place. For the GA 2006 a Press Room, an Interview Room and a Press Conference Room were booked fairly late (some four weeks prior to the meeting). All rooms required:
   - power;
• internet access;
• telephone lines;
• projectors;
• tables and chairs;
• whiteboards;
• etc.

3. Set up contact lists with names, telephone numbers and offices of the most important people and try to contact them once before the meeting starts. Make sure that everyone, team included, can be reached during the meeting. Provide cell phones and prepaid cards to key scientists.

4. Prepare as many practical arrangements as possible before the meeting begins: for example, schedules, own releases, etc.

5. Pass on all necessary information about the meeting to all pressroom staff. This includes when and where the main topics are to be discussed and who the important persons are etc.

6. Make a packing list and ship as much as possible in advance. See: Appendix B: Press Room equipment.

2.3 Pressroom workflow

The workflow in the pressroom can be split into two categories: daily tasks and special tasks:

The daily or continuing tasks:
• answering questions from journalists and scientists per email, phone or in person;
• fixing dates and places for interviews;

The episode was later included in Hogan’s blog on nature.com: http://www.nature.com/nature/journal/v407/n6807/full/407952a0_fs.html
• providing background information for the topics of the day: schedules, explanations to releases, press briefings, etc;
• collecting and displaying press clippings about the meeting;
• preparing press briefings, rehearsing press briefings with participants.

Special tasks:
• representation and dealing with political issues;
• releasing press releases – both your own and others;
• preparing and delivering own talks;
• organising social events to bring media and scientists together (for example dinners or excursions).

2.4 The GA 2006 Press Room staff and their time schedule

Staffing a Press Room takes a full team. The Press Room at GA 2006 was staffed by a minimum of two people at all times – and more usually three – in order to cover press requests and representative duties as well as technical and organisational work. Eight people in total worked in the Press Room for between one and ten days.

1. Lars Lindberg Christensen: 10 days, 8:30 – 21:00 = ~125 hours.
   Duties: Coordination, management, writing of press releases, political issues, hosting of press conferences.

2. Helen Sim: 10 days, 8:45 – 20:00 = ~115 hours.
   Duties: Deputy Press Officer, press contact (phones and in person), arranging and scheduling interviews, hosting of press conferences.

3. Lars Holm Nielsen: 10 days, 8:30 – 21:00 = ~125 hours.
   Duties: Photography, accounting, technical issues, cell phones, presentation preparations, phone duty.

4. Raquel Yumi Shida: 9 days, 8:30 – 19:30 = ~100 hours.
   Duties: Updating cell phone lists, contact lists, agendas, printing and hanging the press clippings on the boards twice a day, locating interview partners and interview locations, phone, organising the Press Room (sorting, coffee, cleaning, etc.), packing and unpacking, phone duty.

5. Nadja Wolf: 8 days, 9:00 – 17:00 = ~64 hours.
   Duties: Office supplies, phone cards, phone, press dinner, assisting with press clippings, locating interview partners and interview locations, setting up the IAU exhibition stand, organising the Press Room (sorting, coffee, cleaning, etc.), assisting in writing releases and press information, assisting during press conferences, packing and unpacking, phone duty.

6. Pedro Russo: 2 days, ~8 hours.

7. Gordon Squires, Spitzer Science Center: 1 day, ~8 hours.
   Duties: Helping with press requests on the 24th August.

8. Robert Hurt, Spitzer Science Center: 1 day, ~8 hours.
   Duties: Helping with press requests on the 24th August.
3 Results and deliverables

This chapter itemises and categorises the results and technical achievements or output from the GA 2006 Press Room.

3.1.1 Public recognition

- An enormous increase in public knowledge and awareness of the IAU and its mission.
- Astronomy and science in general has penetrated more deeply into the popular consciousness than has happened in many years.

3.1.2 Media

- 194 journalists attended (Appendix F: List of participating journalists). This is as many as for the most well-attended AAS meetings.
- Hundreds of interviews were arranged, mainly with IAU-appointed scientists (DPC and EC), but also individual prominent scientists at the conference.
- As an example 16 camera crews were present during the Closing Ceremony, 3 live satellite transmission trucks were parked outside the conference centre.
- 11 press briefings were arranged and held (see Appendix E: Press briefings).
- The media coverage was overwhelming. This is probably the most covered science story of 2006, possibly of the entire decade. 24 folders each with 48 random clippings have been collected, mainly from the web.
- 1 Op-Ed piece in the Washington Post 16 August (written by Dava Sobel, see p. 103) was arranged and edited.

3.1.3 Web

- 1 mirror site for iau.org (http://www.iau2006.org) was set up at ESO due to an unfortunate planned power outage at IAP for 3-4 days. To cope with the amount of traffic the system was distributed over two physical servers with a load-balancing interface.
- Web stats: the IAU mirror site had ~10 million hits, and ~228 GB of files were delivered to 310,000 visitors over the course of a few days. Just after the voting on the resolution, the website received more than 1.3 million hits in 90 minutes (the peak was around 200 requests per second). These stats do not include the main site iau.org for which we do not have web stats. We did however notice that the iau.org was so popular that it was unresponsive over a period of days (indicating that it was inundated with visitors).
- 1 special webcast site was set up for the press on a separate server to ensure stability of the connection (courtesy of CBT/mediastream.cz).
- Webcasts of several events were streamed during General Assembly (courtesy of CBT/mediastream.cz): During the General Assembly, there were 8122 live viewers in total. The most viewed webcast was General Assembly Session 2 (final planet definition vote) with 5056 viewers.
- IAU GA webcast archive (courtesy: CBT/mediastream.cz) has since the General Assembly served 21138 requests (or viewed videos) to date\(^1\). The “Top 10” list shows (in order of number of views):
  1. Discussion on the Definition of a Planet — 6943 views
  2. General Assembly Session 2 (Planet Definition vote) — 6102 views
  3. General Assembly Opening Ceremony — 3170 views
  4. Invited Discourse — Jill Tarter — 1483 views

\(^1\) As of 8 September 2006
5. General Assembly Closing Ceremony — 781 views
6. General Assembly Session 1 — 590 views
7. Invited Discourse — Alan Title — 564 views
8. Invited Discourse — Shuang Nan Zhang — 439 views
9. Peter Gruber Foundation Cosmology Prize Winner Lecture — 433 views
10. Invited Discourse — Geinhard Genzel — 358 views

The webcast archive at astronomy2006.com now has a sustained rate of ~450 views per day. As agreed, the webcast archive will be available for at least 3 years. Based on current estimates, it should reach ~100 000 total views by the time of next General Assembly in Rio in 2009.

3.1.4 Press releases
- All ~2400 abstracts were read and evaluated before the meeting. All Symposia, Joint Discussion and Special Session chairs were contacted and asked for inputs about scientific results with potential public interest.
- 4 official IAU press releases were distributed (Appendix C: IAU Press releases issued during the GA). Some of these were written, edited, approved and distributed in real time.
- These press releases had 14 individual illustrations and images accompanying them.
- 17 other press releases were printed and distributed in the Press Room. Some of these were also distributed electronically via the normal channels.
- In total ~11,000 sheets of A4 paper was used for printouts or photocopies in the Press Room.
- An IAU mailing list of press contacts containing 150+ media organisations was constructed.

3.1.5 Miscellaneous
- One IAU exhibition stand was produced and shipped to Prague.
- Press clippings were posted on the boards outside the Internet Café on the second floor twice a day.
- ~150 digital photos were taken and published on the web during the GA.
- The Press Room was at times, due to its nice practical and technical set up, used as a kind of “mission control” by members of the DPC.
- Backdrops for the Press Interview Room were designed, printed, mounted and transported to Prague.
- Posters for prominent (non-IAU) press releases were designed, printed, mounted and transported to Prague.
- The publication and editing of several articles for the GA Newspaper was coordinated.

3.1.6 Requests
- Roughly 500 requests by phone were received.
- ~230 of these requests by phone were logged. Most included setting up interviews. An estimated 50% of calls were not logged (lack of time and capacity).
- ~66 public requests per email has been logged\(^1\), answered and discussed with the IAU President.

\(^1\) As of 15 September 2006
Three TV transmission trucks were parked outside the Prague Congress Center for the entire day of the Closing Ceremony.

The press clipping boards were updated twice a day.
The IAU exhibition booth.
4 Lessons learned

4.1.1 Interface with locals

- Due to the late appointment of the Press Officer there were (naturally) some difficulties in establishing a good working relationship with the local entities. There were no problems with CBT and all worked extremely well due to the hard work and positive attitude of Zuzana Tesafová. A good working relationship was never established with ICARIS. No major problems arose as a consequence, but, for instance, the media registration was completely decoupled from the Press Room and lists were not updated in time. Also, it was never clear whether journalists were properly informed about the Press Room and its function at the time of registration.
- Much longer planning is necessary to establish a good functioning relationship with the NOC and the companies involved. It is not too early to start early preparations at the end of the previous GA, that is, approximately 3 years in advance.
- The NOC has somewhat different public communication goals from the IAU in general: It is natural for the NOC to focus on the local and national press, whereas the IAU focuses on the international press. This situation and the special local knowledge of the NOC should be exploited to mutual advantage. One NOC appointed person should join the Press Room team to take care of the local/national issues to create a win-win situation for both the IAU and the NOC.
- The room, equipment, and staffing in the Press Room was (by divine intervention?) exactly the right size.
- Sandwich lunches should be provided for journalists and staff in the Press Room.

4.1.2 Science sessions

- The science abstracts arrived ~1 week too late. It takes ~2 weeks to read and evaluate ~2400 abstracts.
- Only about half of the session chairs responded when asked for inputs about publicly interesting results. The Symposium chairs in particular did not respond (too many abstracts to get an overview?).
- Abstracts were delivered as many individual files. One file would have been preferred and would have made the abstracts searchable.
- The Hot Topics session concept is extremely valuable both scientifically and for the press, but needs a bit of preparation to work. Hot Topics abstracts were (as far as we could see) not available, and so could not be shared with the press and public.
- The best method to find the good science is to contact the local Public Information Officers well in advance and let them oversee the interaction with the scientists locally.

4.1.3 Press releases

- The official IAU press releases were praised by journalists for being comprehensive and explaining the topics well (this kind of praise is very rare).
- The large statistical sample of press requests at this GA made it possible to gain interesting knowledge about the information flow and the workings of the whole scientist-Public Information Officer – journalist system. The experience at the GA emphasised that:
2. Journalists only contact a press office when they need something that is not delivered in the press release.
3. The main lesson learned is that the faster a press release can be issued and distributed and the more factual it is, the less overall work will be incurred.

The main reasons that journalists contacted the Press Room in Prague were:
1. To get an interview with people involved.
2. To get additional facts that had not been delivered, most notably:
   - The exact time of the important votes? (which was not known)
   - Who are eligible voters? (not known until after the Opening Ceremony)
   - How exactly will the voting be done?
   - How to interpret the result of the votes (as outlined in iau0603).
   - A statement on “Why Pluto was demoted?”
   - The exact results of the vote counts. (The counts were not made in most cases)
   - Uncertainty regarding the media registration procedure (as ICARIS did not manage to answer people and several times lost media registrations).
   - To get specific technical details for camera crews.

4.1.4 Press briefings
- Almost all the press briefings were worthwhile and fairly well attended.
- All press briefings need to be rehearsed as well as possible well in advance.
- Written guidelines need to be handed out before the conference.

4.1.5 IAU Branding
- The IAU brand was very invisible on most of the GA2006 material (print, web, conference venue – conference rooms, signs). An agreement on using the official IAU logo and other branding on all material should be built into the contract with the NOC.
- Large “flags” with IAU branding should be present in the most important rooms. (Press Conference Room, Press Room, Press Interview Room).
- The IAU logo should also be present on the sponsor boards that are placed in all rooms.

4.1.6 Web
- As the iau.org website was down due to a power outage we had to make a mirror site. This arrangement naturally caused some confusion.
- The Press Officer needs live access to iau.org updating during the GA.
- The IAU webmaster should not go on vacation during the GA.
- There were some interesting problems relating to strictly “press-only information” in press releases that were also later are publicly available on the web (EC/DPC emails, phone numbers, press web cast URLs etc.)
- The press webcast during the Closing Ceremony was a great help in the Press Room as the enormous pressure made it necessary to have two people at the Press Room at all times.

4.1.7 Technical
- The high bandwidth internet connection at the Congress Center was mission critical for the Press Room work and worked flawlessly. Technical note: Due to the lack of a proper local filer where the various files could be stored, our usual filer at ESO in Munich was used. Access was via VPN tunnels from pre-selected pre-installed files. A stable wire (not WLAN) high bandwidth Internet connection is needed for this.
• As a result the main computers had IP addresses from outside the Congress Center (ESO IP addresses) and could therefore not access the Press Room printer. A solution for how to share common files and access a printer on the local network needs to be thought out in advance for future cases. Perhaps a web-based WIKI would be the right thing, but this has to be investigated so as to be able to import/export word files with simple formatting (incl. tables such as phone lists).
• A technical person is a necessity on the Press Room staff to take care of audio-visual equipment (computer set-up, internet set-up etc).
• Some menus of printers and copy machines were not in English. Even the slightest problem took local service staff to resolve (which they did reasonably quickly).
• Conference technical support staff must be able to speak English. This was not always the case in Prague.
• Laser printers (fast) were important. One colour and one B&W were enough.
• An ISDN line (not necessarily including the expensive special ISDN phone) should be ordered in advance and its existence and phone number should be announced to radio journalists who want to bring their own ISDN phone and file with that. This line should be placed in the Press Interview Room.
• An outgoing international call phone line with a known number needs to be in place at least 4 weeks prior to the GA. The expenses for this need to be built into the NOC budget.
• We had 10 (loan) cell phones with Czech prepaid phone cards (20 Euro). Five were taken by the Press Room staff and five given to prominent scientists (mostly DPC). We could have used five more phones, but managed.
• As soon as a scientist is deemed “interesting” (to the press) a local prepaid phone number should be allocated to him, and put in all the external communication.
• A fax machine would have been a plus, but we managed without.
• The Internet connection in the Press Room should be preserved right through the meeting. It was switched off in Prague at 14:00 on Friday 25th August leaving us only with WLAN which did not work for the real Press Room work.

4.1.8 Miscellaneous

• It was difficult to get in contact with individuals during the conference. Pigeonholes are slow and old-fashioned, but are still the best way to reach individuals. Single point remedies like local pre-paid card cell phones work, but only for those people who have been identified in advance and have received a cell phone.
• Guidelines for scientists have to be updated: How to write a draft of a press release, How to participate in a press conference. It would be good to send these guidelines out before the General Assembly.
• Guidelines in the Terms of Reference for future IAU committees on how to interact with the press would be useful.
• The IAU Press Officer should try to limit his/her other commitments such as business meetings (at this GA it was WGCAP business meeting and talks, IYA meetings and talks etc.)
• Getting access to international press clippings is extremely difficult and time consuming even with access to Google News. Physical copies of international newspapers need to be purchased the day after, and in Prague this was not practically possible. At this GA one fulltime person was needed to survey Google News and make printouts for the press clippings walls.
• The press wanted much more interaction with the EC (for interviews etc.), but this was naturally very difficult as the EC schedule had very little “space” built in. Perhaps it would be possible to consider this in the future.
• Conversations in the pressroom are public, and both talent (e.g., the planet definition team, or people rehearsing their press conferences) and pressroom staff need to be mindful of that.

• Our interactions with the GA newspaper were sparse, and this might be helped in future by having one person on the LOC at least nominally in charge of interacting with both. A lot of potential stories spring out of the work in the Press Room.

• The following information on the GA participants would have made our lives easier if we had had access to it:
  o The list of IAU National Representatives (IAU website down).
  o Where (which hotels) the participants were staying (those booked through the GA organisers).
  o The arrival and departure dates of the participants (from GA organisers).
  o The science sessions that participants had expressed interest in when they registered (from GA organisers).

• Binzel’s Play Doh models were appealing.

• The Pluto toy doll we brought from Munich was a nice comic relief in the Press Room and also happened to be used in the Closing Ceremony by Jocelyn Bell-Burnell.

• The press dinner was enjoyable. It is necessary to emphasise that “no host” means “you have to pay” (3 locals left without paying).
The Pluto toy doll brought from Munich provided a nice comic relief during intense voting process.
5 Conclusions

Any event that is as loaded with cultural, scientific issues as the “planet definition” is bound to create a strong response from the community and the public. This response would have occurred no matter what the final outcome of the Resolution vote would have been.

There were indeed negative effects of the “Pluto affair”. Scientists were portrayed in a less than dignified way and the discussions in the community was often portrayed as less factual and more like bickering.

The positive effects however outweigh the negative by far. A large fraction of the demographic segment of people inattentive to science was during and after the GA exposed to science! When asked “on the street” laypeople now even offer their own opinion on the “Pluto issue”, which is very rarely seen. It is the first time in many years to my knowledge that any scientific topic has penetrated so deeply into the public conscience! The enormous public interest in the planet definition story is perhaps best illustrated by the large number of cartoon jokes/caricatures appearing in the media. One of the main results for the IAU is that the public today has a much better knowledge of the Union and its mission as the authority on fundamental astronomical issues.

The discussions between the fractions respectively supporting and opposing the final votes will continue for a while longer. In terms of public communication it is vital that the current great awareness of the Solar System is used to promote scientific issues. The main thing to avoid are sentiments of the sort “If Pluto does not remain a planet I’m gonna hold my breath until I turn blue”. There is a large potential in this “affair” to teach about the Solar System that is still in formation, about debris, about asteroids, about dwarf planets, KPOs, TNOs, planets and more. This is a great opportunity to teach that science is not static, and that when new discoveries are made, science must change!

In the longer term the increased awareness of the IAU due to the “Pluto Affair” can be used to further the interest in the International Year of Astronomy 2009. This situation can also further IAU’s efforts to create a global forum for astronomy communicators that will enable global standards for outreach metadata to interconnect outreach databases, and ultimately perhaps help create a “Google Universe”-type application that will help visualise the treasures hidden in astronomical databases all over the world. This project is far too big for any nation to take on by its own and must be a global undertaking. The IAU is now perfectly placed to lead and coordinate this work.
References

Appendix A: IAU press office 2006-2009 budget proposals

Below follow budget estimates for the IAU press office in 2006 and 2007. Note that:

a) The costs for GA 2006 have already been incurred.
b) The costs listed do not include labour, website hosting, production of printed material, press officer travel costs for GA 2006, loan equipment, overheads etc. These can be seen as sponsorship by the European Space Agency (ESA/ST-ECF) and the European Southern Observatory (ESO).

### Budget proposal for IAU press office 2006

<table>
<thead>
<tr>
<th>GA 2006 pressroom on-site costs</th>
<th>280 EUR</th>
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</thead>
<tbody>
<tr>
<td>Cellphones</td>
<td>280 EUR</td>
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<tr>
<td>Transport on site</td>
<td>60 EUR</td>
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<tr>
<td>Representation (food)</td>
<td>160 EUR</td>
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<tr>
<td>Misc.</td>
<td>100 EUR</td>
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<td><strong>Sub Total</strong></td>
<td><strong>600 EUR</strong></td>
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<table>
<thead>
<tr>
<th>GA 2006 pressroom staff travel</th>
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<tbody>
<tr>
<td>Travel Expenses (3 persons)</td>
<td>500 EUR</td>
</tr>
<tr>
<td>Hotel (3 persons)</td>
<td>2.400 EUR</td>
</tr>
<tr>
<td>Per diem (3 persons)</td>
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<td><strong>Sub Total</strong></td>
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### Running expenses 2006

<table>
<thead>
<tr>
<th>Press release distribution</th>
<th>2.000 EUR</th>
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</thead>
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<tr>
<td>Misc. other expenses</td>
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<td><strong>Total</strong></td>
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### Budget estimate for the IAU press office 2007-2009

<table>
<thead>
<tr>
<th>Running expenses 2007</th>
<th>3.000 EUR</th>
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<tr>
<td>Travel expenses press officer</td>
<td>3.000 EUR</td>
</tr>
<tr>
<td>Press release distribution</td>
<td>2.000 EUR</td>
</tr>
<tr>
<td>Web maintenance</td>
<td>13.500 EUR</td>
</tr>
<tr>
<td>Web, technical</td>
<td>4.500 EUR</td>
</tr>
<tr>
<td>Misc. other expenses</td>
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<tr>
<td><strong>Total</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Running expenses 2008</th>
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<tbody>
<tr>
<td>Travel expenses press officer</td>
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<tr>
<td>Press release distribution</td>
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<tr>
<td>Web maintenance</td>
<td>13.500 EUR</td>
</tr>
<tr>
<td>Web, technical</td>
<td>4.500 EUR</td>
</tr>
<tr>
<td>Misc. other expenses</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>24.000 EUR</strong></td>
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</table>

<table>
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<tr>
<th>Running expenses 2009</th>
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<tr>
<td>GA 2009 pressroom + staff</td>
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<tr>
<td>Description</td>
<td>Amount</td>
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<tr>
<td>----------------------------------</td>
<td>----------</td>
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<tr>
<td>Travel expenses press officer</td>
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<tr>
<td>Press release distribution</td>
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<td>Web maintenance</td>
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<tr>
<td>Web, technical</td>
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<td>Misc. other expenses</td>
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<td><strong>Total</strong></td>
<td><strong>33.500 EUR</strong></td>
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Appendix B: Press Room equipment

Packing list: From ESO/Munich

Office equipment:
- Laserprinter paper
- In-trays
- A4 folders
- Pens, paper, etc.
- Desk lamps
- Stapler + staples
- Punch holing machine
- Label printer
- Label printer tape
- Batteries (8 AA for the label printer)
- Tape
- Gaffa tape, 3 roles
- 10 notepads
- 5 blue in-trays
- Scissors
- 20 Press clippings folders
- Money box with key

Technical equipment:
- Computer beamer
- DVD player, cables
- Lars Laptop
- 3 loan laptops – 2 is OK – need 1
- Power cables
- Loudspeakers
- B/ W printer
- Small screen for projection
- 4 Laptop locks
- USB Sticks
- 10 Mobile phones
- Printer toner
- 3 Mice, keyboards
- Ethernet cables
- 3 TFT Monitors
- 2 extra Ethernet hubs for contingency

Catering stuff:
- Coffee-machine
- Coffee
- Cups
- Sugar
- Sticks to mix the coffee
• Water
• Kitchen roll

Informative literature and give-away articles:
• Euro-VO brochures
• DVDs with animation, PP viewable
• HST postcards, posters etc.
• HST books
• HST brochures
• Advertising Scicomm book, order form
• Hubble DVDs
• 1 Scicomm book printouts

Work material:
• ESA/Hubble releases — 2
• Agenda printouts + background docs (ie. IYA report etc.)

Others:
• Business cards
• Photo flash (Hennes) NIKON D90
• Money – VISA card

Interview room
• Posters for backdrops — e.g. IAU logo, astronomical images
• water, glasses, flowers

Press Room set up
• printer — colour
• printer — B/W
• paper and toner for both
• ideally printers should be networked so that all machines can reach either printer
• Ethernet connections: 2 x 6 plus 4 plus 1 = 17
• 22 Power outlets: Need at least one for each computer, plus one for each printer and copier
• photocopier (with English translation, ideally!)
• wireless connection + connection instructions
• mobiles for staff — five
• chargers for phones
• local SIM cards for phones
• 2-m tables with tablecloths:
  o 6 for one side of the room (journalist use)
  o 6 for other side
  o 1 for printer + monitor
  o 2 for staff use
  o 2 for water, food, coffee
  o if space permits, would have been good to have had another table or equivalent shelf space for distributing releases
• chairs: 19 or 20. Need chairs for people who have dropped in to discuss issues or wait by the phone for an interview, etc.
• whiteboard + markers and cleaner
• a fax machine would have been useful — some people asked for faxes to be sent
• easel for displaying posters / sponsorship information
• stack of document trays
• security cables for laptops
• petty cash tin
• folders for archive of press clippings
• [for display elsewhere in the building] — 4 boards for displaying press clippings
• cupboards — 2 lockable, for office supplies
• [see also packing list for consumables + other small items]
• 2 phones — international dial out must be possible
Appendix C: IAU Press releases issued during the GA

1. IAU0601: The IAU draft definition of “planet” and “plutons"
2. IAU0602: IAU 2006 General Assembly: Result of the IAU Resolution votes
3. IAU0603: IAU 2006 General Assembly: Result of the IAU Resolution votes
4. IAU0604: The International Astronomical Union elects Catherine Cesarsky as new President

********** IAU0601: EMBARGOED UNTIL 16 August 2006, 8:00 CEST **********

The IAU draft definition of “planet” and “plutons”

16-August-2006, Prague The world’s astronomers, under the auspices of the International Astronomical Union (IAU), have concluded two years of work defining the difference between “planets” and the smaller “solar system bodies” such as comets and asteroids. If the definition is approved by the astronomers gathered 14-25 August 2006 at the IAU General Assembly in Prague, our Solar System will include 12 planets, with more to come: eight classical planets that dominate the system, three planets in a new and growing category of “plutons” – Pluto-like objects – and Ceres. Pluto remains a planet and is the prototype for the new category of “plutons.”

With the advent of powerful new telescopes on the ground and in space, planetary astronomy has gone through an exciting development over the past decade. For thousands of years very little was known about the planets other than they were objects that moved in the sky with respect to the background of fixed stars. In fact the word “planet” comes from the Greek word for “wanderer”. But today hosts of newly discovered large objects in the outer regions of our Solar System present a challenge to our historically based definition of a “planet”.

At first glance one should think that it is easy to define what a planet is – a large and round body. On second thought difficulties arise, as one could ask “where is the lower limit?” – how large, and how round should an asteroid be before it becomes a planet – as well as “where is the upper limit?” – how large can a planet be before it becomes a brown dwarf or a star?

IAU President Ron Ekers explains the rational behind a planet definition: “Modern science provides much more knowledge than the simple fact that objects orbiting the Sun appear to move with respect to the background of fixed stars. For example, recent new discoveries have been made of objects in the outer regions of our Solar System that have sizes comparable to and larger than Pluto. These discoveries have rightfully called into question whether or not they should be considered as new ‘planets.’ ”

The International Astronomical Union has been the arbiter of planetary and satellite nomenclature since its inception in 1919. The world’s astronomers, under the auspices of the IAU, have had official deliberations on a new definition for the word “planet”
for nearly two years. IAU’s top, the so-called Executive Committee, led by Ekers, formed a Planet Definition Committee (DPC) comprised by seven persons who were astronomers, writers, and historians with broad international representation. This group of seven convened in Paris in late June and early July 2006. They culminated the two year process by reaching a unanimous consensus for a proposed new definition of the word “planet.”

Owen Gingerich, the Chair of the Planet Definition Committee says: “In July we had vigorous discussions of both the scientific and the cultural/historical issues, and on the second morning several members admitted that they had not slept well, worrying that we would not be able to reach a consensus. But by the end of a long day, the miracle had happened: we had reached a unanimous agreement.”

The part of “IAU Resolution 5 for GA-XXVI” that describes the planet definition, states “A planet is a celestial body that (a) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and (b) is in orbit around a star, and is neither a star nor a satellite of a planet.” Member of the Planet Definition Committee, Richard Binzel says: “Our goal was to find a scientific basis for a new definition of planet and we chose gravity as the determining factor. Nature decides whether or not an object is a planet.”

According to the new draft definition, two conditions must be satisfied for an object to be called a “planet.” First, the object must be in orbit around a star, while not being itself a star. Second, the object must be large enough (or more technically correct, massive enough) for its own gravity to pull it into a nearly spherical shape. The shape of objects with mass above $5 \times 10^{20}$ kg and diameter greater than 800 km would normally be determined by self-gravity, but all borderline cases would have to be established by observation.

If the proposed Resolution is passed, the 12 planets in our Solar System will be Mercury, Venus, Earth, Mars, Ceres, Jupiter, Saturn, Uranus, Neptune, Pluto, Charon and 2003 UB313. The name 2003 UB313 is provisional, as a “real” name has not yet been assigned to this object. A decision and announcement of a new name are likely not to be made during the IAU General Assembly in Prague, but at a later time. The naming procedures depend on the outcome of the Resolution vote. There will most likely be more planets announced by the IAU in the future. Currently a dozen “candidate planets” are listed on IAU’s “watchlist” which keeps changing as new objects are found and the physics of the existing candidates becomes better known.

The IAU draft Resolution also defines a new category of planet for official use: "pluton". Plutons are distinguished from classical planets in that they reside in orbits around the Sun that take longer than 200 years to complete (i.e. they orbit beyond Neptune). Plutons typically have orbits that are highly tilted with respect to the classical planets (technically referred to as a large orbital inclination). Plutons also typically have orbits that are far from being perfectly circular (technically referred to as having a large orbital eccentricity). All of these distinguishing characteristics for plutons are scientifically interesting in that they suggest a different origin from the classical planets.
The draft “Planet Definition” Resolution will be discussed and refined during the General Assembly and then it (plus four other Resolutions) will be presented for voting at the 2nd session of the GA 24 August between 14:00 and 17:30 CEST.

Notes for editors
More detailed information about the implications of the draft Resolution can be found in the other documents accompanying this press release (at http://www.iau2006.org/):

- “Questions and Answers about the Planet Definition”
- Composition of the Planet Definition Committee and bios
- Miscellaneous high-res graphics illustrating the 12 planets and current planet candidates are also available.
- Three articles for the General Assembly newspaper written by Ron Ekers, Owen Gingerich and Roberts Williams

The IAU is the international astronomical organisation that brings together distinguished astronomers from all nations of the world. IAU’s mission is to promote and safeguard the science of astronomy in all its aspects through international cooperation. Founded in 1919, the IAU is the world’s largest professional body for astronomers. The IAU General Assembly is held every three years and is one of the largest and most diverse meetings in the astronomical community’s calendar.

Science contacts (the persons below can all be reached via the IAU GA Press Office, see bottom)
Owen Gingerich
IAU Planet Definition Committee Chair
Tel: via the Press Room +420-261-177-075

Iwan Williams
President, IAU Division III Planetary Systems Sciences
Tel: via the Press Room +420-261-177-075

Ron Ekers
IAU President
Tel: via the Press Room +420-261-177-075

Catherine Cesarsky
IAU President-Elect and member of the Planet Definition Committee
Tel: via the Press Room +420-261-177-075

Richard Binzel
Member of the Planet Definition Committee
Tel: via the Press Room +420-261-177-075

Dava Sobel
Author and historian, member of the Planet Definition Committee
via the IAU Press Office
Tel: via the Press Room +420-261-177-075
Mike Brown
Discoverer of 2003 UB₃₁₃ and a host of other planet candidates
Via Caltech Media Relations
Tel: +1-626-395-3226
E-mail: mbrown@caltech.edu

PIO contact
Lars Lindberg Christensen
IAU Press Officer
IAU GA 2006 Press office, Meeting Room 3.2
Prague Congress Center
Tel: +420-261-177-075
Cellular: +49-173-3872-621
E-mail: lars@eso.org

Links
Additional material in this release package may be found in:
http://www.iau2006.org/
  • Draft Resolution
  • Question and Answer sheet
  • General Assembly Newspaper articles
  • Committee composition

The IAU Web page: http://www.iau.org

IAU News during the 2006 General Assembly: http://www.iau2006.org

IAU General Assembly: http://www.astronomy2006.com


Images of the Pluto system:

Image of 2003 UB₃₁₃:

Image of Ceres:
The world’s astronomers, under the auspices of the International Astronomical Union (IAU), have concluded two years of work defining the lower end of the planet scale – what defines the difference between “planets” and “solar system bodies”. If the definition is approved by the astronomers gathered 14-25 August 2006 at the IAU General Assembly in Prague, our Solar System will consist of 12 planets: Mercury, Venus, Earth, Mars, Ceres, Jupiter, Saturn, Uranus, Neptune, Pluto, Charon and 2003 UB₃₁₃. The three new proposed planets are Ceres, Charon (Pluto’s companion) and 2003 UB₃₁₃. There is no change in the planetary status of Pluto.

In this artist’s impression the planets are drawn to scale, but without correct relative distances.

Credit: The International Astronomical Union/Martin Kornmesser
The world’s astronomers, under the auspices of the International Astronomical Union (IAU), have concluded two years of work defining the lower end of the planet scale – what defines the difference between “planets” and “solar system bodies”. If the definition is approved by the astronomers gathered 14-25 August 2006 at the IAU General Assembly in Prague, three of the bodies in the Solar System will be assigned new status as planets: Ceres, Charon (Pluto’s companion) and 2003 UB₃₁₃. There is no change in the planetary status of Pluto.

In this artist’s impression the planets are drawn to scale, but without correct relative distances.

Credit: The International Astronomical Union/Martin Kornmesser
The world’s astronomers, under the auspices of the International Astronomical Union (IAU), have concluded two years of work defining the lower end of the planet scale – what defines the difference between “planets” and “solar system bodies”. If the definition is approved by the astronomers gathered 14-25 August 2006 at the IAU General Assembly in Prague, our Solar System will consist of 12 planets: Mercury, Venus, Earth, Mars, Ceres, Jupiter, Saturn, Uranus, Neptune, Pluto, Charon and 2003 UB313.

There will most likely be more planets announced by the IAU in the future. Currently a dozen “candidate planets” are listed on IAU’s “watchlist” which keeps changing as new objects are found and the physics of the existing candidates becomes better known. A number of these planet candidates are shown here.

In this artist’s impression the planet candidates are drawn to scale, but without correct relative distances.

Credit: The International Astronomical Union/Martin Kornmesser
iau0601d: The new Solar System? [unannotated]

Credit: The International Astronomical Union/Martin Kornmesser

As iau0601a but without annotations.

iau0601e: Three new planets? [artist’s impression]

Credit: The International Astronomical Union/Martin Kornmesser

As iau0601b but without annotations.
iau0601f: Planet candidates in the Solar System [artist’s impression]

As iau0601c but without annotations.
Credit: The International Astronomical Union/Martin Kornmesser
Members of the Planet Definition Committee

From Upper Left:

Dr. Andre Brahic is Professor at Universite Denis Diderot (Paris VII) and is Director of the Laboratory Gamma-gravitation of the Commissariat a l’Energie Atomique. He specializes in planetary rings, and has co-discovered the rings and arcs of Neptune. For the French-speaking public, Andre Brahic is one of the best known popularisers of science and astronomy, having authored a number of books.

Dr. Iwan Williams, Queen Mary University of London, is an expert on the dynamics and physical properties of Solar System objects. He is the current President of IAU Division III (Planetary Systems Sciences).

Dr. Junichi Watanabe is an Associate Professor and also Director of the Outreach Division of NAOJ. He is a solar system astronomer and highly appreciated in Japan as interpreter and writer of astronomy for the public and students. He has strong connections with amateur astronomers, science editors, school teachers and journalists.

Dr. Richard Binzel is Professor of Earth, Atmospheric and Planetary Science at MIT and a specialist in asteroids and outer solar system small bodies, and is also a well known and respected educator and science writer.

Dr. Catherine Cesarsky, Director General of ESO and President-Elect of the IAU, took part in the work of the committee, bringing in the perspective of the IAU Executive as well as that of an astronomer at large.

Dava Sobel is the author of the very successful books Longitude, The Planets, and Galileo’s Daughter. She has a solid background in, and knowledge of, the history of science, astronomy in particular.

Dr. Owen Gingerich, Professor of Astronomy and History of Science Emeritus at the Harvard-Smithsonian Center for Astrophysics, is an esteemed historian of astronomy with a broad perspective, and a prize-winning educator.

Credit: The International Astronomical Union
“Planet Definition” Questions & Answers Sheet

The following Question and Answer sheet may help to interpret the “IAU Resolution 5 for GA-XXVI” provided this is passed during the 2nd Session of the 2006 IAU General Assembly.

Q: What is the origin of the word “planet”?
A: The word “planet” comes from the Greek word for “wanderer”, meaning that planets were originally defined as objects that moved in the sky with respect to the background of fixed stars.

Q: Why is there a need for a new definition for the word “planet”?
A: Modern science provides much more knowledge than the simple fact that objects orbiting the Sun appear to move with respect to the background of fixed stars. For example, recent new discoveries have been made of objects in the outer regions of our Solar System that have sizes comparable to and larger than Pluto. (Noting that historically Pluto has been recognized as “the ninth planet.”) Thus these discoveries have rightfully called into question whether or not they should be considered as new “planets.”

Q: How did astronomers reach a consensus for a new definition of “planet”? 
A: The world’s astronomers, under the auspices of the International Astronomical Union, have had official deliberations on a new definition for the word “planet” for nearly two years. The results of these deliberations were channelled to a Planet Definition Committee comprising seven persons who were astronomers, writers, and historians with broad international representation. This group of seven convened in Paris in late June and early July 2006. They culminated the two year process by reaching a unanimous consensus for a proposed new definition of the word “planet.”

Q: What new terms are proposed as official IAU definitions?
A: There are two new terms being proposed for use as official definitions of the IAU. The terms are: “planet” and “pluton”.

Q: What is the proposed new definition of “planet”?
A: The new definition of “planet” recognizes and utilizes the capabilities of modern science. The new definition is based on the principle that we no longer need to rely on the simple definition from past millennia that an object is a “planet” if it moves against the background of fixed stars. Instead we can utilize our modern ability to measure the physical properties of an object to determine its true nature. An object is thus defined as a planet based on its intrinsic physical nature. Two conditions must be satisfied for an object to be called a “planet.” First, the object must be in orbit around a star, while not being itself a star. Second, the object must be large enough (or more technically correct, massive enough) for its own gravity to pull it into a nearly spherical shape. The shape of objects with mass above 5 x 10²⁰ kg and diameter greater than 800 km would normally be determined by self-gravity, but all borderline cases would have to be established by observation.

Q: What is the exact wording of the official IAU proposed definition of “planet” in “Resolution 5 for GA-XXVI”?
A:
A planet is a celestial body that (a) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and (b) is in orbit around a star, and is neither a star nor a satellite of a planet.

Q: Does an object have to be in orbit around a star in order to be called a “planet”?
A: Yes.

Q: Does a body have to be perfectly spherical to be called a “planet”?
A: No. For example, the rotation of a body can slightly distort the shape so that it is not perfectly spherical. Earth, for example, has a slightly greater diameter measured at the equator than measured from pole to pole.

Q: Based on this new definition, how many planets are there in our Solar System?
A: There are currently 12. Eight are the classical planets Mercury through Neptune. Three are in a newly defined (and growing in number) category called “plutons”, for which Pluto is the prototype. One is Ceres, which may be described as a dwarf planet.

Q: What are the 12 planets?

Q: How are these 12 planets categorized?
A: There are eight “classical planets”: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Ceres is a planet, but because it is smaller than Mercury, one may describe it as a “dwarf planet”. A new category of planet is now defined: “plutons”. Pluto, Charon, and 2003 UB₃₁₃ fall into the growing category of planets called “plutons”.

Q: What are the classical planets?
A: The classical planets are those recognized by sky watchers and astronomers starting from the beginning of human history until the year 1900 A.D. The classical planets are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune. Note that the term “classical planet” is only a historical reference and not an IAU definition.

Q: What is a dwarf planet?
A: A dwarf planet is a term generally used to describe any planet that is smaller than Mercury. Note that the term “dwarf planet” is simply a descriptive category and not an IAU definition. Terms such as “terrestrial planets” and “giant planets” are additional examples of descriptive categories that are not IAU definitions.

Q: What is a “pluton”?
A: A pluton is a new category of planet now being defined by the IAU. A “pluton” is an object satisfying the technical (hydrostatic equilibrium shape in the presence of self-gravity) definition of “planet.” Plutons are distinguished from classical planets in that they reside in orbits around the Sun that take longer than 200 years to complete (i.e. they orbit beyond Neptune). Plutons typically have orbits that are highly tilted with respect to the classical planets (technically referred to as a large orbital inclination). Plutons also typically have orbits that are far from being perfectly circular (technically referred to as having a large orbital eccentricity). All of these distinguishing characteristics for plutons are scientifically interesting in that they suggest a different origin from the classical planets.
Q: Where does the name “pluton” come from?
A: The name “pluton” comes from Pluto itself. Pluto is the first object discovered that is a large spherical body, and therefore a planet, orbiting beyond Neptune.

Q: Is a “pluton” a planet?
A: Yes.

Q: Is Pluto a “pluton”?
A: Yes.

Q: Is Pluto a planet?
A: Yes. In fact, Pluto’s large companion named Charon is also large enough and massive enough to satisfy the definition of “planet”. Because Pluto and Charon are gravitationally bound together, they are actually now considered to be a “double planet.”

Q: Is Pluto a dwarf planet?
A: If one describes any planet smaller than Mercury as a “dwarf planet”, then Pluto could be called a dwarf planet. Note that in terms of an IAU definition, Pluto is a “pluton.” “Dwarf planet” is simply a descriptive category like “terrestrial planet” and “giant planet.” None of these descriptive categories are formally defined by the IAU.

Q: What is a “double planet”?
A: A pair of objects, which each independently satisfy the definition of “planet” are considered a “double planet” if they orbit each other around a common point in space that is technically known as the “barycentre”. In addition, the definition of “double planet” requires that this “barycentre” point must not be located within the interior of either body.

Q: What is a “satellite” of a planet?
A: For a body that is large enough (massive enough) to satisfy the definition of “planet”, an object in orbit around the planet is called a “satellite” of the planet if the point that represents their common centre of gravity (called the “barycentre”) is located inside the surface of the planet.

Q: The Earth’s moon is spherical. Is the Moon now eligible to be called a “planet”?
A: No. The Moon is a satellite of the Earth. The reason the Moon is called a “satellite” instead of a “planet” is because the common centre of gravity between the Earth and Moon (called the “barycentre”) resides below the surface of the Earth.

Q: Jupiter and Saturn, for example, have large spherical satellites in orbit around them. Are these large spherical satellites now to be called planets?
A: No. All of the large satellites of Jupiter (for example, Europa) and Saturn (for example, Titan) orbit around a common centre of gravity (called the “barycentre”) that is deep inside of their massive planet. Regardless of the large size and shapes of these orbiting bodies, the location of the barycentre inside the massive planet is what defines large orbiting bodies such as Europa, Titan, etc. to be “satellites” rather than planets.

Q: Why is Pluto-Charon a “double planet” and not a “planet with a satellite”? 
A: Both Pluto and Charon each are large enough (massive enough) to be spherical. Both bodies independently satisfy the definition of “planet”. The reason they are called a “double planet” is that their common centre of gravity is a point that is located in free space outside the surface of Pluto. Because both conditions are met: each body is “planet-like” and each body orbits around a point in free space that is not inside one of them, the system qualifies to be called a “double planet.”

Q: Pluto has at least two recently discovered additional satellites that are smaller than Charon. If these smaller satellites also orbit the “barycentre”, does this make Pluto a “quadruple planet”?
A: No. The two newly discovered smaller bodies in orbit around Pluto are too small and not massive enough for their self-gravity to force them in to a spherical shape. Therefore neither of these bodies independently satisfies the definition of “planet.” The fact that their size (mass) and shapes does not qualify them as planets implies that they must be called satellites, even though the center of gravity (called the “barycentre”) about which they orbit is located outside the surface of Pluto.

Q: Can there be triple planets or quadruple planets?
A: Yes, but none are currently known.

Q: Is Ceres a planet?
A: Yes.

Q: Didn’t Ceres used to be called an asteroid or minor planet?
A: Historically, Ceres was called a “planet” when it was first discovered (in 1801) orbiting in what is known as the asteroid belt between Mars and Jupiter. Because 19th century astronomers could not resolve the size and shape of Ceres, and because numerous other bodies were discovered in the same region, Ceres lost its planetary status. For more than a century, Ceres has been referred to as an asteroid or minor planet.

Q: Why is Ceres now being called a “planet”?
A: An object in orbit around a star is now being called a “planet” if it is large enough (or more technically, massive enough) for its own gravity to pull it into a nearly spherical shape. Recent Hubble Space Telescope images that resolve the size and shape of Ceres show it to be nearly spherical. More technically, Ceres is found to have a shape that is in a state of hydrostatic equilibrium under self-gravity. Therefore Ceres is a planet because it satisfies the IAU definition of “planet.” [Published reference for shape of Ceres: P. Thomas et al. (2005), Nature 437, 224-227. Dr. Peter Thomas is at Cornell University.]

Q: Is Ceres a dwarf planet?
A: If one describes any planet smaller than Mercury as a “dwarf planet”, then Ceres could be called a dwarf planet. Note that “dwarf planet” is simply a descriptive category like “terrestrial planet” and “giant planet.” None of these descriptive categories are formally defined by the IAU.

Q: Is Ceres a “pluton”?
A: No.

Q: What is 2003 UB₃₁₃?
A: “2003 UB₃₁₃” is a provisional name given to a large object discovered in 2003 that resides in an orbit around the Sun beyond Neptune.

Q: Is 2003 UB₃₁₃ a planet?
A: Yes.

Q: Why is 2003 UB₃₁₃ a planet?
A: Recent Hubble Space Telescope images have resolved the size of 2003 UB₃₁₃ showing it to be as large as, or larger than Pluto. Any object having this size, and any reasonable estimate of density, is understood to have sufficient mass that its own gravity will pull it into a nearly spherical shape determined by hydrostatic equilibrium. Therefore, 2003 UB₃₁₃ is a planet because it satisfies the IAU definition of “planet.” [Published reference: M. Brown et al. (2006). Astrophysical Journal 643, L61-L63. Dr. Michael Brown is at the California Institute of Technology.]

Q: Will the new planet 2003 UB₃₁₃ receive a name? When?
A: Yes. The International Astronomical Union has the official authority to assign names to objects in space. This object has been popularly called “Xena”, but this is not an official IAU name. A decision and announcement of the new name are likely not to be made during the IAU General Assembly in Prague, but at a later time.

Q: Has the IAU ever named a planet?
A: No, so far not.

Q: Is 2003 UB₃₁₃ a “pluton”?
A: Yes.

Q: Is 2003 UB₃₁₃ a dwarf planet?
A: If one describes any planet smaller than Mercury as a “dwarf planet”, then 2003 UB₃₁₃ could be called a dwarf planet. Note that “dwarf planet” is simply a descriptive category like “terrestrial planet” and “giant planet.” None of these descriptive categories are formally defined by the IAU.

Q: What is an object called that is too small to be a “planet”?
A: All objects that orbit the Sun, which are too small (not massive enough) for their own gravity to pull them into a nearly spherical shape are now collectively referred to as “small Solar System bodies.” This collection includes the category of objects we continue to call asteroids and comets. This collection also currently includes, near-Earth objects (NEOs), Mars- and Jupiter-Trojan asteroids, most Centaurs and most Trans-Neptunian Objects (TNOs). In the new system of IAU definitions, the term “minor planet” is no longer used.

Q: Is the term “minor planet” still to be used?
A: No. The term “minor planet” is no longer to be used for official IAU purposes. The term will be replaced by “small Solar System bodies.”

Q: Why is the term “minor planet” being replaced by “small Solar System bodies”?
A: Under the new definition of “planet”, nearly all objects currently called “minor planets” are not planets. For IAU purposes, a definition and name is needed that clearly distinguishes between objects that are officially recognized as planets and those that are not.
Q: For any newly discovered object, how will a decision be reached on whether or not to officially call it a “planet.”
A: The decision on whether or not an object is officially a “planet” will be made by a review committee within the IAU. The review process will be an evaluation, based on the best available data, of whether or not the physical properties of the object satisfy the definition of “planet.” It is likely that for many objects, a period of time of several years may be required in order for sufficient data to be gathered.

Q: Are there additional “planet” candidates currently being considered?
A: Yes.

Q: Does this mean there will be more than 12 planets in our Solar System?
A: Almost certainly yes.

Q: When will additional new planets likely be announced?
A: When the responsible committee has had time to work on the issues after the resolution has been voted upon. Most likely any further new planet announcements will not be made until after the General Assembly in Prague.

Q: How many more new planets are there likely to be?
A: Perhaps as many as a dozen or two new planets in the IAU category called “plutons” remain to be discovered. We estimate this number based on our understanding of the current discovery statistics. This understanding is subject to change as new data continue to be gathered.

Q: When is an object too large to be called a “planet”?
A: The new definitions proposed by the IAU seek only to define the lower boundary between an object that is a “planet” or a “small Solar System body.” At this time there is no official IAU definition in place or proposed that defines the upper limit for when an object is, for example a “planet” or a “brown dwarf.” This limit is generally thought to be about 13 times more massive than Jupiter, but is subject to discussion.

Q: Is the new definition for “planet” intended to apply also to objects discovered in orbit around other stars?
A: Yes.

Q: Are objects that have planetary sizes and masses, but which are free floating in space (and not orbit a star) officially “planets” by the IAU definition?
A: No. At this time there is no official IAU definition in place that addresses this class of objects.

Q: Is a “pluton” a dwarf planet?
A: If one describes any planet smaller than Mercury as a "dwarf planet", then any pluton smaller than Mercury could be called a dwarf planet. Note that "dwarf planet" is simply a descriptive category like "terrestrial planet" and "giant planet." None of these descriptive categories are formally defined by the IAU.
Q: What is the difference between a “pluton” and a “plutino”?
A: A “plutino” is a small body that has a similar orbit to Pluto, that is, it has the same 248 year orbital period as Pluto. Plutino is not an official IAU description. All currently known plutinos are too small to be planets. Plutinos are not plutons.

Q: Is Pluto the ninth planet?
A: Historically it was indeed the ninth planet to be discovered, but now Pluto is also known as the first pluton, with its moon Charon being the second pluton. The classical planets can be numbered by their distance from the Sun, and there is no change in their order. Plutons, on the other hand, may due to their high eccentricity change their relative distances from the Sun with time (and hence their order).

Q: In summary how will the Solar System look if the Resolution is passed?
A: If the Resolution is successfully passed, there will be 12 currently known planets in our Solar System:

Table 1: Overview of the planets in the Solar System as per 24 August 2006 if “Resolution 5 for GA-XXVI” is passed.

<table>
<thead>
<tr>
<th>Object</th>
<th>IAU definition</th>
<th>IAU planet category</th>
<th>Descriptive category</th>
<th>Unofficial mean diameter estimate³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>Planet</td>
<td>Classical</td>
<td></td>
<td>4,879 km</td>
</tr>
<tr>
<td>Venus</td>
<td>Planet</td>
<td>Classical</td>
<td></td>
<td>12,104 km</td>
</tr>
<tr>
<td>Earth</td>
<td>Planet</td>
<td>Classical</td>
<td></td>
<td>12,746 km</td>
</tr>
<tr>
<td>Mars</td>
<td>Planet</td>
<td>Classical</td>
<td></td>
<td>6,780 km</td>
</tr>
<tr>
<td>Jupiter</td>
<td>Planet</td>
<td>Classical</td>
<td></td>
<td>138,346 km</td>
</tr>
<tr>
<td>Saturn</td>
<td>Planet</td>
<td>Classical</td>
<td></td>
<td>114,632 km</td>
</tr>
<tr>
<td>Uranus</td>
<td>Planet</td>
<td>Classical</td>
<td></td>
<td>50,532 km</td>
</tr>
<tr>
<td>Neptune</td>
<td>Planet</td>
<td>Classical</td>
<td></td>
<td>49,105 km</td>
</tr>
<tr>
<td>Ceres</td>
<td>Planet</td>
<td>Dwarf</td>
<td></td>
<td>952 km</td>
</tr>
<tr>
<td>Pluto</td>
<td>Planet</td>
<td>Pluton</td>
<td>Dwarf</td>
<td>2306±20 km</td>
</tr>
<tr>
<td>Charon</td>
<td>Planet</td>
<td>Pluton</td>
<td>Dwarf</td>
<td>1205±2 km</td>
</tr>
<tr>
<td>2003 UB₃₁₃</td>
<td>Planet</td>
<td>Pluton</td>
<td>Dwarf</td>
<td>2400±100 km</td>
</tr>
</tbody>
</table>

Other objects that appear large enough so that their shape satisfies the definition of “planet” will be further considered on a case by case basis. Examples of these are listed below.

³ Brown, Binzel, private communication (2006)
Table 2: Planet candidates as per 24 August 2006 to be given future consideration if “Resolution 5 for GA-XXVI” is passed.

<table>
<thead>
<tr>
<th>Object</th>
<th>Unofficial diameter estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003 EL61</td>
<td>2000×1000×1200 km$^3$</td>
</tr>
<tr>
<td>2005 FY5</td>
<td>1500±300 km$^3$</td>
</tr>
<tr>
<td>(90377) Sedna</td>
<td>1200-1800 km$^3$</td>
</tr>
<tr>
<td>(90482) Orcus</td>
<td>1000±200 km$^3$</td>
</tr>
<tr>
<td>(50000) Quaoar</td>
<td>~1000 km$^3$</td>
</tr>
<tr>
<td>(20000) Varuna</td>
<td>600±150 km$^3$</td>
</tr>
<tr>
<td>(2002) TX300</td>
<td>&lt;700 km$^3$</td>
</tr>
<tr>
<td>(28978) Ixion</td>
<td>500±100 km$^3$</td>
</tr>
<tr>
<td>(55565) 2002 AW197</td>
<td>700±100 km$^3$</td>
</tr>
<tr>
<td>(4) Vesta</td>
<td>578×560×458 km$^3$</td>
</tr>
<tr>
<td>(2) Pallas</td>
<td>570×525×500 km$^3$</td>
</tr>
<tr>
<td>(10) Hygiea</td>
<td>500×400×350 km$^3$</td>
</tr>
</tbody>
</table>

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6 Based on Spitzer results
7 Based on Spitzer and Hubble results
8 Brown, Binzel, private communication (2006)
9 Mean of Spitzer and Hubble results
10 Stansberry et al. (2005), BAAS 37, 737
11 Upper limit from Spitzer results
12 Stansberry et al. (2005), BAAS 37, 737
13 Stansberry et al. (2005), BAAS 37, 737.
14 Thomas et al. (1997), Science 277, 1492.
15 Drummond and Cooke (1989), Icarus 78, 323.
16 Dunham et al. (1990), Astron J. 99, 1636.
The Final IAU Resolution on the definition of “planet” ready for voting

24-August-2006, Prague  At the second session of the 2006 International Astronomical Union (IAU) General Assembly, which will be held 14:00 Thursday 24 August, members of the IAU will vote on the Resolutions presented below. There will be separate sequential votes on Resolution 5A and Resolution 5B. Similarly, there will be separate votes on Resolutions 6A and 6B.

Following active discussion among IAU scientists at the IAU 2006 General Assembly in Prague, draft Resolution 6b (issued 16 August 2006) has been updated and amended.

IAU President Ron Ekers says: “IAU’s rules for proposing resolutions are based on an open democratic process and it is a great pleasure for the IAU Executive Committee to see the level of engagement of so many astronomers here. We want to engage as broad a part of the IAU community as possible in the decision-making process to give this Resolution the best chance to be passed.”

Below are the full texts of “IAU Resolution 5a for GA-XXVI”, “IAU Resolution 5b for GA-XXVI” and “IAU Resolution 6a for GA-XXVI” and “IAU Resolution 6b for GA-XXVI”. The voting will take place in four steps.

The voting on these Resolutions is expected to end today (Thursday 24 August 2006) between 15:30 and 16:00 CEST. This is a rough estimate.

According to the revised Statutes approved at the First Session of the General Assembly last week, scientific issues such as Resolutions are decided by majority of those IAU members present and voting at the business meeting. Thus the scientific resolutions, including those on the definition of solar system bodies, will be presented and decided by voting of the individual members. Yellow ballots will be handed out to all IAU members at the entrance. Members will vote by raising these ballots in the air; the number of raised ballots will be counted. The result of the vote should be known shortly thereafter and will be communicated in a public statement.

Notes for editors
A press conference about the Closing Ceremony of the General Assembly, including the results of the planet-definition vote, will be held at 18:00, in Meeting Room 3.3 of the Prague Congress Center. (It will NOT be possible for journalists to ring in to this conference: they must be there in person.)

The panel for the press conference will be:
• Ron Ekers (outgoing IAU President)
• Catherine Cesarsky (incoming IAU President, Member of the Planet Definition Committee)
• Jan Palous (Chair of the National Organising Committee)
This press conference will conclude around 18:30 CEST.

The IAU is the international astronomical organisation that brings together distinguished astronomers from all nations of the world. Its mission is to promote and safeguard the science of astronomy in all its aspects through international cooperation. Founded in 1919, the IAU is the world’s largest professional body for astronomers. The IAU General Assembly is held every three years and is one of the largest and most diverse meetings on the astronomical community’s calendar.

**Contacts**

Following the vote, some of the members of the planet definition committee will be available for interviews (after the final vote):

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RESOLUTIONS
Resolution 5A is the principal definition for the IAU usage of “planet” and related terms. Resolution 5B adds the word “classical” to the collective name of the eight planets Mercury through Neptune.

Resolution 6A creates for IAU usage a new class of objects, for which Pluto is the prototype. Resolution 6B introduces the name “plutonian objects” for this class. The Merriam-Webster dictionary defines “plutonian” as:

Main Entry: plu•to•ni•an
Pronunciation: plü-'tO-nE-&n
Function: adjective
Usage: often capitalized
: of, relating to, or characteristic of Pluto or the lower world

After having received inputs from many sides — especially the geological community — the term “Pluton” is no longer being considered.

IAU Resolution: Definition of a Planet in the Solar System
Contemporary observations are changing our understanding of planetary systems, and it is important that our nomenclature for objects reflect our current understanding. This applies, in particular, to the designation ‘planets’. The word ‘planet’ originally described ‘wanderers’ that were known only as moving lights in the sky. Recent discoveries lead us to create a new definition, which we can make using currently available scientific information.

RESOLUTION 5A
The IAU therefore resolves that planets and other bodies in our Solar System be defined into three distinct categories in the following way:
(1) A planet\textsuperscript{18} is a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and (c) has cleared the neighbourhood around its orbit.

(2) A dwarf planet is a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape\textsuperscript{19}, (c) has not cleared the neighbourhood around its orbit, and (d) is not a satellite.

(3) All other objects\textsuperscript{20} orbiting the Sun shall be referred to collectively as “Small Solar System Bodies”.

**RESOLUTION 5B**

Insert the word “classical” before the word “planet” in Resolution 5A, Section (1), and footnote 1. Thus reading:

(1) A classical planet\textsuperscript{21} is a celestial body . . .

and

**IAU Resolution: Pluto**

**RESOLUTION 6A**

The IAU further resolves:

Pluto is a dwarf planet by the above definition and is recognized as the prototype of a new category of trans-Neptunian objects.

**RESOLUTION 6B**

The following sentence is added to Resolution 6A:

This category is to be called “plutonian objects.”

\textsuperscript{18} The eight planets are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.
\textsuperscript{19} An IAU process will be established to assign borderline objects into either dwarf planet and other categories.
\textsuperscript{20} These currently include most of the Solar System asteroids, most Trans-Neptunian Objects (TNOs), comets, and other small bodies.
\textsuperscript{21} The eight classical planets are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.
IAU 2006 General Assembly: Result of the IAU Resolution votes

24-August-2006, Prague: The first half of the Closing Ceremony of the 2006 International Astronomical Union (IAU) General Assembly has just concluded. The results of the Resolution votes are outlined here.

It is official: The 26th General Assembly for the International Astronomical Union was an astounding success! More than 2500 astronomers participated in six Symposia, 17 Joint Discussions, seven Special Sessions and four Special Sessions. New science results were vigorously discussed, new international collaborations were initiated, plans for future facilities put forward and much more.

In addition to all the exciting astronomy discussed at the General Assembly, six IAU Resolutions were also passed at the Closing Ceremony of the General Assembly:

1. Resolution 1 for GA-XXVI: “Precession Theory and Definition of the Ecliptic”
2. Resolution 2 for GA-XXVI: “Supplement to the IAU 2000 Resolutions on reference systems”
3. Resolution 3 for GA-XXVI: “Re-definition of Barycentric Dynamical Time, TDB”
5. Resolution 5A: “Definition of ‘planet’ ”
6. Resolution 6A: “Definition of Pluto-class objects”

The IAU members gathered at the 2006 General Assembly agreed that a “planet” is defined as a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and (c) has cleared the neighbourhood around its orbit.

This means that the Solar System consists of eight “planets” Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. A new distinct class of objects called “dwarf planets” was also decided. It was agreed that “planets” and “dwarf planets” are two distinct classes of objects. The first members of the “dwarf planet” category are Ceres, Pluto and 2003 UB313 (temporary name). More “dwarf planets” are expected to be announced by the IAU in the coming months and years. Currently a dozen candidate “dwarf planets” are listed on IAU’s “dwarf planet” watchlist, which keeps changing as new objects are found and the physics of the existing candidates becomes better known.

The “dwarf planet” Pluto is recognised as an important proto-type of a new class of trans-Neptunian objects. The IAU will set up a process to name these objects.

Results:
Resolution 5A: "Definition of Planet" was not counted but was passed with a great majority.
Resolution 5B: "Definition of Classical Planet" had 91 votes in favour, but many more against so there was no count.
Resolution 6A: "Definition of Pluto-class objects" was passed with 237 votes in favour, 157 against and 17 abstentions.
Resolution 6B: "Definition of Plutonian Objects" had 183 votes in favour and 186 votes against.

Below are the planet definition Resolutions that were passed.

Notes for editors
A press conference about the Closing Ceremony of the General Assembly, including the results of the planet-definition vote, will be held at 18:00, in Meeting Room 3.3 of the Prague Congress Center. (It will NOT be possible for journalists to ring in to this conference: they must be there in person.)

The panel for the press conference will be:
- Ron Ekers (outgoing IAU President)
- Catherine Cesarsky (incoming IAU President, Member of the Planet Definition Committee)
- Jan Palous (Chair of the National Organising Committee)
- Richard Binzel (Member of the Planet Definition Committee)
- Karel van der Hucht (incoming Secretary General)

This press conference will conclude around 18:30 CEST.

The IAU is the international astronomical organisation that brings together distinguished astronomers from all nations of the world. Its mission is to promote and safeguard the science of astronomy in all its aspects through international cooperation. Founded in 1919, the IAU is the world’s largest professional body for astronomers. The IAU General Assembly is held every three years and is one of the largest and most diverse meetings on the astronomical community’s calendar.

Contacts
Following the vote, some of the members of the planet definition committee will be available for interviews (after the final vote):

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Links
- Programme for the Closing Ceremony:  
- Live public webcast of the Closing Ceremony:  
  http://astronomy2006.com/tv/
- Live press webcast of the Closing Ceremony (press only, please do not distribute):  
- The IAU Web page:  
  http://www.iau.org
- IAU News during the 2006 General Assembly:  
  http://www.iau2006.org
- IAU General Assembly:  
  http://www.astronomy2006.com
- Free registration for the media:  

RESOLUTIONS
Resolution 5A is the principal definition for the IAU usage of “planet” and related terms.

Resolution 6A creates for IAU usage a new class of objects, for which Pluto is the prototype. The IAU will set up a process to name these objects.

IAU Resolution: Definition of a “Planet” in the Solar System
Contemporary observations are changing our understanding of planetary systems, and it is important that our nomenclature for objects reflect our current understanding. This applies, in particular, to the designation “planets”. The word “planet” originally described “wanderers” that were known only as moving lights in the sky. Recent discoveries lead us to create a new definition, which we can make using currently available scientific information.

**RESOLUTION 5A**
The IAU therefore resolves that “planets” and other bodies in our Solar System be defined into three distinct categories in the following way:

1. A “planet”\(^{22}\) is a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and (c) has cleared the neighbourhood around its orbit.

2. A “dwarf planet” is a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape\(^{23}\), (c) has not cleared the neighbourhood around its orbit, and (d) is not a satellite.

3. All other objects\(^{24}\) except satellites orbiting the Sun shall be referred to collectively as “Small Solar-System Bodies”.

**IAU Resolution: Pluto**

**RESOLUTION 6A**
The IAU further resolves:

Pluto is a “dwarf planet” by the above definition and is recognized as the prototype of a new category of trans-Neptunian objects.

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\(^{22}\) The eight planets are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.

\(^{23}\) An IAU process will be established to assign borderline objects into either dwarf planet and other categories.

\(^{24}\) These currently include most of the Solar System asteroids, most Trans-Neptunian Objects (TNOs), comets, and other small bodies.
Images

iau0603a:

Credit: The International Astronomical Union/Martin Kornmesser

iau0603b:

Credit: The International Astronomical Union/Martin Kornmesser

iau0603c:
Credit: The International Astronomical Union/Lars Holm Nielsen

Credit: The International Astronomical Union/Lars Holm Nielsen
Questions and Answers 2

Q: What is the origin of the word “planet”?
A: The word “planet” comes from the Greek word for “wanderer”, meaning that planets were originally defined as objects that moved in the night sky with respect to the background of fixed stars.

Q: Why is there a need for a new definition for the word “planet”?
A: Modern science provides much more knowledge than the simple fact that objects orbiting the Sun appear to move with respect to the background of fixed stars. For example, recent new discoveries have been made of objects in the outer regions of our Solar System that have sizes comparable to and larger than Pluto. (Noting that historically Pluto has been recognized as “the ninth planet.”) Thus these discoveries have rightfully called into question whether or not they should be considered as new “planets.”

Q: How did astronomers reach a consensus for a new definition of “planet”? 
A: The world’s astronomers, under the auspices of the International Astronomical Union, have had official deliberations on a new definition for the word “planet” for nearly two years. The results of these deliberations were channelled to a Planet Definition Committee and ultimately proposed to the IAU General Assembly. Continued evolution of the definition allowed a final consensus and vote.

Q: What new terms are used in the official IAU definition?
A: There are three new terms adopted as official definitions by the IAU. The terms are: “planet”, “dwarf planet”, and “small solar system body.”

Q: In plain language, what is the new definition of “planet”?
A: A “planet” is an object in orbit around the Sun that is large enough (massive enough) to have its self-gravity pull itself into a round (or nearly round) shape. In addition a “planet” orbits in a clear path around the Sun – there are no other bodies in its path that it must sweep up as it goes around the Sun.

Q: What is the exact wording of the official IAU proposed definition of “planet”?
A: A “planet” is a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and (c) has cleared the neighbourhood around its orbit.

Q: Does a body have to be perfectly spherical to be called a “planet”?
A: No. For example, the rotation of a body can slightly distort the shape so that it is not perfectly spherical. Earth, for example, has a slightly greater diameter measured at the equator than measured at the poles.

Q: Based on this new definition, how many planets are there in our solar system?
A: There are eight planets in our Solar System; Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune. “My very educated mother just served us nachos.”

Q: Is that all, only eight planets?
A: No. In addition to the eight planets, there are also three known “dwarf planets”. Many more “dwarf planets” are likely to be discovered soon.

Q: What is a dwarf planet?
A: A dwarf planet is an object in orbit around the Sun that is large enough (massive enough) to have its own gravity pull itself into a round (or nearly round) shape. Generally, a dwarf planet is smaller than Mercury. A dwarf planet may also orbit in a zone that has many other objects in it. For example, an orbit within the asteroid belt is in a zone with lots of other objects.

Q: How many dwarf planets are there?
A: Currently there are three known dwarf planets. Ceres, Pluto, and 2003 UB₃₁₃.

Q: What is Ceres?
A: Ceres is (or now we can say it was) the largest asteroid, about 1000 km across, orbiting in the asteroid belt between Mars and Jupiter. Ceres now qualifies as a dwarf planet because it is now known to be large enough (massive enough) to have self-gravity pulling itself into a nearly round shape. [Published reference for shape of Ceres: P. Thomas et al. (2005), Nature 437, 224-227. Dr. Peter Thomas is at Cornell University.] Ceres orbits within the asteroid belt and is an example of a case of an object that does not orbit in a clear path. There are many other asteroids that can cross the orbital path of Ceres.

Q: Didn’t Ceres used to be called an asteroid or minor planet?
A: Historically, Ceres was called a “planet” when it was first discovered (in 1801) orbiting in what is known as the asteroid belt between Mars and Jupiter. Because 19th century astronomers could not resolve the size and shape of Ceres, and because numerous other bodies were discovered in the same region, Ceres lost its planetary status. For more than a century, Ceres has been referred to as an asteroid or minor planet.

Q: Why is Pluto now called a dwarf planet?
A: Pluto now falls into the dwarf planet category on account of its size and the fact that it resides within a zone of other objects, known as the Kuiper Belt.

Q: Is Pluto’s moon Charon a dwarf planet?
A: For now, Charon is considered just to be Pluto’s moon. The idea that Charon might qualify to be called a dwarf planet on its own, may be considered later. (Charon may receive consideration because Pluto and Charon are comparable in size and orbit each other, rather than just being a moon orbiting a planet.)

Q: Jupiter and Saturn, for example, have large spherical satellites in orbit around them. Are these large spherical satellites now to be called dwarf planets?
A: No. All of the large satellites of Jupiter (for example, Europa) and Saturn (for example, Titan) orbit around a common centre of gravity (called the “barycentre”) that is deep inside of their massive planet. Regardless of the large size and shapes of these orbiting bodies, the location of the barycentre inside the massive planet is what defines large orbiting bodies such as Europa, Titan, etc. to be “satellites” rather than planets.

Q: What is 2003 UB₃₁₃?

A: “2003 UB313” is a provisional name given to a large object discovered in 2003 that resides in an orbit around the Sun beyond Neptune.

Q: Is 2003 UB313 a planet?
A: No. It is a dwarf planet.

Q: Why is 2003 UB313 a dwarf planet?
A: Recent Hubble Space Telescope images have resolved the size of 2003 UB313 showing it to be as large as, or larger than Pluto. Any object having this size, and any reasonable estimate of density, is understood to have sufficient mass that its own gravity will pull it into a nearly spherical shape. 2003 UB313 also orbits within the Kuiper Belt – a region that has not been cleared out. Therefore, 2003 UB313 is a dwarf planet. [Published reference: M. Brown et al. (2006). Astrophysical Journal 643, L61-L63. Dr. Brown Michael Brown is at the California Institute of Technology.]

Q: Will the new dwarf planet 2003 UB313 receive a name? When?
A: Yes. The International Astronomical Union has the official authority to assign names to objects in space. This object has been popularly called “Xena”, but this is not an official name. A decision and announcement of the new name are likely to be made within a few months.

Q: What is an object called that is too small to be a planet or dwarf planet?
A: All objects that orbit the Sun, which are too small (not massive enough) for their own gravity to pull them into a nearly spherical shape are now defined as being “small solar system bodies.” This class currently includes most of the solar system asteroids, near-Earth objects (NEOs), Mars and Jupiter Trojan asteroids, most Centaurs, most Trans-Neptunian objects (TNOs), and comets.

Q: What is a “small solar system body”?
A: The term “small solar system body” is a new IAU definition to encompass all objects orbiting the Sun that are too small (not sufficiently massive) to satisfy the definition of planet or dwarf planet.

Q: Is the term “minor planet” still to be used?
A: The term “minor planet” may still be used. But generally the term “small solar system body” will be preferred.

Q: For any newly discovered object, how will a decision be reached on whether or not to officially call it a planet, dwarf planet, or other?
A: The decision on how to classify newly discovered objects will be made by a review committee within the IAU. The review process will be an evaluation, based on the best available data, of whether or not the physical properties of the object satisfy the definitions. It is likely that for many objects, a period of time of several years may be required in order for sufficient data to be gathered.

Q: Are there additional “planet” candidates currently being considered?
A: No. None appear likely in our Solar System. But there are planet discoveries galore around other stars.
Q: Are there additional “dwarf planet” candidates currently being considered?
A: Yes. Some of the largest asteroids may be candidates for “dwarf planet” status and some additional “dwarf planet” candidates beyond Neptune will soon be considered. The total number of dwarf planets to be found in the coming months and years could reach to over 100.

Q: When will additional new dwarf planets likely be announced?
A: Probably within a few months.

Q: How many more new dwarf planets are there likely to be?
A: There may be dozens or perhaps more than 100 waiting to be discovered.
The International Astronomical Union elects Catherine Cesarsky as new President

28-August-2006, Prague: The 2006 General Assembly of the International Astronomical Union (IAU), meeting in Prague (Czech Republic), has elected the ESO Director General, Dr. Catherine Cesarsky, as President for a three-year period (2006-2009). Dr. Cesarsky is the first woman to receive this high distinction. Dr. Cesarsky has three exciting years ahead of her, especially since 2009 will be the International Year of Astronomy.

The 2006 IAU General Assembly meeting in Prague contained two weeks of passionate discussions: From black holes, dark energy, Near Earth Asteroids, to the most distant galaxies, detection of extra solar planets, confusion limits in the infrared, the definition of a planet and much more. Every celestial object, every concept, every observation, every prediction got scrutinized, debated and refined by the 2500 participating astronomers. At the Closing Ceremony of the 26th General Assembly the IAU also chose the four new Officers of the Executive Committee for 2006-2009: Dr. Catherine Cesarsky, ESO Director General, as President, Dr. Robert Williams of the Space Telescope Science Institute as President-Elect, Dr. Karel A. van der Hucht of SRON, Netherlands, as General Secretary, and Dr. Ian Corbett, ESO’s Deputy Director General, as Assistant General Secretary.

Prof. Ron Ekers, the outgoing IAU President said: "The past few years have been highly productive for astronomy, with many discoveries giving new insights into our Universe which have excited scientists and general public alike. Catherine Cesarsky is internationally honoured as a scientist, and I am delighted that she has agreed to serve the IAU as President. She has already given invaluable service to the IAU and I am confident that she will provide outstanding leadership as President."

The new President said "It is a great honour and a pleasure for me to be President of the International Astronomical Union for the next three years, especially in view of the proposed International Year of Astronomy in 2009, in which the IAU will play a leading role as a catalyst and a coordinator. I am very much looking forward to working with my colleagues in the IAU to ensure that this is a great success."

The International Year of Astronomy in 2009 offers an ideal opportunity to highlight astronomy’s role in enriching all human cultures, to promote astronomy in the developing nations, to inform the public about the latest discoveries, and to emphasize the essential role of astronomy in science education. Individual countries will be undertaking their own initiatives, considering their own national needs, while the IAU will act as coordinator of 2009 International Year of Astronomy on the global scale. The IAU plans to liaise with, and involve, as many as possible of the ongoing outreach and education efforts throughout the world, including those organized by amateur astronomers.
Notes for editors

Dr. Cesarsky, ESO Director General since 1999, is known for her successful research activities in several central areas of modern astrophysics. She first worked on the theory of cosmic ray propagation and acceleration, and galactic gamma-ray emission. Later, she led the design and construction of the ISOCAM camera onboard the Infrared Space Observatory (ISO) of the European Space Agency (ESA), and the ISOCAM Central Programme that studied the infrared emission from many different galactic and extragalactic sources. This has led to new and exciting results on star formation and galactic evolution, and in the identification of the sources providing the bulk of the energy in the Cosmic Infrared Background. Dr. Cesarsky is author of more than 250 scientific papers. Dr. Cesarsky received the COSPAR (Committee on Space Research) Space Science Award in 1998 and is member of several renowned national and international Science Academies. She is married and has two children.

Dr. Cesarsky was born in France. She received a degree in Physical Sciences at the University of Buenos Aires and graduated with a PhD in Astronomy in 1971 from Harvard University (Cambridge, Mass., USA). Afterwards she worked at the California Institute of Technology. In 1974, she moved to France, becoming a staff member of the Service d’Astrophysique (SAp), Direction des Sciences de la Matière (DSM), Commissariat à l’Énergie Atomique. She then established her career in France. From 1985 to 1993, she was the Head of SAp. Later, as Director of DSM (1994—1999), she lead about 3000 scientists, engineers and technicians active within a broad spectrum of basic research programmes in physics, chemistry, astrophysics and earth sciences.

The IAU is the international astronomical organisation that brings together almost 10,000 distinguished astronomers from all nations of the world. Its mission is to promote and safeguard the science of astronomy in all its aspects through international cooperation. The IAU also serves as the internationally recognized authority for assigning designations to celestial bodies and any surface features on them. Founded in 1919, the IAU is the world’s largest professional body for astronomers. The IAU General Assembly is held every three years and is one of the largest and most diverse meetings on the astronomical community’s calendar.

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PIO and 2009 International Year of Astronomy contact

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The New IAU Executive Committee
From left to right: Dr. Karel A. van der Hucht (SRON, the Netherlands), new IAU General Secretary, Dr. Robert Williams (Space Telescope Science Institute), new President-Elect, Dr. Catherine Cesarsky (ESO), new President, and Dr. Ian Corbett (ESO), new Assistant General Secretary.

Credit: The International Astronomical Union/Ed Janssen (ESO)
Appendix D: List of other press releases distributed

1. ESO 32/06, 24.08.06: Catherine Cesarsky elected President of the International Astronomical Union and Ian Corbett elected Assistant General Secretary
2. CSIRO, 22.08.06: “Heartbeats” link magnetars, pulsars
3. Release: Demographics of globular clusters – a revolutionary new picture
4. IceCube: Fact Sheet 2006
5. CAHA, Calar Alto: AstraLux: Hubble’s Sharp Resolution from Calar Alto
6. CAHA, Calar Alto: The most luminous quasar state ever observed
7. UNAWE, 22.08.06: Launch of Universe awareness initiative
8. IceCube: IceCube Collaboration begins to analyze neutrino events
9. Release: “Universe 20% of the way through its fuel reserves”
10. ESO 31/06, 17.08.06: Far away galaxy under the microscope
11. ESA/Hubble, 17.08.06: Hubble sees faintest stars in a globular cluster
12. Peter Gruber Foundations, 15.08.06: COBE team honored
13. Gaia: Gaia Fringe Meeting
14. NASA, Spitzer, 15.08.06: NASA’s Spitzer digs up troves of possible solar systems in Orion
15. NASA, Spitzer, 14.08.06: Teens and teachers discover a cauldron of star formation
16. ESA, Hubble, 14.08.06: Large and small stars in harmonious coexistence
17. Jodcast: First podcast from an IAU General Assembly
Appendix E: Press briefings

Announcement of the Gruber prize
Tuesday 15 August 2006 12:00, Press Conference Meeting Room 3.3

The 2006 Gruber Cosmology Prize will be awarded at the opening ceremony of the International Astronomical Union's General Assembly in Prague on Tuesday 15 August 2006. The Prize carries a gold medal and a $US250,000 cash prize.

Two up and coming young cosmologists will also receive fellowships. Details are available on embargo for long-lead publications.

The Cosmology Prize opens the Gruber Prize season — with later ceremonies at Harvard Law School, American Society for Human Genetics, Annual Meeting in New Orleans, Society for Neuroscience Annual Meeting in Atlanta; and Columbia University Law School, New York City. Since 2000, the Cosmology Prize of the Peter Gruber Foundation has recognized individuals for their ground-breaking theoretical, analytical, or conceptual discoveries.

Present:
- Niall Byrne, Media Advisor
- Peter Gruber, Chairman of the Peter Gruber Foundation: Introduction
- Patricia Murphy Gruber, President of PGF
- Chair person of Cosmology Prize Advisory Board: Motivation & Announcement of the Gruber prize recipient
- 2006 Cosmology Prize Laureate: NN
- Other team members – grouped in the audience.
Evaluation
Worthwhile – Most of the COBE team was gathered. Number of journalist attending: ~20
Definition of a Planet process
Wednesday, August 16 2006 15:30, Press Conference Meeting Room 3.3

- IAU president Ron Ekers: Introduction and the IAU role for making a planet definition (5 mins)
- IAU EC “Planet Definition” Committee chair Owen Gingerich: The draft IAU Resolution and its implications (10 mins)
- Bob Williams: The IAU process during the GA (7 mins)
- Richard Binzel: Why this exact definition? — Physics of planetary bodies (5 mins)
- Q&A

Evaluation
Number of journalists attending: ~25
Excellent — Large interest including TV.

Professor Richard Binzel and the planet Play Doh models.
Near Earth Objects — risk or opportunity?
Thursday, August 17 2006 10:00, Press Conference Meeting Room 3.3

Asteroid science is the first link of a chain of actions that mankind must put up to prevent and/or mitigate the effects of a potential asteroid collision. The other links involve communities such as civil protection, politicians, disaster managers and even experts in international laws, that are these years becoming aware of the potential problem. Through the impressive new instruments and programmes planned to observe Near Earth Objects (NEOs), the next years will see an explosion in data about these objects. Data that will enable a much better coverage of the NEO population, and therefore also ultimately give us greatly improved risk assessments. The increasing amount of early, and thus inaccurate, data will initially have the Earth within the error box, and this will pose a major challenge to the IAU, the astronomical community and also the press. In order to respond timely, fact-based and with authority to the anticipated NEA detections the IAU Executive Committee has in July 2006 formed an "IAU EC Advisory Committee on Impact Threats to the Earth".

But NEOs is much more than just a risk. They also hold interesting scientific opportunities and are an essential tool to understand the overall populations of asteroids and comets and to constrain the formation of the planetary system.

During this briefing a brief status of some of the currently closest monitored, and publicly most discussed, objects will be presented. 2004 VD17 and 99942 Apophis are currently among those.

- Giovanni B. Valsecchi (6 mins): Near Earth Asteroids — risk or opportunity?
- Andrea Milani Comparetti (6 mins): Asteroid impact prediction
- David Morrison, Chair, the IAU EC Advisory Committee on “Impact Threats to the Earth” (6 mins): The expansion of NEO surveys to sub-km objects and its implications
- N. Kaiser, Principal Investigator of Pan-STARRS (6 mins): Pan-STARRS and other leaps in NEA instrumentation

Evaluation
Number of journalists attending: 15
Worthwhile + TV
Science discovery: Hubble sees faintest stars in a globular cluster
Thursday, August 17 2006 12:00, Press Conference Meeting Room 3.3

The NASA/ESA Hubble Space Telescope has uncovered what astronomers are reporting as the dimmest stars ever seen in any globular star cluster.

NASA’s Hubble Space Telescope has uncovered what astronomers are reporting as the dimmest stars ever seen in any globular star cluster. Globular clusters are spherical concentrations of hundreds-of-thousands of stars.

These clusters formed early in the 13.7-billion-year-old universe. The cluster NGC 6397 is one of the closest globular star clusters to Earth. Seeing the whole range of stars in this area will yield insights into the age, origin, and evolution of the cluster.

Note: Story under embargo until 17.08 20:00 CEST

Note: Finger food and drinks available.

- Dr. Harvey Richer: Introduction and part
- Dr. Gregory Fahlman: part 2
- Lead scientist: part 3

Evaluation

Number of journalists attending: 18
Excellent – lots of interviews afterwards + TV
The most exciting astronomical facilities of the next decade
Thursday, August 17 2006 15:00, Press Conference Meeting Room 3.3

The next decade is going to see the completion or near-completion of a long range of exciting large and extremely large astronomical facilities. This briefing will provide a bite-size overview of the status of the most interesting of these.

- Gerry Gilmore (20 mins)
- Q&A (25 mins)

Evaluation
Number of journalists attending: 10

Worthwhile + TV
Supernova 1006 a millennium later
Friday, August 18 2006 13:00, Press Conference Meeting Room 3.3

Supernova 1006 is generally recognized as the brightest supernova ever witnessed in recorded human history. This star was so spectacular that contemporary observers around the world (all in the northern hemisphere) recorded the event during some three years, despite its southern location at Dec (1006) = −38° and it was even compared with the Moon in brightness. Records indicate that the event itself reached a peak apparent magnitude of about −7.5, some three magnitudes brighter than any other historical supernova.

Agenda (6 mins per speaker)

- P.F. Winkler: Thousand years with SN 1006
- F.R. Stephenson: Historical records of SN 1006
- K.S. Long: Modern optical and UV observation of SN 1006
- K. Koyama: New results on SN 1006 from the just commissioned Japanese X-Ray telescope Suzaku
- S.P. Reynolds: SN 1006: the most direct evidence yet for 100+ TeV cosmic rays

Evaluation

Number of journalists attending: 6
Worthwhile + TV
Demography of globular clusters — a revolutionary new picture
Tuesday, August 22, 2006 10:00, Press Conference Meeting Room 3.3

Until few years ago it was commonly believed that globular clusters consisted of a “simple stellar population” — that all the stars were formed from a chemically uniform cloud of gas within a relatively short interval of time, long ago in the infancy of our Milky Way. Recent advances in observations and theory has provoked a revolution in our understanding and it is now well accepted that at least two different stellar components are common in an increasing number of globular clusters, and even three generations in some of them. In this briefing three independent experts outline how the latest observations and theories converge, and explain the implications for the emergence of this revolutionary new picture of the globular clusters.

Alison I. Sills (McMaster University, Hamilton, Ontario, Canada): Overview and Dynamical implications of multiple stellar populations

Giampaolo Piotto (Dipartimento di Astronomia, Universita’ di Padova, Padova, Italy): Observational evidence of multiple stellar populations in globula clusters

Francesca D’Antona (INAF, Osservatorio di Roma, Monte Porzio): Formation of Globular Clusters: not as simple as we believed

Evaluation
Number of journalists attending: ~10
Worthwhile
Kick-off of the Universe Awareness project
Tuesday, August 22 11:30, Press Conference Meeting Room 3.3

The Universe Awareness initiative is being officially launched at the IAU General Assembly in Prague.

Universe Awareness (UNAWE) is an international project that will expose economically disadvantaged young children, aged between 4 and 10 years, to the inspirational aspects of astronomy. By conveying a feeling for the vastness and beauty of the Universe UNAWE aims to broaden the minds of the children, to enhance their understanding of the world and to demonstrate the power of rational thought.

Agenda (6 mins per speaker)

- Prof. George Miley, Joint Chair, UNAWE International Steering Committee
- Mr. Claus Madsen, Joint Chair, UNAWE International Steering Committee
- Dr. Cecilia Scorza de Appl, Chair, UNAWE Education Committee
- Dr. Carolina Ödman, Project Manager/Coordinator,

Evaluation

Number of journalists attending: 10
Worthwhile
Black Holes Anno 2006
Wednesday, August 23 2006 13:00, Press Conference Meeting Room 3.3

During this press briefing a selection of the most outstanding experts in black holes will summarize the current standing of our knowledge of these enigmatic objects.

- M.J. Rees: The use of black holes to test Einstein's theory, and the role they play in galaxy evolution, and in explosive phenomena such as gamma ray bursts, quasars, and radio galaxies
- P. Madau: The First Massive Black Holes
- G. Hasinger: How Black Holes Grow
- R. Genzel: News from the nearest supermassive Black Hole
- L. Ferrarese: Supermassive Black Holes and Stellar Nuclei: the Dark and Bright Side of Galaxy Cores

Evaluation

Number of journalists attending: 20
Excellent.
Results of the Resolution votes at the closing ceremony

Thursday, August 24 2006 18:00, Press Conference Meeting Room 3.3

- Richard Binzel
- Catherine Cesarsky
- Oddbjørn Engvold
- Jan Palous

Evaluation

Number of journalists attending: 30+
Excellent + TV
Status of the Definition of a Planet decision after the General Assembly
Friday, August 25 2006 10:30, Press Conference Meeting Room 3.3

- IAU President Catherine J. Cesarsky
- Past IAU President Ronald D. Ekers
- IAU President-Elect Robert Williams

Evaluation
Number of journalists attending: 20
Excellent — TV
Appendix F: List of participating journalists

In total 195 media were registered. Mostly from Czech and Japanese media. A few, but very influential, were from press agencies such as DPA, AFP and AP.

<table>
<thead>
<tr>
<th>No</th>
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Appendix G: Lessons learned from the GA XXV 2003 Press Room

Helen Sim
Press Officer, IAU General Assembly XXV (Sydney, 2003)

• We asked for, but did not get, a room for running press conferences. This was a serious omission and affected the way we interacted with the press. We were not able to run press conferences about the meeting itself, scientific issues highlighted at the meeting, or conferences linked with media releases being sent out from the meeting.
• We had to buy an answering machine to receive calls that came in overnight, when the press room was unattended. (The conference centre switchboard was such that we were unable to set up voicemail for the pressroom.)
• The computers in the room were networked so that all had access to the printer. This was a big advantage. It would have been even better to have had a hub so that information could have been exchanged directly between the computers in the room – e.g. sent from any machine to the machine being used to layout the newspaper.
• We had, and used:
  o cabcharge vouchers (for sending people to interviews in radio and TV studios)
  o petty cash
  o details of local courier companies (used, for instance, to have B-roll tapes sent out to be copied)
• We had a large number of staff (mostly students) to:
  o answer phones
  o run errands and find people in the meeting
  o write copy for the newspaper.
• The staff worked to a roster, half a day at a time. We had at least six people working at any one time.
• Staff had to keep timesheets to record their hours worked, as they were being paid on an hourly rate.
• The arrangement for paying the staff was not put in writing before the meeting by the conference organizers: there was an oral agreement only. This was a serious disadvantage.
• The industrial conditions under which the staff were employed (insurance, and so on) were not clarified before the meeting.
• The most difficult task is finding people within the meeting. Key people must be supplied with mobile phones. We hired phones for the meeting. However, as most people now have a phone, it would be easier just to supply them with a SIM card for a local network.
• Many requests were received from overseas media (and locally, from the multicultural broadcaster, SBS television and radio) for scientists speaking specific languages. These requests could probably be best handled by the IAU country representatives. For this to happen, country representatives need to be equipped with (ideally) phones or pagers. As this was not the case, it was usually very difficult to find speakers of specific languages.
• As it was often impossible to contact people during the day, it is necessary to have the hotel names and phone numbers of all key people (including country representatives). This we did not have, except on an ad hoc basis.
• We used a paper-based system for recording incoming messages and queries and tracking whether they’ve been answered or otherwise followed up: a book with those tear-out sheets for taking messages, and a record book for EACH phone in the room where the details of callers and their questions were recorded, along with the action taken.
• For booking the interview room and scheduling interviews, we used a whiteboard.
• It was a huge advantage to have the interview rooms right next to the media room. The interview rooms were reasonably well sound-proofed, which was an advantage for TV and radio.

• We arranged to have food and drink sent to the media room. This was important, as the room was too busy for people to go out for lunch.

• The general non-specialist) media – especially radio and TV – wanted to speak with charismatic scientists who could summarise the whole meeting, explain what it was all about, and who felt comfortable in talking about a whole range of topics going on at the meeting. The local media all wanted to interview the people they already knew and had interviewed before (namely, Seth Shostak and Heather Couper — even though those two didn't have any active scientific roles at the meeting).

• I looked to identify newsworthy science stories ahead of time and present these as media releases. However, the organisers of the joint discussions and symposia weren't very good, in general, at knowing what exciting stories were going to emerge in their areas. I undertook to write the media releases or have them written locally. It would be preferable to accept only media releases that had been properly prepared by press officers of the relevant institutions, and which came with appropriate supporting materials (images, websites, animations, etc).

• We could not modify the meeting website to post news releases as they became current, or notify the press of events of events they might be interested in. This was a serious disadvantage.
### Equipment for 2003 press room and media room

**Furniture**
- at least 3 large (2m) tables for working at, sorting and distributing releases, etc
- 8 chairs
- desks/tables for computers
- room dividers to separate media area from newspaper area

**Equipment**
- 4 PCs. Software: Microsoft Office and browser.
- 1 fax machine with telephone handset
- 1 photocopier
- 1 A4 colour laser printer
- 3 USB drives for data downloads
- mobile phones: one for the office, others for runners and the interviewees of the day.
- 3 desk lamps
- 2 powerboards
- 2 extension cords
- 2 large bins for waste paper (for recycling)
- 1 general rubbish bin
- 1 electric stapler
- 1 pinboard for messages and announcements
- 1 pinboard for press clippings
- stationery
- 4 telephone handsets

**Datalinks**
- Four ISDN lines for phone calls to and from media. The phone numbers had to be known 6 weeks ahead of the meeting.
- 4 broadband internet connections for the 4 permanent PCS (will be needed to download graphics and animations and update website)
- 6 internet connections for journalists to plug their laptops into

**Staff**
- four student runners (mainly for locating people for interview)
- three media wranglers

**INTERVIEW ROOM for phone, TV and radio interviews**

**Furniture**
- room dividers sufficient to partition room into three reasonably soundproof areas
- 3 small tables
- 6 chairs
- 1 or more couches with backs, for TV interviews

**Equipment**
- 3 telephone handsets
- water jug and plastic cups
- 3 backdrops featuring GA logo and suitable graphics
- sign/s for door
- 3 tabletop vases for flowers

**Datalinks**
- 3 ISDN phone lines

**Staff**
- room coordinator
Appendix H: Excerpt of media coverage

Here follow excerpts of the press coverage. They were somewhat randomly selected from the Internet. Getting access to all paper copies of the newspapers, journals and magazines was unfortunately not practically possible.

Selected headlines

*Pluto for Demotion*
Redorbit, 16.08.06

*Candidate planets rock cosmic family*
Business Day, 17.08.06

*Don’t let new planets overwhelm your world!*
The Hindu, 18.08.06

*Chaos im Sonnensystem*
FAZnet, 16.08.06

*Astronomers throw a bone to Pluto*
The Roanoke Times, 20.08.06

*Hubble glimpse faintest stars*
BBC News, 18.08.06

*Pluto identity crisis*
Daily Telegraph, 18.08.06

*Tiny Pluto deserves some respect*
The Record, 17.08.06

*Will Pluto go Bluto?*
LA Times, 16.08.06

*Pluto may survive war of the worlds*
Irish examiner, 17.08.06

*Make Pavarotti a planet already*
The chaser, 18.08.06

*Pluto stripped of planet status*
AM, 25.08.06

*Pluto: Down but maybe not out*
space.com, 31.08.06

*With Pluto gone, which of us will be next?*
Toronto Star, 02.09.06

*Not a dwarf planet to those who believe*
Toronto Star, 02.09.06
Planet politics. How I tried – and failed – to save Pluto
Boston Globe, 03.09.06

Fight on to save Pluto
Herald Sun, 01.09.06

Pluto: The blacklash begins
Nature, 31.08.06

Adieu, poor Pluto, sent to the doghouse
The Age, 28.08.06

From planet to dwarf
Life, 29.08.06

Conspiracy Theories
Letter in Kuwait Times, 29.08.06

Pluto needs to find a new solar system
Telegram.com, 28.08.06

So I’m not a planet? Says who?
Baltimore Sun, 27.08.06

Going ‘round and ‘round on defining Pluto
Boston Globe, 28.08.06

Solar Shake up
Des Moines Register, 29.08.06

Scientists create big bang with planet definition
abc news, 31.08.06

And then there were 8 (goodbye, Pluto)
Herald Tribune, 25.08.06

Astronomers goofed on Pluto
Times Union, 30.08.06

Good Heavens! How many planets have we?
Cybernoon, 24.08.06

Astronomers clash in a war of worlds
The Associated Press, 24.08.06

Planets or pla-nots?
Austin American Statman, 24.08.06

Astronomie: ieider mit den Plutons!
Die Presse, 22.08.06

Planets Askew in the Heavens, and Here on Earth, a Mess
The NY Times, 22.08.06
I [heart] Pluto
The NY Times, 23.08.06

Astronomie: Die letzten Tage des Planeten Pluto
Die Presse, 24.08.06

And then there were eight...
Daily Telegraph, 25.08.06

...Uranus, Neptune...Hey, Where's Pluto?
Washington Post, 25.08.06

Kamera erspäht geschrupften Riesen
Spiegel online, 21.08.06

Hubble fotografa estrelas mais fracas da galaxia
Tecnocientista, 18.08.06

Changes in our solar system: Is trouble coming? Hawking answers
abc news, 16.08.06

The most luminous quasar state ever observed
SpaceRef.com, 21.08.06

Get Pluto out of here!
Time Magazine, 20.09.06

“Asteroid busters” widen sky search,
LJWorld.com, 18.08.06

Does size matter?
Birmingham News, 20.08.06

Earth' moon could become a planet
CNN News, 18.08.06

A new world order
Courant, 16.08.06

Aging stars reveal secrets of the Universe
Innovations-report, 21.08.06

Spitzer descobre “planetas em potencial”,
Ciencia, 21.08.06

Astronomers set up killer asteroid task force
FOXNews, 17.08.06

Asteroiden-Jäger fuerchten Panik vor Resultaten ihrer Arbeit
Spiegel online, 18.08.06

Altersheim der Milchstrasse
Deutschlandfunk, 18.08.06
The distant dozen
The proposed new roll call of 12 planets in the solar system reinstates Ceres, formerly considered an asteroid, and categorizes Pluto, Charon and 2003 UB313 all as plutons, ices beyond the orbit of Neptune.

Pluto’s safe in remaining a planet
Little guy likely to get solar system company

By Dan Vergano
USA TODAY

Pluto stays, but textbooks may never be the same as astronomers call for a new definition of planets that would raise the solar system’s total from nine to 12, with possibly more to come.

The proposal comes from the International Astronomical Union (IAU), the leading worldwide body for astronomers who have been trying to make sense of new discoveries as they ask old questions about whether Pluto is big enough to rate as a planet. The new definition adds three planets to the existing nine, keeping Pluto.

“Yes, Virginia, Pluto is a planet,” says planet definition panel member Richard Binzel of the Massachusetts Institute of Technology.

Some science museums and astronomers have removed Pluto from the list of planets, sparking squabbles about a definition.

The IAU panel would define a planet as any object orbiting a star that has been pulled by its own gravity into a ball shape and is not a satellite of another planet. In effect, it means:

▸ Ceres, initially called a planet after its 1801 discovery and the largest object in the asteroid belt, is reinstated as a planet after a century’s demotion to asteroid.

▸ Pluto and Charon, Pluto’s large moon, are the solar system’s first “double planet” because they revolve around one another. Even though Earth’s moon is bigger than Pluto or Charon, it is considered a satellite because it revolves around a center of gravity within Earth.

▸ At least two dozen “plutons,” or Pluto-like planets, are likely to be discovered.

The proposal will be voted on next week.

“Overall, I think the proposal is a step in the right direction,” says Bob Millis, director of the Lowell Observatory in Flagstaff, Ariz., where Pluto was discovered.

But Mike Brown of the California Institute of Technology, whose team announced the discovery of the planet UB313 last year, said he was “shocked” by the proposed definition. He views the caveat about moons, which would make the 568-mile-wide Ceres a planet, while leaving off Jupiter’s moon Ganymede, 3,200 miles wide, as unscientific. “Ceres isn’t a planet,” he says. “Give me a break.”
Sind unsere WM-Helden geldgeil?

GÜNTER GRASS

Der SS-Beweis

Aus diesem Nebel können neue Planeten entstehen

41% der Deutschen leben vom Staat
The Independent, 16.08.06

Solar system welcomes three new planets

By Steve Connor
Science Editor

The nine planets of the solar system are about to be transformed into 12, with three new members being added to the exclusive club of large celestial objects orbiting the Sun.

Astronomers are about to unveil an official proposal to extend the definition of a planet to include at least three more objects that are known to be large enough to warrant planetary status.

It means that astronomy textbooks will have to be rewritten with the names Ceres, Charon and Eris being added to the more familiar names of the classical planets.

At one point it was thought that Pluto was the smallest and most distant of the planets – and therefore out of the club – but now it appears that it is welcomed as the prototype of a new class of smaller planets, known as “plutinos”.

The International Astronomical Union (IAU), which has been the arbiter of planetary nomenclature since 1906, has received a new definition of a planet from a special committee of experts set up two years ago to adjudicate on the issue. Ron Renzio, the president of the IAU, said the ancient description of a planet as an object that

The International Astronomical Union is to consider the following new definition of a planet:

"A planet is a celestial body that (a) has sufficient mass for its self-gravity to overcome rigid-body torques so that it assumes a hydrostatic equilibrium (nearly round) shape, and (b) is in orbit around a star, and is neither a star nor a satellite of a planet."

The difference, Professor Richard Binzel, a planetary scientist and member of the definition committee, "Nature decides whether or not an object is a planet."

The new definition of a planet means that there are no other objects in our solar system that are known to be in the solar system that may one day be included in the planetary club.

The seven-member definition committee convened in Paris in late June and early July, and its recommendations will now go to the IAU's general assembly which will take place in Seattle this week.

Professor Owen Gingerich, the committee chairman, told delegates that discussions were long and hard, but the end consensus was reached.

"In all, we had very vigorous discussions of both the scientific and the cultural-historical issues and in the end several members admitted that they had not slept well, worrying that we would not be able to reach a consensus," Professor Gingerich said.

"By the end of a long day, there had been no real difference of opinion of the members of the definition committee, and we reached a unanimous agreement."

The terms committee chairman was also discovered that Eris was bigger than Pluto, which was discovered in 1930 and was only called a planet because it was originally thought to be as big as Earth.
Pluto survives as solar system acquires three more planets

Scientists reach ‘natural’ definition of a planet

Simon Ings

Small bodies that meet criteria to be called planets

Alec Paxman

Science correspondent

98
Los astrónomos que confirmaron el Big Bang obtienen el premio Gruber

M. R. E., Madrid

El diseñador de la misión espacial que permitió detectar en 1992 fluctuaciones en el eco del Big Bang y 18 miembros de su equipo científico compartieron ayer el premio Gruber de cosmología, dotado con 250,000 dólares (196,000 euros). La Fundación Gruber premió sus hallazgos con el satélite COBE de la NASA, que midió irregularidades en la radiación de fondo que, en el rango de las microondas, permea actualmente el universo y es una reliquia de la explosión primordial con la que se inició. Los experimentos no sólo confirmaron que se produjo el Big Bang sino que permitieron identificar estas arrugas térmicas con el nacimiento de las actuales estructuras, como las galaxias. Los hallazgos fueron considerados uno de los hitos científicos del siglo XX. Desde entonces, numerosas observaciones desde Tierra y desde el espacio han aumentado la información sobre la historia del Universo, la evolución de sus estructuras e incluso la existencia de componentes misteriosos como la energía y la materia oscura.

El premio fue anunciado en la ceremonia de apertura de la reunión de la Unión Astronómica Internacional en Praga. John Mather, director científico de la misión COBE, obtuvo la mitad del premio. La otra mitad la compartieron los miembros del equipo científico, entre ellos George Smoot, que lideró en 1992 el análisis. Ayer, Smoot señaló: “Fue un placer participar en los descubrimientos de COBE y mucho más que sean reconocidos con este premio”.

Hacia atrás en el tiempo

Los instrumentos a bordo del satélite miraron hacia atrás en el tiempo 13.000 millones de años, hasta el universo primitivo. Fue la primera misión de cosmología de la NASA y la culminación de un sueño de 15 años de Mather, que hizo la propuesta en 1974 y que dirigió el proyecto, que llegó a ocupar a 1,500 personas.


El País, 16.08.06
So what is a planet? The debate continues

By Dennis Overbye

Pluto, it seems, has dodged a bullet. In the hope of ending years of wrangling, a committee of astronomers and historians has proposed a new definition of the word "planet" that would expand or shrink the family of planets from nine to three and chart a thousand of classrooms out of drag.

But astronomers immediately began to wrangle about it.

"It's a mess," Michael Brown of the California Institute of Technology said. "Among the chosen few within the solar system, Pluto has clearly been challenged in recent years, but also Ceres, the largest asteroid, 2003 UB313, nicknamed Xena, an object discovered by Brown in 2005 orbiting far beyond Pluto in the outer solar system and even Pluto's largest moon, Charon."

In addition, at a dozen more solar system objects are waiting in the wings to see if they fit the new definition of planets, which is that an object must be massive enough that gravity formed it into a sphere and that it circulates a star and not some other planet.

The definition, they said, would apply both inside and outside the solar system.

The new definition was to be announced Wednesday in Prague, where about 2,500 astronomers are meeting in the triennial assembly of the International Astronomical Union, the world's group of Planet Definition Committee, whose chairman is Owen Gingerich, a Harvard astronomer. The astronomers will vote on the definition on Aug. 25.

In a statement, Gingerich said this might not be the last word on what a planet is. "Science is an active enterprise, constantly bringing new surprises," he said.

So it was no surprise that as word of the decision leaked out Tuesday, reactions from astronomers suggested that the argument was far from over.

This will be the talk of the town in Prague, said Alan Boss, a planetary theorist at the Carnegie Institution of Washington, who said the new definition, with four paragraphs and four footnotes, is "astonishingly complex." He added that it had been written by lawyers, not scientists. "I don't think this is the one we're looking for," Boss said.

Neil Gehrels Tyson, director of the Hayden Planetarium, which was named over the course of five years ago for dedicating Pluto in an exhibit in its new Rose Center at the American Museum of Natural History in New York, was clearly disappointed in the committee's work. "I'm happy there's finally a definition that's unambiguous," Tyson said. "There hasn't been one in 250 years."

But roundtable, he was not a very big one. 2003 UB313, nicknamed Xena, satisfying astronomical bodies. A "Pluto-like" object is well served by this definition," he said.

But Alan Stern, of the Southwest Research Institute in Boulder, Colorado, called the definition "a nice solution that works both inside and outside the solar system."

Everybody agrees that a little clarity is needed, when it comes to categorizing the members of the solar system. The proposed definition could come as a relief to schoolchildren and others who have rallied to the cause of Pluto.

The planet (if that is what it is) has been an oddball ever since Clyde Tombaugh spotted it wandering in the outer reaches of the solar system beyond Neptune in 1930. Not only is it much smaller than the other eight planets, only a fifth the mass of Earth, but its orbit is unusually elliptical and inclined to the plane that marks the orbits of the other planets. In recent decades, however, other objects with orbits like Pluto's have been discovered in the Kuiper Belt, a rocky debris beyond Neptune.

Many astronomers began to argue that it made more sense to think of Pluto as a Kuiper Belt object, a minor planet instead of a planet. When it was reported that the Hayden Planetarium had done just that in its new Rose Center, which opened in 2000, a firestorm erupted. Schoolchildren rushed to the defense of lonely little Pluto.

Two years ago, the International Astronomical Union appointed a group to come up with a definition that would resolve this tension. The group, led by Ivan Williams, of Queen Mary University, London, deadlocked. This year, a new group with broader input took up the problem. After a sleepless night in Paris, this spring, what Gingerich calls a miracle took place. "We had reached unanimous agreement."

In a nod to the idea of classifying Pluto with the Kuiper Belt, the group proposed calling planets with elongated orbits beyond Neptune "Plutoids," while emphasizing that they would still be planets.

But Brown pointed out that at least 43 other publicly known objects in the Kuiper Belt are big enough to fit the planet definition, and that his group was sitting on a list of dozens more. "We're going to have more planets inside the solar system than we have outside," Boss said.

Boss and Brown were especially critical of a feature of the new definition that would bestow planetary status on Charon, a moon of Pluto, with a diameter of about 700 miles, or 1,200 kilo meters. "Charon is too small for gravity to crush all other forces and make it round, but so are some of Jupiter's and Saturn's moons, as well as our own."

The New York Times

NY Times, 16.08.06
Allen on Damage Control After Remarks to Webb Aide

By Michael D. Shear and Tim Craig
Washington Post Staff Writers

RICHMOND, Aug. 15 — Sen. George Allen on Tuesday sought to contain the political damage from remarks he made to a Fairfax County man that dredged up charges of racial insensitivity — allegations that have dogged him for years as governor, senator and now presidential hopeful.

Despite a quick apology Monday, criticism poured in about Allen’s use of the word “macaca” to address a volunteer for the campaign of his Democratic opponent, James Webb, and also about another Allen comment, “Welcome to America.”

Democrats, left-wing bloggers and civil rights groups called him “insensitive” and “racist,” while some conservatives called him “foolish” and “mean.”

The question was already debated all day: Was “macaca,” which literally means a genus of monkey, a deliberate racial epithet or a word artfully bored with no meaning? And what was Allen trying to say by singling out the young man of Indian descent?

Allen’s defenders rushed to his side, saying the comments, though careless, do not reflect what is inside the senator’s heart. Sohikkal

See ALLEN, A6, Col. 3

Pluto’s New Place in Space Could Be as a ‘Pluton’

By Rob Stein
Washington Post Staff Writer

Hoping to end the acrimony over whether Pluto is really a planet, an international committee of astronomers has come up with a new definition that would save the tiny body’s place in the sun’s family.

Under the long-awaited proposal, Pluto would remain in the pantheon of planets by becoming the prototype of a new subcategory of small, outer solar system objects dubbed “plutons” — planets, but distinct from the eight larger “classical” planets closer to the sun.

The changes would require astrophysics textbooks to be rewritten and every schoolchild to be taught a new vision of the solar system, because three other planets would get promoted to planet status, as well — expanding the total from the traditional nine to 12.

‘Everybody’s been wanting to know: Is Pluto a planet?’” said Richard P. Binzel of the Massachusetts Institute of Technology, who served on the seven-member committee assembled by the International Astronomical Union (IAU) to settle the explosive issue. “The answer is ‘yes, Virginia, Pluto is a planet.’

The proposal to resolve the dispute is being officially unveiled today at the IAU’s general assembly in Prague. It will be hotly debated until Aug. 24, when about 3,000 astronomers will vote on it. Scientists expressed mixed feelings about the new definition, but it generally drew initial praise, and several predicted it

See PLUTO, A7, Col. 1

Web Searches Go Low-Tech: You Ask, a Person Answers

By Yuki Nishio
Washington Post Staff Writer

Yahoo Inc. wants people such as Felicia Villari, a San Francisco food aficionado, and Richard Marchi, a grandfather from Marion, Ill., to turn an ordinary online search into a place to find answers to life’s pressing questions: What’s the best way to sauté a spaghetti squash? How do I know if it’s true
digital files. For Yahoo and a handful of other companies trying to harness knowledge from a vast corps of users, such projects raise their own big questions: Will users trust the advice of volunteers, and is this new form of sharing information online useful and accurate?

Typical search engines — such as Google and the main engine at Yahoo — rely primarily on mathe-

Average price of regular unleaded gasoline

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WASHINGTON, 05.07, 05.08, 05.09

THE NATION

Blow for Bio-Pharming

In the first ruling of its kind, a federal court decides that some crops engineered to produce vaccines and medicines are an environmental hazard.

METHO

Diving for Their Dinner

A new kind of activist has descended on the D.C. region: "Frogmen" try to raise

FOOD

The treaty in Khiam, at times, they outnumbered the residents. Acting on the orders of Hama Nasser, the group’s secretary general, they began clearing rubble, pulling bodies from collapsed houses.

See HEBRON, A4, Col. 5

The teens of Summer

Tomatoes, corn and peaches. The August trek is ripe, and the chefs of Washington are ready with recipes.

The Beach Gourmet

Six strategies for cooking in a rented kitchen.
Pluto May Become A ‘Pluton’

PLUTO, FROM A.I.

will be ratified.

"I think it's a good compromise," said Larry W. Esposito of the University of Colorado, who had opposed maintaining Pluto and similar bodies as planets. "They're really too small and don't amount to much. But it would be too difficult to demote Pluto. This way, we don't have to scratch it off the list."

The status of Pluto, the smallest of the nine planets, has been called into question by the discovery in recent years of other objects of similar size and distance from the sun. But suggestions that Pluto be demoted prompted heated debate and angry denunciations.

In an attempt to settle the issue, the IAU assembled a 10-member committee, which deadlocked after two years of intensive debate. That led to creation of the smaller committee, which met in Paris June 10 and July 1 to find a way out of the thicket.

Under the new definition, a planet would be defined as any body massive enough to be round that is not a star but is orbiting one.

"These are the most fundamental physical parameters that apply not only in our solar system, but everywhere in the universe," Binzel said.

"That's what's so appealing about the definition — it can be applied universally."

The eight "classical" planets would be Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Ceres, an object located between Mars and Jupiter that has long been considered an asteroid, would be considered a planet.

"One might call it a 'dealt planet,' but that's not an official term," Binzel said.

Pluto, another object discovered orbiting in 1930 called Charon, and a body discovered in 2003 that is slightly farther from the sun — temporarily named Umba — would be planets. A planet would be any object beyond Neptune.

"Currently, we know of three, but there are other objects that are close in size to Pluto that will have to go through an evaluation process to determine whether they will be considered planets," Binzel said.

"We fully expect there are even more discoveries to come that are likely to be in this class of planets," Binzel and other committee members stressed that categorizing Pluto as a planet was in no way meant to downgrade its longtime status as the ninth planet.

"We might be demoting it from the list of eight classical planets, but we're promoting it by making it the head of its own special class," said Owen Gingerich of Harvard University, who chaired the panel.

Other astronomers praised the committee for developing a relatively simple but scientifically valid definition to categorize the new objects being discovered, thanks to advances in technology and more powerful telescopes.

"I think the group brilliantly came up with a simple scientific name that can be used to decide whether something should be considered a planet," said S. Alan Stern of the Southwest Research Insti-

ute in Boulder, Colo., who served on the committee that deadlocked.

"I'm very pleased."

But Mike Brown of the California Institute of Technology in Pasadena said he is disappointed, even though the proposal would characterize the object he discovered, Umba, as a planet.

"My first reaction was, "Wow, this would mean this thing I found is a planet," which is pretty exciting," Brown said.

"Then I started looking at the details, and I don't think they got it right." Brown questioned the criteria in the details of the proposal, which, for example, would make Pluto a planet but not Earth's moon.

"I find the definition oddly inconsistent. It makes no sense to me," Brown said. "They are sort of trying to have things both ways: They want to have a scientific definition, but they also don't want to offend cultural sensibilities."

Brown questioned why a committee would need to vote on what gets planet status.


But the proposal came as welcome news to Neil deGrasse Tyson, director of the Hayden Planetarium in New York. Tyson was inundated with angry andampionship e-mails and letters from schoolchildren when he opened an exhibit that displayed Pluto apart from other planets.

"This is about the only way you could define planethood in a way that would include Pluto. So I find it a little surprising," Tyson said. "I'm happy to finally have an unambiguous definition, so I don't have to worry about it after this."
**Dava Sobel**

**Pluto’s Brave New Worlds**

*Discoveries in Our Solar System Force Astronomers to Ask: What’s a Planet?*

Pluto has become the butt of jokes lately, replacing Uranus as the solar system’s laughingstock — and all because scientists find themselves forced, at last, to come to terms with the meaning of the word “planet.”

Traditional definitions have existed since ancient times, when planetary meaning wandered, applied to seven moving lights in the sky: the sun, the moon, Mercury, Venus, Mars, Jupiter and Saturn. But telescopes have revealed more objects in the solar system than were dreamt of in ancient philosophy, and new discoveries demand strict, useful terminology that will help astronomers categorize a host of newfound worlds.

Pluto, discovered in 1930, was hailed as a planet before its true nature came to light. In time, Pluto proved to be far smaller than any of the other planets, and very unlike them in the way it orbits the Sun at an exaggerated tilt. Even so, there seemed no need to coin a new designation for Pluto, and it held on to its planet classification. But in 1982 astronomers made the first of what now amount to several hundred sightings of other solar system bodies at the distance of Pluto and beyond. Suddenly there was reason to reclassify Pluto as a member of this new society, which quickly became known as “trans-Neptunian objects” or “Kuiper Belt objects,” in honor of Gerard Kuiper (1955-1973), who had predicted a vast zone of small bodies in the environs of Pluto.

As astronomers began to debate the issue, it spilled over into popular awareness and ignited considerable heat, for the planets are held in common, in awe, by all mankind. What might have constituted a purely scientific discussion, akin to deciding whether a particular tree was coniferous or deciduous, instead became public discourse.

On one side were major-planet purists who felt that bodies smaller than 1,500 miles in diameter (a size calculated to eliminate Pluto) should be dropped from the planet list. On the other side were Plutophiles who objected to arbitrary size discrimination. One Pluto specialist asked plaintively, “Is a dishshund not a dog?”

The lack of consensus on the “planet” definition struck people both within and outside the planetary science community as ludicrous, though several everyday terms we all think we understand are similarly vague. “Life,” for example, poses semantic problems for biologists — as well as for exobiologists, who hope to identify it if and when they find it on Mars or Europa.

In 2005, after a Kuiper Belt object tentatively named “Xena” turned out to be larger than Pluto, the question changed from “Should Pluto continue to be called the ninth planet?” to “Are there 10 planets in all?” Also in 2005, Ceres, a small body discovered more than 200 years ago between Mars and Jupiter and long dismissed as a “minor planet” or “asteroid,” was observed by the Hubble telescope to be more or less round. Scientifically, a roundish object carries more weight than a potato-shaped one, because roundness signifies the greater mass required to pull itself into a ball, or “hydrostatic equilibrium.”

Ceres raised the question, “Are there perhaps 11 planets?”

Not for the first time, but with new urgency in 2006, the International Astronomical Union (IAU) impaneled a committee to define both the word “planet” and the status of Pluto.

Our committee — seven in number, like the planets of old — met at the Paris Observatory in late June and reached a unanimous agreement. In short: A planet is a body in orbit around a star (as opposed to orbiting another planet) and big enough for gravity to make it round. The full text of our proposed definition is being released today, to be discussed by astronomers from around the world, now in Prague at the IAU General Assembly, and voted upon next week. If approved, our resolution will not only leave Pluto in place but will also add “Xena” (2003 UB313) and Ceres to the current census of planets — with room for additions as future discoveries warrant.

What’s more, Pluto will lend its name to a newly defined category of planets — the “plutons” — which differ from the other planets by virtue of their highly inclined, elongated orbits, which take more than two centuries to complete and which suggest a different origin. As the prototype of this class, Pluto may still attract funny remarks, but it will have gained new significance.

Dava Sobel, author of “Longitude,” “Galileo’s Daughter,” and “The Planets,” served as the sole non-scientist on the Planet Definition Committee.
Mass cut-off between stars and brown dwarfs revealed
17 August 2006
NewScientist.com news service
David Shiga

The faintest stars ever seen in an ancient star cluster have been imaged by the Hubble Space Telescope.

The observations provide the most accurate measurement ever made of the mass boundary between lightweight stars and “failed” stars called brown dwarfs – the dividing line is at about 80 times the mass of Jupiter, in line with theoretical predictions.

Stars and brown dwarfs are both made of the same materials – mostly hydrogen and helium – but their long-term behaviour is different. Stars – even those with very low mass, called red dwarfs – can burn hydrogen for many billions of years. Brown dwarfs, on the other hand, are not massive enough to sustain hydrogen fusion for long, fizzling out after just 1 billion years or so.

Previously, scientists calculated that the minimum mass needed to sustain long-term hydrogen burning is about 75 Jupiters. But observational confirmation has been hard to come by because young brown dwarfs and young low mass stars look very similar.

Ancient clusters

One way to distinguish the two is to look for the faintest stars in very old star clusters. Stars in clusters are thought to share approximately the same age, so old clusters should contain no observable brown dwarfs – the failed stars would have already cooled and faded from view.

Any faint objects seen in such clusters would be red dwarfs or white dwarfs. Dense cores of mostly carbon and oxygen that are the cooling embers of stars like the Sun.

“Globular” star clusters – so named because of their round shape – are ideal for studying these faint stars because they are more than 10 billion years old, and contain hundreds of thousands or millions of stars.

Now, astronomers led by Harvey Richer of the University of British Columbia in Vancouver, Canada, have used Hubble to find the faintest red dwarfs ever seen in a globular cluster. They looked at a relatively nearby cluster called NGC 6397, which is 8500 light years from Earth.

Stark contrast

The cluster is 13.5 billion years old, nearly as old as the universe. “The brown dwarfs have by now faded off into obscurity so there is a very stark contrast between the stars that could burn hydrogen and the ones that couldn’t,” says team member Jay Anderson of Rice University in Houston, Texas, US.

Theory predicts that the mass cut-off for what constitutes a star is different for objects of different metallicity, which refers to the proportion of elements heavier than hydrogen the object contains.

For objects with a metallicity similar to that of the Sun, theory suggests that anything with less than 7.5% the mass of the Sun – or about 75 Jupiters – will be a brown dwarf.
In the case of NGC 6397, which has a metallicity 100 times lower than that of the Sun, the dividing line is expected to be at 8.3 times the mass of the Sun, or about 83 Jupiters.

The members of the dim red dwarf population seen in the Hubble images appear to be heavier than this limit, in agreement with theoretical calculations.

**Tightest constraint**

The new observations are sensitive to stars 10 to 20 times fainter than in previous work on the same cluster, Anderson told *New Scientist*.

"This kind of observation is probably the best kind of constraint one can get," says Gibor Basri of the University of California, Berkeley, US. The theoretically predicted hydrogen burning limits "have stood up to what observational tests we have," he told *New Scientist*. "I don't think anyone thinks they're off by a lot."

The observations also revealed the telltale signs of very old white dwarfs. Although white dwarfs start out with temperatures of about 100,000° Kelvin, some of those seen in the Hubble images are old enough to have cooled below 4000° K.

That is low enough for hydrogen atoms in their atmospheres to join together to form molecules. This makes the white dwarfs blurrier than they would otherwise appear, an effect rarely observed before.

**Journal reference**: *Science* (vol 313, p 936)

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Round objects

Planets are spherical, and the International Astronomical Union’s attempt to make this part of their definition has merit.

There was once a prissy British civil servant who, when he came across a passage in a memo that displeased him, wrote “round objects” in the margin as a synonym for something rude. This arch circumlocution was lost on the bluff minister he served, who fired back a query as to who this Round fellow was, and why he objected so much.

We can expect there to be plenty of members of the International Astronomical Union (IAU) who, reading the proposed new definition of a planet offered to them by their executive committee, will want to scream something equally rude and rather blunter in the margin — and will want to make their objections heard, possibly quite vociferously, at their general assembly in Prague this week (see page 724).

We understand and, to some extent, sympathize. But we would suggest that, instead, they acquiesce in the new definition, which will have the effect of increasing the number of planets in the Solar System to 12, and open the doors to more. They should do this for two reasons: it is not a bad definition; and it will at least stop the rumbling debate over the status of Pluto.

In the 1990s, it became clear that Pluto, the most newly discovered planet, was the most conspicuous of a crowd of icy “trans-neptunian objects” (TNOs), some of which might well be larger. There was an obvious historical parallel to this situation with asteroids in the nineteenth century. When it was found that there were dozens of asteroids, Ceres, the largest and first discovered, was demoted from its position as a proper planet. It is now a “minor planet” along with all the other asteroids. Pluto, it was argued by analogy, should be a minor planet with the rest of the TNOs on similar grounds.

This proposal sparked a degree of public debate that irritated many astronomers, who felt that the question of whether a particular body gets called a planet or not is of no scientific interest whatsoever. Still, the IAU decided that it should try and resolve the matter: planets loom large in the public imagination, and it seemed only reasonable for astronomers to be able to say whether a new discovery (or for that matter an old friend) was a planet or not.

The IAU’s proposal is that the term ‘planet’ should apply to an object that has a sufficiently strong gravitational field to have pulled itself into a spherical shape, that is in orbit around a star, but that is not a star itself. This lets in Pluto and 2003 UB₈₉, a TNO that is a touch bigger and not yet equipped with an IAU-approved name. It also readmits Ceres. And in the most peculiar aspect of the whole business, Charon, previously considered to be a moon of Pluto, will become a planet in its own right. Moons, however spherical, will remain satellites, not planets, in the IAU’s eyes. But because the centre of mass of the Pluto–Charon system lies outside the body of Pluto, Charon, although tiny compared with, say, Neptune’s moon Triton, qualifies as a planet.

Nine more TNOs, and three more asteroids, will become candidate planets, pending further investigation of how spherical they are. More planetary TNOs may follow, when discovered. To tidy things up, the minor planets will get renamed; those that don’t have enough of a gravitational grip on themselves to be proper planets will now be “small Solar System bodies.”

“All this will doubtless lead to ructions, but it is at least a coherent approach, and it has a fairly clear basis in physical properties.”

Revival in Iran

Whatever its motivation, Iran’s support for education and science is to be welcomed.

In eleventh-century Persia, it is said that three school friends pledged to serve their country and share their fortunes. Very different fortunes, it turned out.

Nizam al-Mulk became prime minister to two consecutive Persian kings. He built a network of roads across the country, and established the chain of “Nizamiyya” schools, which taught theology, science and mathematics, adhering to a national curriculum.

Hassan-i Sabbah became the head of a fanatical religious group, the Hashshashin, which operated an almost independent government, protected by a string of castles. The many attempts by Persian kings to overthrow the Hashshashin failed, and Nizam al-Mulk was eventually assassinated by Sabbah’s followers.

Omar Khayyam became the greatest astronomer and mathematician of his age. He invented, for example, the Khayyam triangle — better known as the Pascal triangle, after Blaise Pascal who described it hundreds of years later. Khayyam also provided his country with a solar calendar, more accurate than the gregorian calendar we use today. And he became one of Persia’s most popular poets.

In the millennium since the three school friends parted company, the country we now know as Iran has witnessed a sometimes glorious, often sad, political history. Along with the rest of the Middle East, Iran’s scientific power declined as Europe’s ascended with the
Planets are rounded. Will that do?

Next week, a single show of hands at an astronomy meeting, Faith Ondrejka GUI - being one of the primeplains in one of the below - with unknown numbers to be disclosed.

A seven-member panel appointed by the International Astronomical Union has recommended a new definition of a planet: any body orbiting around a star that is a planet in orbit around a multihabited planet, and that is massive enough for gravity to have squished it into an approximately spherical shape.

The IAU plenary meeting took place in Melbourne in 2015, with a slightly revised version, that will become the official scientific word on the term.

In the definition, objects with a mass greater than five times 10^24 kilograms, and typically with a diameter greater than 800 kilometers, would qualify as planets. That would instantly elevate the asteroid Ceres and the dwarf planet Pluto into planet status.

In 2006, the American Astronomical Society, the European Space Agency, and the International Astronomical Union (IAU) all agreed on a new definition of a planet: any object orbiting the Sun that is larger than 800 kilometers in diameter and is not part of a larger object.

The discovery of the 12th planet, Eris, beyond Pluto in 2005 brought many to a halt. Astronomers have estimated that it is about 20 percent larger than Pluto, but smaller than any of the other eight planets.

All 12 planets have now defined a million miles.
Les plus pâles étoiles du ciel

Des astrophysiciens affirment avoir observé les étoiles les plus pâles qui puissent exister, dans l’amas NGC 6397, grâce au télescope spatial Hubble. Deux catégories extrêmes d’étoiles ont ainsi pu être “calibrées”, expliquent Harvey Richer et ses collègues aujourd’hui dans la revue Science : d’un côté les étoiles dont la masse est trop faible pour qu’elles puissent s’allumer, de l’autre les vestiges des étoiles géantes qui dont les cendres sont presque froides.

Les naines brunes sont des étoiles “ratées” dont la masse est insuffisante pour que la réaction de fusion s’emboîte en leur cœur. Elles restent donc de faibles astres toute leur vie. Grâce à une observation en continu de plusieurs jours d’une région de l’amas globulaire NGC 6397, les chercheurs ont obtenu une image révélant les étoiles les plus faibles, autrement dit les plus petites étoiles capables de consommer de l’hydrogène. Ils en déduisent la masse critique à partir de laquelle la fusion de l’hydrogène peut se déclencher. Les calculs de l’équipe de Richer rejoignent la théorie : la limite est de 0,083 fois la masse du Soleil.

Une autre théorie a été vérifiée par l’observation au cours de cette étude : l’évolution des naines blanches, les vestiges des étoiles supermassives qui meurent en explosant. Les naines blanches sont des objets très denses dont la température diminue progressivement, pendant des millions d’années, jusqu’à ce qu’elles deviennent totalement obscures. L’équipe de Richer a identifié les plus pâles naines blanches, qui émettent une lumière bleue, comme l’avait prédit Hansen à la fin des années 90. En effet, lorsque l’étoile refroidit, son atmosphère s’enrichit en hydrogène qui absorbe la lumière rouge.

Ces travaux permettront de mieux calculer l’âge de l’amas sphérique, qui s’est formé dans notre galaxie il y a plus de 13 milliards d’années.

Cécile Dumas
(18/08/06)

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http://sciences.nouvelobs.com/cgi/edition/qobs_imprime?cde=20060817.OBS8566
8/21/2006
Get Pluto out of Here!
Why it's not a planet, Europe is no continent and W. isn't "43"
By JEFFREY KLUGER

History has no record of Grover Cleveland and Grover Cleveland ever sitting down together. That's odd, since the two Presidents occupied the Oval Office just four years apart--Cleveland from 1885 to 1889, and Cleveland following him there in 1893. Had it not been for the four years Benjamin Harrison served as President between them, the country could have transitioned from one Cleveland to the other without even changing the monogrammed bathrobe in the White House residence.

Had Cleveland and Cleveland ever spoken, it would have been a decidedly one-way conversation, since they were the same man. But you wouldn't know it from American history books. Right there in the great march of Presidents, from Washington at No. 1 to Bush at 43, is Cleveland clocking in at 22 and then again--like a presidential whack-a-mole--at 24. We're a country with 43 Presidents, but only 42 men have held the job. The two President Bushes affectionately refer to each other by the nicknames 41 and 43, but the fact is, they're really 40 and 42.

It was last week's coverage of the controversy concerning the planet Pluto that brought Cleveland to mind (and, no, not because of his physique; that was Taft). Much the way 19th century pundits no doubt fought over which numeral to assign the inconveniently nonconsecutive Cleveland, astronomers have spent the past few years debating whether or not Pluto is in fact a planet or whether new findings place it in a family of smaller, humbler objects. The problem is more complex than just firing a planet and downsizing the solar system from nine to eight. If you keep your definitions loose enough to retain Pluto, then you have to award the planet label to at least three similar objects in our solar system. Think Congress gets into a slapfest over the problems of immigrant workers? That's civil compared with astronomers' cutouts over immigrant worlds.

So let's be clear: Pluto has to go. Clean out your locker, turn in your playbook and go see the coach. Oh, and on your way out, tell the other walk-ons and wannabes that the roster is frozen. We're sticking with the original eight.

http://www.time.com/time/magazine/printout/0,8816,1229099,00.html
8/21/2006

Time, 20.08.06
There’s sound scientific reason to return the solar system to what it was before Pluto the poseur was discovered in 1930. True planets form in roughly the equatorial plane of the sun, occupying specific, permanent orbits. That’s not Pluto. It is a tiny joyrider from the rubble stream surrounding the solar system that broke free and orbits the sun in a tilted, elongated orbit.

But astronomers don’t see things so simply. Instead, they’ve appointed a committee that met in Paris in June and July and drafted a proposed solution that defines a planet by shape, center of orbital gravity and more. Committees and clarity don’t go together, and the proposal is just what critics feared: science as tax code, with the cosmos codified in such elaborate ways that, never mind nine planets, we could end up with dozens.

It’s this kind of overthinking that leads not just to the cosmic sloppiness of a crowded solar system but also to the existential absurdity of counting Cleveland twice. You don’t have to be a stickler to want to heed the dictum of William of Ockham, the 14th century monk who famously declared, “Things should not be multiplied unnecessarily,” which is how they said “Less is more” back then. So in honor of Ockham, let’s dispense with a few other stubborn, definitional problems once and for all.

Europe: you’re not a continent; you’ve never been a continent. I know, it would be galling if a raw cowboy island like Australia retained its glittery Continent label while you were downgraded to Midsize Peninsula of Western Asia. But hello? Look at a map. Besides, these days you’ve got the euro, which is currently trading at about a buck thirty against the dollar. Don’t be greedy.

Y: a vowel? Please. Y gets plenty of work as a consonant without having to moonlight in a job it wasn’t designed for. Someone needs to show some guts and either change the spelling of problem words (what’s wrong with fli, cri, cript?) or relax the rule about every word having to have at least one vowel in it. Either way is fine, but the whole "sometimes y" thing has always smelled like a dodge.

Panda: raccoon or bear? Seems the lesser known red panda has a scrap of raccoon in him, which has thrown the whole panda clan into question. I say split the difference: go with bears for the white ones, raccoons for the red ones, and do it quick. (These are biologists we’re dealing with, not astronomers. Give them too much time, and they’ll start dissecting things.) And if we ever find yet another type of panda out there, just call it Grover Cleveland. There are plenty of those to go around.
Pluto Demoted, Loses Planetary Status

From Associated Press

9:06 AM PDT, August 24, 2006

PRAGUE, Czech Republic — For decades, it's been confused with a cartoon dog and ridiculed as a puny poser. Now Pluto, the solar system's consummate clinging-on, has suffered its worst humiliation: It's not even a planet anymore.

After a tumultuous week of clashing over the essence of the cosmos, leading astronomers today stripped Pluto of the planetary status it has held since its discovery in 1930. The new definition of what is -- and isn't -- a planet fills a centuries-old black hole for scientists who have labored since Copernicus without one.

The historic vote by the International Astronomical Union officially shrinks Earth's neighborhood from the traditional nine planets to eight.

But the scientists made clear they're as sentimental as anyone else about the ninth rock from the sun.

Jocelyn Bell Burnell -- a specialist in neutron stars from Northern Ireland who oversaw the proceedings in Prague -- urged those who might be "quite disappointed" to look on the bright side.

"It could be argued that we are creating an umbrella called 'planet' under which the dwarf planets exist," she said, drawing laughter by waving a stuffed Pluto of Walt Disney fame beneath a real umbrella. Later, she hugged the doll as she stood at the dais.

"Many more Plutos wait to be discovered," added Richard Binzel, a professor of planetary science at the Massachusetts Institute of Technology.

The decision by the prestigious international group spells out the basic tests that celestial objects will have to meet before they can be considered for admission to the elite cosmic club.

For now, membership will be restricted to the eight "classical" planets in the solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

Much-maligned Pluto -- named for the God of the underworld -- doesn't make the grade under the new rules for a planet: "a celestial body that is in orbit around the sun, has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a ... nearly round shape, and has cleared the neighborhood around its orbit."
Pluto is automatically disqualified because its oblong orbit overlaps with Neptune's.

Instead, it will be reclassified in a new category of "dwarf planets," similar to what long have been termed "minor planets." The definition also lays out a third class of lesser objects that orbit the sun -- "small solar system bodies," a term that will apply to numerous asteroids, comets and other natural satellites.

Experts said there could be dozens of dwarf planets catalogued across the solar system in the next few years -- handing the world's school teachers a challenge.

Neil Crumpton, a science teacher at Mountfitchet High School in Stansted Mountfitchet, north of London, called the announcement "very exciting."

"To be honest, this has been brewing for a while. Pluto has always been a bone of contention among astronomers because of the odd way it orbits the sun," Crumpton said. "For a start, we'll have to change all the mnemonics we use to teach children the lineup of the planets. But Pluto has not disappeared and it doesn't hurt children to know about it."

NASA said today that Pluto's demotion would not affect its $700 million New Horizons spacecraft mission, which earlier this year began a 9 1/2-year journey to the oddball object to unearth more of its secrets.

"We will continue pursuing exploration of the most scientifically interesting objects in the solar system, regardless of how they are categorized," Paul Hertz, chief scientist for the science mission directorate, said in a statement.

The decision at a conference of 2,500 astronomers from 75 countries was a dramatic shift from just a week ago, when the group's leaders floated a proposal that would have reaffirmed Pluto's planetary status and made planets of its largest moon and two other objects.

That plan proved highly unpopular, splitting astronomers into factions and triggering days of sometimes combative debate that led to Pluto's undoing. In the end, only about 300 astronomers cast ballots.

Now, two of the objects that at one point were cruising toward possible full-fledged planethood will join Pluto as dwarfs: the asteroid Ceres, which was a planet in the 1800s before it got demoted, and 2003 UB313, an icy object slightly larger than Pluto whose discoverer, Michael Brown of the California Institute of Technology, has nicknamed "Xena."

Charon, the largest of Pluto's three moons, is no longer under consideration for any special designation.

Brown was pleased by the decision. He had argued that Pluto and similar bodies didn't deserve planet status, saying that would "take the magic out of the solar system."

"UB313 is the largest dwarf planet. That's kind of cool," he said.

But as it all sank in, he added: "Deep down inside, I know this is the right thing to do. It's sad. As of today, I have no longer discovered a planet."
Comment and analysis

Down but not out

The decision to relegate Pluto from planet to "dwarf planet" was a wrench for astronomers, but there's no need for a tearful farewell, says Stephen Battersby

Last week's relegation of the planet formerly known as Pluto - now classified merely as a dwarf planet - has upset some people. They have become rather attached to it. For 76 years, Pluto was one of only eight worlds deemed worthy of being grouped in the same category as our own home. It was also the smallest planet by far - always an endearing characteristic, but also its problem, of course.

In recent years, many other icy bodies have been discovered out there beyond the orbit of Neptune, some of comparable size to Pluto, one of them bigger. If the word "planet" was going to have a scientifically sensible definition, then either they all had to join the club, or Pluto had to leave.

The decision was in the hands of the International Astronomical Union, which names everything in the heavens. At last week's general assembly in Prague, Czech Republic, its planetary definition committee suggested ranking as a planet anything with sufficient gravity to squeeze it into a sphere. It was a daringly simple definition that would include a hundred or more objects in the solar system, Pluto among them.

Inevitably, it got a hostile reaction from many astronomers. One reason is scientific. The study of solar-system dynamics suggests that the planets (except for Pluto) formed around the young sun by sweeping up or flinging away the material around their orbit, clearing out their own space in the protoplanetary disc. In that context, Pluto is more like the asteroids that orbit between Mars and Jupiter, a leftover planetary building block rather than a planet.

There's also an emotional reason for the astronomers' antipathy: a sentimental attachment to the special status of planet. The word would be debased by letting in the riff-raff. A hundred planets? Two hundred? It's an uncomfortable prospect.

You may baulk at the idea that sentimentality plays a role in a decision like this, but scientific considerations could only take the argument so far. Scientists identified three distinct categories of object orbiting the sun: eight big planets, lots of small irregular junk, and quite a few round planetoids in between. The only remaining issue was whether to classify all those round things as planets.

The IAU members decided not to, so we are left with eight, though there is no compelling scientific argument for or against; the choices differ only in emotional appeal, and among the astronomers present in Prague the definition excluding Pluto turned out to be more appealing. Fearing that this would anger the public, the committee tabled a resolution that all the new dwarf planets beyond Neptune should be put in a new class named "Plutinos". But should the IAU even have tried to give the word "planet" a scientific definition? Why not just let it remain in general use and define more precise scientific terms for themselves? In part it is because of an attachment to the word itself; it crops up a lot in scientific papers, and would be hard to abandon. It would also be unfair. The public deserve a scientific definition, one that reflects the world as accurately as possible. Not perfectly, of course - there are a lot of diverse objects in the solar system, and putting them into strict categories is artificial. Yet it's also necessary, if we want to use words to describe the world.

In the classroom, the original definition suggested by the IAU would probably have worked just as well as the final one. If the original draft had passed, with nine planets becoming hundreds, then teaching little children and order to every schoolchild would rapidly have become absurd, so the focus would have shifted to what kinds of planets there are, which is far more interesting than simply learning a list.

How will the ruling affect science beyond the classroom? One area where we could see a concrete difference is in space exploration. It will probably be easier to sell a mission to a fully fledged planet, for Ceres - which was briefly considered the fifth planet from the sun when it was discovered in 1801 - might now miss out. Luckily, the New Horizons mission to Pluto, Charon and the Kuiper belt has already been launched.

There's no need to lament little Pluto. Talk of it being airbrushed out of textbooks is nonsense. Pluto is just as intriguing a place now as it was before. Indeed, it will gain much more positive publicity when NASA's New Horizons mission visits in 2015. "The first mission to the last planet" now has to become the first mission to the late planet, but that hardly matters; it will turn Pluto from a vaguely mollified blob into a well-mapped world.

After all, plenty of other heavenly bodies have not suffered too much in public estimation despite relatively lowly status. Being called a moon has not affected the way people look at Jupiter's icy Europa, with its interior ocean thought to be a possible home for life. People are as fascinated with Saturn's methane-clouded moon Titan as they are with the planet itself, and there are plenty of other satellites out there more interesting than certain planets one could mention. Planets are interesting because of their kinship to Earth, but for Pluto there is life beyond.
Asteroid fly-by eludes study

On 3 July, an asteroid zipped past Earth at a distance of some 400,000 kilometres — slightly farther away than the Moon. In theory, something that close ought to be easy to study. But astronomers have struggled to map the size and shape of the space rock — and now say they know why they found it so difficult.

The rock, dubbed 2004 XP14, is one of more than 800 ‘near-Earth asteroids’ that have been identified in orbits that come perilously close to our planet. This particular rock is unlikely to hit us, but astronomers hoped their observations would help establish how diverse such asteroids are and so better quantify the threat they pose.

But the data obtained by the team proved surprisingly hard to analyse. “The asteroid rotates slowly, so its appearance in the images, due to rotation, hardly changed at all,” says Lance Benner, an astronomer at NASA’s Jet Propulsion Laboratory in Pasadena, California, who led the effort to image the asteroid.

That’s unusual. “Most near-Earth asteroids are very fast rotators,” says Vishnu Reddy, a graduate student at the University of North Dakota who also observed the object. Benner and his colleagues imaged 2004 XP14 using a 70-metre radio antenna at the Goldstone Complex in California. At 260 metres across, the asteroid was a lot smaller than earlier predictions of up to 880 metres. This, together with its rotation rate of roughly one turn every 500 hours, meant that the images the team received barely changed during recording sessions of up to 2 hours. As a result, the researchers could not build the detailed picture of the rock that they wanted.

Earth may be safe from 2004 XP14, but there are plenty more asteroids out there that might collide with us. Having identified three-quarters of the candidates 1 kilometre or more in diameter, NASA plans to widen its search to include objects as small as 150 metres across. And in July, the International Astronomical Union formed a committee to keep it up to date about asteroids that may pose a serious threat to our planet.

Heidi Lefford

Blip on the horizon: radar imaging of the asteroid 2004 XP14 proved to be more difficult than expected.

Nature, 24.08.06 (IAU NEA WG mentioned)
'Morning After' Pill Is Cleared for Wider Sales
By GARDINER HARRIS 9:33 AM ET
The Food and Drug Administration today approved over-the-counter sales of the "morning-after" contraceptive pill to women 18 and older.

Some in G.O.P. Say Iran Threat Is Played Down
By MARK MAZZETTI
Some Republicans are voicing anger that American spy agencies have not issued more ominous warnings about Iran.
U.S. Says Iranian Nuclear Proposal Is Inadequate

The Katrina Year
Storm's Escape Routes: One Forced, One Chosen
By SHARLA DEWAN
The experience for many New Orleans residents who went west instead of east has been very different.

Astronomers Decide Pluto Is Not a Planet
The International Astronomical Union set new guidelines that downsized the solar system from nine planets to eight.

Housing Reports Reveal a Slowing Market
By JEREMY W. PETERS 55 minutes ago
The Commerce Department reported today that 4.3 percent fewer new homes were sold in July than in June.

Africa Adds to Miserable Ranks of Child Workers
By MICHAEL WINESE
In sub-Saharan Africa, more than one in four children below age 14 works, and some are not even paid.

U.S. and New Zealand Reject Kidnappers' Demand
By GREG MYRE 9:35 AM ET
A militant group in Gaza demanded the release of Muslims in U.S. prisons for two Fox News journalists.

Incident Aboard Plane Not Linked to Terrorism
By JEREMY W. PETERS 10:02 AM ET
Northwest Flight 42 turned back after several passengers were observed passing cell phones back and forth.

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August 24, 2006

**Astronomers Decide Pluto Is Not a Planet**

*By THE ASSOCIATED PRESS*

*Filed at 12:20 p.m. ET*

PRAGUE, Czech Republic (AP) -- Leading astronomers declared Thursday that Pluto is no longer a planet under historic new guidelines that downsize the solar system from nine planets to eight.

After a tumultuous week of clashing over the essence of the cosmos, the International Astronomical Union stripped Pluto of the planetary status it has held since its discovery in 1930. The new definition of what is -- and isn't -- a planet fills a centuries-old black hole for scientists who have labored since Copernicus without one.

Although astronomers applauded after the vote, Jocelyn Bell Burnell -- a specialist in neutron stars from Northern Ireland who oversaw the proceedings -- urged those who might be "quite disappointed" to look on the bright side.

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"Many more Plutos wait to be discovered," added Richard Binzel, a professor of planetary science at the Massachusetts Institute of Technology.

The decision by the prestigious international group spells out the basic tests that celestial objects will have to meet before they can be considered for admission to the elite cosmic club.

For now, membership will be restricted to the eight "classical" planets in the solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

Much-maligned Pluto doesn't make the grade under the new rules for a planet: "a celestial body that is in orbit around the sun, has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a ... nearly round shape, and has cleared the neighborhood around its orbit."

Pluto is automatically disqualified because its oblong orbit overlaps with Neptune's.

Instead, it will be reclassified in a new category of "dwarf planets," similar to what long have been termed "minor planets." The definition also lays out a third class of lesser objects that orbit the sun -- "small solar system bodies."

Astronomers Decide Pluto Is Not a Planet - New York Times

a term that will apply to numerous asteroids, comets and other natural satellites.

Experts said there could be dozens of dwarf planets catalogued across the solar system in the next few years.

NASA said Thursday that Pluto’s demotion would not affect its US$700 million New Horizons spacecraft mission, which earlier this year began a 9 1/2-year journey to the oddball object to unearth more of its secrets.

“We will continue pursuing exploration of the most scientifically interesting objects in the solar system, regardless of how they are categorized,” Paul Hertz, chief scientist for the science mission directorate, said in a statement.

The decision on Pluto at a conference of 2,500 astronomers from 75 countries was a dramatic shift from just a week ago, when the group’s leaders floated a proposal that would have reaffirmed Pluto’s planetary status and made planets of its largest moon and two other objects.

That plan proved highly unpopular, splitting astronomers into factions and triggering days of sometimes combative debate that led to Pluto’s undoing. In the end, only about 300 astronomers cast ballots.

Now, two of the objects that at one point were cruising toward possible full-fledged planethood will join Pluto as dwarfs: the asteroid Ceres, which was a planet in the 1800s before it got demoted, and 2003 UB313, an icy object slightly larger than Pluto whose discoverer, Michael Brown of the California Institute of Technology, has nicknamed Xena.

Charon, the largest of Pluto’s three moons, is no longer under consideration for any special designation.

Brown, who watched the proceedings from Cal Tech, took Thursday’s vote in stride -- even though his discovery won’t be christened a planet.

"UB313 is the largest dwarf planet. That's kind of cool," he said.

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AP Science Writer Alicia Chang in Los Angeles contributed to this story.

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On the Net:

International Astronomical Union, www.iau.org

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NY Times, 24.08.06
And then there were 8 (goodbye, Pluto)

Astronomers vote to trim solar system

By Dennis Overbye

Pluto got its walking papers on Thursday. Throw away the place mats. Grab a magic marker for the classroom charts. Take a pair of scissors to the solar system mobile.

After years of wrangling and a week of bitter debate, astronomers meeting in Prague voted on a sweeping reclassification of the solar system. In what many of them described as a triumph of science over sentiment, Pluto was demoted to the status of a “dwarf planet.”

In the new solar system there are 8 planets, at least 3 dwarf planets, and tens of thousands of so-called “smaller solar system bodies,” like comets and asteroids.

For now, the dwarf planets include, besides Pluto, Ceres, the largest asteroid, and an object known as UB 313, nicknamed Xena, that is larger than Pluto and, like it, orbits out beyond Neptune in a zone of icy debris known as the Kuiper Belt. But there are dozens more potential dwarf-planets known in that zone, planetary scientists say, and the number in that category could quickly swell.

In a nod to Pluto’s fans, the astronomers declared Pluto to be the prototype for a new category of such “trans-Neptunian” objects but failed in a close vote to approve the name Plutonians for them.

“The new definition makes perfect sense in terms of the science we know,” said Alan Boss, a planetary theorist at the Carnegie Institution of Washington, adding that it does not go too far in cultural terms. “We have a duty to satisfy the whole world.”

The vote completed a stunning turnaround from only a week ago, when the assembled astronomers had been presented with a proposal that would have included 12 planets, including Pluto, Ceres, Xena and even Pluto’s moon Charon, a fact that Boss said spoke to the integrity of the planet-defining process. “The officers were willing to change their resolution and find

Tom Cruise in middle of real-life drama

The war of words between the actor Tom Cruise and the Viacom chairman, Sumner Redstone, is escalating. In a rare attack against a powerful studio executive, Cruise’s representatives at Creative Artists Agency, the leading talent shop in Hollywood, signaled that it would be loath to do more business with Paramount if Redstone continued to call the shots. That warning came after Redstone declared that his movie unit was severing ties with Cruise’s production company after 14 years because of the actor’s erratic behavior.

Meanwhile, losing likability is the cardinal sin for any movie star, and Cruise’s began to plummet even before his couch-jumping days.

PLUTO, Continued on Page 4

Herald Tribune International, 25.08.06
Pluto toch gedegradeerd tot dwerg

Door George Beekman

Dat is de uitspraak van een stemming gistermiddag onder astronomen tijdens de algemene vergadering van de Internationale Astronomische Unie (IAU) in Pраг. Het zonnensysteem verliest een planeet, maar krijgt er een serie dwergplaneten bij. De zogenaamde 'iswereld' van het formaat van Pluto die voorbij de baan van Neptunus voorbijkomt, moet - wanneer ze aan de juiste criteria voldoen - voortaan ook dwergplaneet worden genoemd.

Het heet de drammie opnieuw geordend volgens een nieuwe definitie van planeet. De vergadering stemde in met een voorstel planeten voortaan te definieren als hemellichamen die om de zon draaien, volledige massa bezitten om onder invloed van hun eigen gewicht vrijwel bolvormig te zijn, en andere objecten in de buurt van hun omloopbaan hebben 'weggeveegd'. In die definitie passen Mercurius, Venus, de aarde, Mars, Jupiter, Saturnus, Uranus en Neptunus, niet Pluto.

Hemellichamen die aan het eerste en het tweede criterium voldoen maar niet aan het derde, worden 'dwergplaneten' genoemd. Dat geldt nu voor Ceres (de grootste planeetoid in de gordel tussen Mars en Jupiter), Pluto (een van de grootste iswerelden buiten de baan van Neptunus) en Xena (een in 2003 ontsloten iswereld die grootder is dan Pluto).

Een alternatief voorstel stuitte op veel heftigheid. Hierin zou Pluto wel een planeet blijven en zouden ook de planeetoiden Ceres, Pluto's grote maan Charon en andere grote iswerelden de status van planet krijgen. Na heftige discussies werd uiteindelijk de aanvullende astronamische eis gesteld dat een hemellichaam alleen een planeet mag worden genoemd als het - via zijn zwaartekrachtsveld - andere objecten in de buurt van zijn baan 'weggeveegd'. Het belang van de acht 'klassieke' planeten ging voor.
Słoneczny
wściekle się broni

Awantura wśród astronomów po relegowaniu Plutona z Układu Słonecznego. Nic mu to jednak nie pomoże

TOMASZ ROŻEK

O fatalnej decyzji i przypadku naukowego nieuchwytu - komentował wzburzony Alan Stern z instytutu w San Antonio.

O tym, że Pluton nie jest już planeta, zdecydowała w czwartek Międzynarodowa Unia Astronomiczna (IAU). Ma ona na całym świecie prawie 10 tysięcy członków, z których na zjeździe w Pradze pojawiło się niespełna 3 tysiące. Zainteresowanie definicją planety było znaczne - do głosowania dotarły tylko 424 osoby, 5 proc. uprawnionych!

Pierwsza definicja planety pojawia się kilka dni przed głosowaniem. Wynikało z niej, że Układ Słoneczny powiększy się o planetoidę Ceres, największy plutonowy księżyc Charon i daleką planetoidę Xene. Komisja opracowująca definicję planety nie spytuje jednak o zdanie wszystkich specjalistów. Z tej propozycji zadawalony był geodeta planetarni, ale inni uczestnicy poczuli się pominięci i postanowili ją odrzucić - podzielił się tę propozycję powieści astronom Owen Gingerich. Według niego najlogicniejszą opozycję powinna stanowić IAU, a nie komisja Stern.

Od czwartku planeta jest tylko taka to, która ma krążyć wokół gwiazdy (samo nie będąc ani gwiazdą, ani księżyca) i mieć kształt kulisty - nie budzić kontrowersji. Trzeba jednak zauważyć, że w tej definicji nie ma już planet, tylko planety świadczenia odkrywców, a nie odkrywca Plutona.


Dokładnie nieprzerażonym może być budować nazwania Plutona, Ceres i Xemy planetami karłowatymi. Można to interpretować jako podgrupe ośmiu właściwych planet, ale tak nie jest. Planety karłowate to niezależna grupa ciał niebieskich.

Jest za przykro, ale moje małżeństwo planetologiczne, które się kończy, powiedz mi do swojego co niższej planety, co jest niezależną grupą ciał niebieskich. W 2006 roku zatęskniemy za swoją planetą.
Les planétologues rétrogradent Pluton

Notre système solaire ne compte finalement que huit planètes, a tranché l’Union astronomique internationale après de houleux débats.

En moins d’une semaine, le système solaire aura été balayé d’incroyables séquences. Il y a un mois encore, il comptait autant planètes. Il y a quelques jours, il était au point de tomber troisième. Aujourd’hui, il n’en a plus que huit. Les astronomes qui, jusqu’au 24 août, participaient à Prague à l’assemblée générale de l’Union astronomique internationale (UAI) ont en effet décidé de retirer à Pluton son statut de planète.


Tout juste un astre désert et glacial dont le diamètre – 2 300 km – est inférieur de plus de 1 000 km à celui de la Lune, satellite naturel de la Terre. De plus, Pluton suit une trajectoire très elliptique – quand collés des planètes historiques sont plutôt circulaires –, dont la planète est income par rapport à celui de ses anciennes sœurs.

Voyant à main levée, les astronautes ont donc balayé avec un bel ensemble à Prague la motion que l’UAI leur avait présentée il y a une semaine (Le Monde, du 16 août). Motões qui était pourtant le fruit de réflexions menées pendant des mois par un petit groupe de sept experts, il est vrai pas toujours d’accord sur le sens à donner aux mots. Mais c’est le lot de toutes les assemblées générales, une motion en appelle une autre, puis une autre...

De « complets idiots »

Au point qu’il y a quelques jours les planétologues ne retonnaient plus leurs petits. Fattigés de ces discussions, mais encore assurés, l’un d’entre eux proposait même en aparté de s’en remettre à ces peuples très sages qui ne comptent pas au-delà de trois. Une planète donc, deux planètes, trois planètes et…, au delà, beaucoup de planètes !

Fini donc la belle et éphémère classification entre planètes « telluriques et gazeuses » et planètes naines parmi lesquelles figuraient en première analyse Pluton, son satellite Charon, avec qui elle forme un système binaire très différent du couple Terre-Lune, mais aussi Xena. Celle connue officiellement sous le nom 2003 UB313 et pour qui le scandale est arrivé, puisque son emboîtement dépassa Pluton de 100 km.

Avait été également intégrée à l’équipe Cérès une boule rocheuse dépassant les 900 km et croissant, non pas aux confins du système solaire comme Pluton, Charon et Xena, mais entre Mars et Jupiter, où tourmentent des milliers d’astéroïdes dont pas soient de forme sphérique. Un critère essentiel pour entrer dans l’histoire.

Ne peuvent prétendre désormais au titre envié de planète que les astres qui ont « une masse suffisante pour leur gravité l’empêcher de s’assembler en un corps (ou une forme presque sphérique) ». Mais un autre, qui est sans doute le critère le plus sévère, qu’ils « aient entretenu tout corps susceptible de se déplacer sur une orbite proche ».

En fait, les objets de la ceinture d’astéroïdes en sont exclus tout comme ceux qui les longaient – et chaque année plus nombreux – de la ceinture de Kuiper, à laquelle appartient Pluton. La croissance est en effet grande de devoir reviser régulièrement la liste des planètes avec de nouvelles découvertes.

Peu important qu’on n’ait pu passer pour de « complets idiots » avec nos habitudes, phalle le professeur Rowan Robinson, l’important, c’est que le verre [de la connaissance] a été retourné. [...] Dans quelques années, nous pourrons avoir quarante ou des nouveaux planètes vistas. Le fait que Pluton ait été rétrogradé n’est donc pas si important. »

Jean-François AUGIEREAU

Le Monde, 26.08.06
Pluto ist kein Planet

Sueddeutsche Zeitung, 26.08.06
Το νέο Ηλιακό μας Σύστημα

Τελικά πόσος πλανήτης έχει το Ηλιακό μας Σύστημα; Οι επιστήμονες αναζητούν συνέχειας απαντήσεις.

Δύο ζώδια χωρίς «καθαρήτρια». Αυτή η επιστήμη άρχισε να μιλάει στην αστρονομία και σε όσους ανήκουν στον αστεροσκοπικό κόσμο.

Παρθένοι και Ζωηρά θα βρούμε τον συντρόφο; Μπορεί να κυμαίνεται, που μπορούμε να δούμε τους ζώδια στον πλανήτη του Ζωηρά;
Nasa contro gli astronomi: Plutone è un pianeta

L'amaerezza dell'ente Usa dopo il declasamento: l'Europa ha sbagliato
come conseguenza del rimuovem-
eto di oggetti sempre più grandi circa l'entità di Plutone. Gli astronomi sistematicamente avevano sostenuto la proposta, ma cosi l'Ufficio di ricerca-
la dimostrazione che sembrava mag-
ti di Plutone, ecco strutture o-
ti del nuovo in poi. La nuova mappa del sistema solare è un'opera di riferimento per Plutone come esempio di una nuo-

to del sistema solare. Ora è composto di tre planeti: Plutone, Terra e Mercurio.

La nuova mappa

La mappa più dettagliata di Plutone scaturì dalle ricerche di Margherita Hack.

La Hack: sono protette senza senso

Aggiornarsi è un dovere degli scienziati

La mappa è uno strumento fondamentale per la comprensione del sistema solare. Ora è composto di tre planeti: Plutone, Terra e Mercurio.

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Skoly se Pluta nevzdají!


Příčina je dostatečně obecná, známá a dostatečně rozšířená. Už by se měla stát obecnou a dostatečnou, neboť jde o obecné a dostatečné obecné a dostatečné obecné a dostatečné obecné. Zdroj: Michael Moskowitz

Pluto končí. Už to není planeta.

Měli bychom mít ve věci dovolit Lucemburk. Na několika, je vývoj

KONEC PLUTA

Astronomové věří na konferenci v Praze rozhodli, že Pluto již není planetou. Končí sedmadvacáté létní dny dlouhá éra, kdy sluneční soustava měla devět planet.

Prokázáno, že Pluto je devítnásobně tuhší než Mars. Měli bychom mít ve věci dovolit Lucemburk.

Planeta Pluto

Planetou planety některé planety

HRŽDÝ

1340000 km

Vítek

956 000 000 km

Země

395 000 000 km

Pluto

13 500 km

Doba otáčky slunce

2888.5 v

Pochodně trpítková

Výběr

WWW

www

www

www

DNES, Czech Republic, 26.08.06. Note the crying children and Pluto being cut away from the Solar System.
Engelsk i barnehaven.
Mislædning eller omhu?

VIDENSKAB & DEBAT

Vov vov vov

Politiken, 27.08.06
Da Pluto røg ud af vores univers

Diplomatiske bågårdshandler, fraktioner, tøtte flertalsafgerelser og tvister om formuleringer, der vær, en FN-topmænd og værdigt. Degraderingen af Pluto på denne uges astronomtopmøde i Prag mindede mere om politik end videnskab.

Af Lars Dalager, Prag

D

har fem år hindstrægt. En oplagt gruppe af astronomer var itranse i kongressrum-
neres pressrum med dokumenter.

hjemmefolk og organisationer og stod

omgivet af journalister, indtil vi alle blev fre-

ligt inviteret. De forklarede, at kappe ud,
hårdt arbejde, Giselle Tom
gren, en leveranstalt, satsede sig for de

ned at forbedre den mest i Den Inter

nationale astronomers Union (IAU), for

at finde vejen til at modernisere det fælles

planeterne. Ved Prag kongressen blev det

nedlængst bygget i en universitet.

Runde-Planeten

Hindstræget var åbnet et andet lag i den mest

opholdsrum i Den Internationale Astronoma
tiske Union (IAU), en kongress, der havde

tagne plads på universitetet i Prag. I Prag fik de en astronomer

planeterne på hverandre og analyse flere til grise

'Pluto er ikke nogen planet. Det er en

planetonin!'

Der har aldrig været en offentlig definition af

planeton, men Pluto er formentlig den mest

bekendte. Da Pluto var det mest

bekendte, gav den en stor drift indenfor fælles

af en mængde, der fik Pluto i det

Planetoide, der på det hjælpe

brug af en mængde, der fik Pluto i det

Planetoide, der på det hjælpe

af en mængde, der fik Pluto i det

Planetoide, der på det hjælpe

af en mængde, der fik Pluto i det

Planetoide, der på det hjælpe

af en mængde, der fik Pluto i det

Planetoide, der på det hjælpe
Pluto: the backlash begins

The future of the Solar System — or at least that of some of its nomenclature — may be thrown into turmoil by scientists who are calling for a boycott of a new definition of a planet.

On 24 August, delegates at the general assembly of the International Astronomical Union (IAU) in Prague voted to define the planets of the Solar System by three criteria. To deserve planet status, the assembly agreed, a chunk of rock or ball of gas must be big enough for its gravity to have made it round, must orbit the Sun but not be a satellite of another planet, and must have cleared other bits of debris from its orbit. Round objects, including Pluto, that failed on the final count became not planets but "dwarf planets."

The definition originally proposed on 16 August by the IAU would have had just two criteria — roundness and not being a moon. This was rejected by members at the meeting where the three-part definition was voted on as the final word on the subject. But many IAU members were not in Prague for the vote, and some are furious at the outcome.

"I am just disgusted by the way the IAU, which is meant to represent the best in science, handled this matter," says Alan Stern, a planetary scientist at the Southwest Research Institute in Boulder, Colorado. As principal investigator for NASA's New Horizons mission to Pluto, he has a particular interest in its status. But he says the issue is not really Pluto's status so much as the idea of putting objects in orbital contexts. "We do not classify objects in astronomy by what they are near," he says. "We classify them by their properties."

The day after the new definition was unveiled, Stern was among a dozen scientists who launched a petition to contest it. By e-mail, they sought the support of their colleagues for the following statement: "We, as planetary scientists and astronomers, do not agree with the IAU's definition of a planet, nor will we use it. A better definition is needed." More than 300 people had added their names to the petition as Nature went to press on Tuesday.

Stern thinks that requiring a planet to have "cleared its orbit" rules out some of the Solar System's other eight planets. These include Neptune, the orbit of which is crossed by Pluto, and Jupiter, which shares its orbit round the Sun with the Trojan asteroids.

The "clearing" criterion was introduced when astronomers who study the dynamics of the Solar System insisted that the definition should recognize their idea of what constitutes a planet — an object with a mass that dominates its orbital zone. Owen Gingerich, chair of the committee that proposed the 16 August resolution, thinks the IAU had no choice but to bend to the dynamics' demands. "They may not have had a majority for anything positive, but they could rouse a strong negative majority simply because there are so many little fieldions," he explains.

"The dynamics part of the definition is a rather complex one," says Ron Ekers, past IAU president. "Couching the idea in terms of a planet 'clearing its orbit' was intended to make the issue easier for the public to understand. But it may well end up confusing matters."

Some organizations have already said they will accept the IAU's new definition. Encyclopaedia Britannica, for example, issued a statement saying that some of its articles on Pluto and the Solar System were updated online the same day the IAU's pronouncement was made. According to a spokesperson, later revisions may reflect any uncertainty, but "the vote by the IAU is considered binding — until the next vote, whether it's next year or next century," NASA, too, promised to abide by the definition, adding that it will "continue pursuing exploration of the most scientifically interesting objects in the solar system, regardless of how they are categorized."

Others are waiting to see how strong the counter-movement becomes. A black ribbon was tied around the Pluto plate at the Smithsonian Institution's National Air and Space Museum in Washington DC when the IAU's verdict was announced, says curator Andrew Johnston. But
Diary of a planet’s demise

While attending the International Astronomical Union’s meeting in Prague, Jenny Hogan kept the world up to date on the Pluto debate through our newsblog. Edited excerpts:

Monday 21 August

The proposal to define a planet as anything round that isn’t a moon, and thus increase the tally in our Solar System to 13, is scheduled for discussion at lunchtime tomorrow. But many astronomers have already conveyed their objections to the executive committee of the International Astronomical Union (IAU) by e-mail — and some are supporting a second, rival definition.

This alternative definition argues that a planet, as well as being round, must also be “by far the largest object in its local population”. This definition knocks Pluto off its planetary pedestal (although it offers it a co-planetary dwarf planet status), and destroys the chances of promotion for Ceres, queen of the asteroid belt.

Of the 100 people in the closed meeting last Friday where the alternative definition was floated, a show of hands showed about 50 for it and only 10 for the IAU’s suggestions.

Tuesday 22 August

15:00 For people who often tell journalists that defining a planet is a meaningless labelling exercise, astronomers actually seem to care a great deal. The open discussion on what makes a planet stopped just short of fisticuffs.

The official resolution has been divided into three parts, each of which will be voted on separately on Thursday at the closing ceremony. These cover the requirement of roundness, the distinction between a binary planet and a double planet, and the definition of a planet.

Tuesday 22 August

23:00 My dinner companions tonight include some (very tired) members of the Planet Definition Committee. They say they have received hundreds of e-mails over the past few days from geologists complaining about the proposal in the original definition to use ‘pluton’ to mean an object in the same class as Pluto. Pluton is a term of long-standing and wide use in geology, where it refers to an intrusion of igneous rock.

Another problem has emerged in translation. The French name for Pluto is — you’ve guessed it — Pluton. The definition committee thought this linguistic borrowing would give the pluton label special appeal for French-speaking astronomers, but apparently some of them object.

All this leads to speculation that tomorrow’s revised definition, whatever other changes it contains, will include a replacement word for ‘pluton’.

Dwarf planet in quotes

“I’m here. I’m a sphere. Get used to it.”
Pluto itself, talking to Gady Epstein of the Baltimore Sun about its recent demotion.

“If I don’t know about the public, but... the astromomers will be upset.”
Patrick Moore, astronomer and veteran presenter of the BBC’s The Sky at Night.

“Please don’t turn Pluto into a dwarf planet because that makes me sad. I’ll miss Pluto a lot.”
Daniel Ruben, aged six, on Nature’s newsblog.

“This is as if botanists had found something between trees and bushes and invented the word ‘animal’ to describe it.”
Allen Garcia of the University of North Carolina, Chapel Hill, on the proposal to call dwarf planets “plutons” — a term that geologists have long used to describe certain bodies of rock.

“Since the term is not in the Microsoft Word or WordPerfect spellcheckers, we thought it was not that common.”
Owen Gingerich, chairman of the Planet Definition Committee, which proposed the use of the term pluton.

“The comments were intelligent, but they came with a passion that makes me think this debate has a non-intelligent dimension.”
Paul Murdin, Cambridge astronomer, at the annual meeting of the International Astronomical Union.

“It’s over, it’s done.”
Richard Binzel, an astronomer at the Massachusetts Institute of Technology and member of the Planet Definition Committee, on the Prague vote.


Nature, 31.08.06
and a planet–moon system, and the naming of Pluto-like objects.

Within seconds of comments being invited, queues form at the microphones. One by one, astronomers denounce the definition in tones ranging from offended to furious. The representatives of the Planet Definition Committee slump into their chairs, heads propped on their hands.

Andrea Milani of the University of Pisa is first to reach a microphone. He articulates the concerns of the "dynamists"—astronomers interested in orbits, many of whom feel strongly that the condition of dominating an orbital zone should be a central part of the definition. Milani becomes more incensed as he speaks, ending by saying "your paper is a kind of offence to the entire dynamical community".

Meanwhile, those who work on extrasolar planets—some with many times the mass of Jupiter—feel that their field has been neglected. Why does the definition not set an upper mass limit? As this point was raised again and again, IAU president Ron Ekers became more and more frustrated. "We want your input, but not right now," he eventually snapped.

11:30 We are now on version three of the planet definition. I was expecting another lively show of dissent—but it is not to be, thanks to Jocelyn Bell Burnell, the astronomer who discovered the first pulsar. A member of the IAU's resolution committee, which decides what gets voted on, she takes formidable control of the meeting. With only 45 minutes available, she requires comments to be no more than "elevator pitches"—sold in the time it takes a lift to travel one floor. The astronomers merrily follow her orders.

The latest version requires that a planet be both round and, at the insistance of the dynamists, dominant. Round objects that don't dominate their local orbital zone are "dwarf planets." Bell Burnell spells out the consequences: "This means that Pluto is a dwarf planet, but it is not a planet." Would that be acceptable to the assembled astronomers?

It seems so. In a quick show of hands, more arms are raised in favour than against.

Thursday 24 August

The final text of the resolution (version four by my count) is posted in today's edition of the conference newspaper Nuncius Solesinis III. According to this resolution, the Solar System has eight top-flight planets, with Pluto in a second class of "dwarf planets." Separate votes will be held on whether to label these "planets," "classical planets," or whether, if anything, to do about putting Pluto and other round trans-neptunian objects into a "planetary object" category. "Only minor corrections can be accommodated at this stage," the paper warns.

12:30 I'm skipping down the stairs of the conference centre on my way to a 10.30 interview (not about planets!) when I encounter a charge of scientists led by the esteemed Brian Marsden. "You're the press," one of his cohort says, "we want to see the press room with youthful vigour!"

I retrace my steps. Marsden has, for many years, been the head of the Minor Planet Center at Harvard, a clearing house for orbital data on asteroids and comets. (This week's redefinitions are set to turn them into "small Solar-System bodies"). Today marks his retirement, but he enters the press room with youthful vigour.

He holds up an A4 sheet of paper, on which is written in very large letters the word "Planetino." "Planetino is what they say in the resolution is a dwarf planet," he proclaims.

Pointing to the ten or so astronomers struggling behind him, Marsden says his proposal to call "dwarf planets" "planetinos" instead has support from representatives of Uruguay, Brazil, the Czech Republic, the Netherlands, Norway, Serbia, and the United Kingdom—at least. The press room descends into a hubbub as reporters grab their notebooks or leap to their laptops. The press officers trying to run the show look on, bemused.

15:00 Just before the closing ceremony starts, a television crew searches for a miserable American Pluto after all was discovered at the Lowell Observatory in Flagstaff, Arizona, by the American Clyde Tombaugh. The search so far seems to have been fruitless. But I do see someone waving a picture of Pluto the Disney dog somewhere near the front.

14:35 "You will need a pen or a pencil," says Bell Burnell, who is chairing the session. The audience duly rummages in its bags, in order to add inverted commas to the category "dwarf planets" and clarify the situation over satellites. A speaker from the floor suggests, to much laughter, dropping all the resolutions except footnote 1 to 5A: "The eight classical planets are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune."

14:43 At last, the vote. Astronomers wave little yellow cards in the air to indicate their support for resolution 5A—that's the one that recognizes three categories of objects: planets, "dwarf planets" and small Solar-System bodies. A few people wave their cards to vote the resolution down, a few abstain.

A moment's hesitation from the chair. Then: "I believe the resolution is clearly carried." Amazing! A decision! I wouldn't have predicted that at the week's beginning. Bell Burnell brings out teaching aids from under the table. A blue balloon to represent the planets. A stuffed Disney Pluto and a box of cereal (Cereals, therefore cereal, get it?) stand in for the "dwarf planets." There's something indistinguishable and lumpy for the small Solar-System bodies.

Next, a vote on resolution 5B. Are classical planets and "dwarf planets" all planets proper, giving us two classes of planets and making "planet an umbrella term?" (Out comes an umbrella labelled "planets!") Ninety-one in favour. The number against is overwhelming—no need to count again.

"It's clear that resolution 5B is not passed," the chair reports. So, we have eight planets only. Pluto is out.

Straight after the vote, I see Richard Binzel of the Massachusetts Institute of Technology, a member of the Planet Definition Committee. He says, with some relief, "It's over, it's done." Oh no it's not.
PLUTO

Underworld Character Kicked Out of Planetary Family

PRAGUE, CZECH REPUBLIC—The debate wasn’t even supposed to be about Pluto. Last week’s vote by the International Astronomical Union (IAU) to redefine the term “planet” was intended to set rules for the classification of new discoveries in the outer solar system. Instead—a pair of votes that made headlines around the world—IAU not only dropped the small, distant ice ball from the roster of planets but also all but guaranteed that no more planets would be discovered in the solar system in the future.

The decision, made here at the closing session of the IAU’s triennial meeting,* reclassifies Pluto as a “dwarf planet”—but not a planet. That is “patently incorrect,” says astronomer and Pluto buff Alan Stern of the Southwest Research Institute in Boulder, Colorado, who heads the New Horizons mission that set off last January to explore the tiny icesn 2015. “If the IAU wants to proclaim that the sky is green, that doesn’t make it so.” But other astronomers and planetary scientists—including some who supported Pluto’s planetary status—say it’s time to move on.

Reclassified. Under new rules adopted by the International Astronomical Union, Pluto becomes one of three “dwarf planets” as well as the interiormost member of a still-unnamed class of Kuiper belt objects.

The question became impossible to ignore in the summer of 2005, when Michael Brown, a planetary scientist at the California Institute of Technology in Pasadena, announced the discovery of 2003 UB₃₁₃ (nicknamed “Xena”), an icy world further from the sun than Pluto and some 10% larger. Had Brown discovered the 10th planet? Without a formal definition, there was no way to tell. So earlier this year, the IAU Executive Committee asked seven people (including award-winning science writer Davia Sebel) to write one.

Chaired by Owen Gingerich, a professor of astronomical history at the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts, the committee met in Paris on 30 June and 1 July and unanimously agreed that planet club membership would be open to any sun-circling body big and massive enough to become spherical under its own self-gravity. That would include not only Pluto and “Xena” but also Ceres, the largest member of the rocky asteroid belt between the orbits of Mars and Jupiter. The definition also opened the door for scores of yet-to-be-discovered Kuiper belt planets. In addition, the committee proposed that Pluto’s large moon Charon should be considered a planet in its own right and that Pluto-like objects in the Kuiper belt should be called “plutons.”

IAU presented the resolution to its General Assembly on 16 August, giving the roughly 2,500 attendees more than a week to discuss it. But the committee expected clear sailing. “We felt we had a resolution that anybody could love,” Sebel says.

Instead, the “12-planet proposal” went down in flames. Critics objected that planets should also be defined by their orbital dynamics, not just their size and shape. All eight “major” planets, they pointed out, were massive enough to sweep up, fling away, or gravitationally control all the debris in their parts of the early solar system, but Ceres and Pluto—and a host of other candidate “planets”—were not.

Many astronomers lambasted the resolution during a tumultuous lunchtime meeting on 22 August. To Gingerich’s argument that the proposal rested on physical criteria, astero- noid researcher Andrea Milani of the University of Pisa in Italy, literally screamed, “Dynamics is not physics!” Other astronomers protested the committee’s neglect of extrsolar planets, only to be angrily silenced by outgoing IAU President Ronald D. Ekers, who declared such issues to be “out of order!” Some in the audience expressed chagrin. “It should never have become this emotional,” says astronomer George Miley of Leiden University in the Netherlands.

On the morning of 24 August—the day of the vote—IAU issued a revised resolution (5A) adding gravitational dominance to the requirements for planethood and omitting any reference to Charon or “plutons.” Ceres, Pluto, “Xena,” and other sun-circling bodies were labeled “dwarf planets.”

But to the surprise of many, IAU added an optional amendment (resolution 5B) that would have changed the term “planet” in
resolution 5A into “classical planet.” By restricting the new definition to the eight existing “classical planets,” the second resolution implied that dwarf planets were a subcategory of planets, too. To “Pluto-bashing” planetary scientists, it looked as if the committee had made a final attempt to keep the small balls in the planet league.

As it turned out, resolution 5A (including the dynamical criterion) passed by a margin so wide that no formal count was deemed necessary, and its sibling 5B was soundly defeated. At 3:32 p.m. European time, Pluto ceased to be a planet.

The Plutoics wars aren’t over yet. “This is a sloppy, bad example of how science should be done,” says Stern, who was not at the meeting. In protest, he and others have already withdrawn articles from an upcoming edition of a professional solar system encyclopedia after the editor requested them to change Pluto’s status in the articles. A petition against the accepted planet definition is already circulating among planetary scientists.

But 2003 UB₃₁₃’s discoverer Michael Brown (who is not an IAU member and thus had no say in the matter) urges peace. “It was the right scientific choice. As scientists, we should say, ‘It’s fine. Let’s let it go and get on with the business.’”

The business includes coining a word for dwarf planets beyond Neptune, of which Pluto has been designated as the prototype, and setting an official name for dwarf planet 2003 UB₃₁₃. Planetary scientists must also decide whether dwarf planets belong in their large and steadily growing list of minor planets or in a new catalog. And of course, schoolbooks have to be rewritten. Despite the flood of news stories speculating about the effect of the IAU vote on students’ fragile psyches, Brown predicts that children will adapt easily to the revised solar system. “People are not as upset about schoolkids as they think they are,” he asserts. “They’re actually upset about their memories of themselves as schoolkids. The kids will be fine.”

—GOVERT SCHILLING

Govert Schilling is an astronomy writer in Amsterdam, the Netherlands. With additional reporting by John Bohannon and Robert Coe.
Scientists challenge Pluto's demotion

By Andy Sullivan

WASHINGTON (Reuters) - Hundreds of U.S. scientists have challenged a recent decision by an international astronomy group to strip Pluto of its planetary status with a petition rejecting its definition of what constitutes a planet.

The astronomical explosion shows that debate is likely to continue over the status of the icy rock at the edge of the solar system that was considered the ninth planet until a vote last week by the International Astronomical Union.

Petition organizer Alan Stern said the union's decision was driven by politics, not science.

"The IAU can say the sky is green all day long and that doesn't make it so," said Stern, a planetary scientist at the Southwest Research Institute in Boulder, Colorado.

"The IAU created a definition which is technically flawed, linguistically flawed and scientifically embarrassing," Stern said in a phone interview.

The 300 astronomers and planetary scientists who signed the petition said they would not use the IAU's definition. Dissenters are organizing a conference next year to hash out a better definition, Stern said.

Pluto has been considered the ninth planet since it was discovered 1930. But the 2003 discovery of a nearby, larger body known as Xena prompted a reconsideration.

After rejecting a proposal to name Xena and two other bodies as planets, the IAU decided to downgrade Pluto and create a first-ever definition of what constitutes a planet.

According to the IAU, a body can be considered a planet if it orbits the Sun, is large enough to be made round by its own gravity, and has cleared the area around it of smaller cosmic objects.

That definition would exclude Earth and other planets that are pelted with asteroids, Stern said.

Others who did not sign the petition also criticized the IAU's decision.

"I'd like to see philosophers, writers and policymakers weigh in on this before we start rewriting textbooks," said Mark Buie, also at the Southwest Research Institute.

"If one scientist involved in crafting the IAU's definition said other points of view were inevitable," Buie said.

"There are many viable definitions for the word 'planet,'" said Richard Binzel, a planetary scientist at the Massachusetts Institute of Technology.

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Planet politics
How I tried -- and failed -- to save Pluto

By Owen Gingerich | September 3, 2006

NAMING HAS ALWAYS been a tricky business in astronomy. When Galileo discovered four “planets” accompanying Jupiter, he intended to name them “Medican stars,” after his hipped-to-patron. He got the job, but lost on the names. Kepler introduced the word “satellites,” and Medican never stuck.

William Herschel tried to name his new planet “Georgium Sidus” for King George III, but the international astronomy community would have none of that, calling it Uranus instead.

Lowell Observatory in Flagstaff, Ariz., was lucky with Pluto, which was discovered there in 1930. The name, suggested by an 11-year-old school girl, incorporated the initials of Boston Brahmin Percival Lowell, who had initiated the search for the object decades earlier.

Yet controversy finally caught up with Pluto in 2006. Pluto, it had turned out, was not a massive object influencing Uranus and Neptune in their courses, as Lowell and his contemporaries had assumed. It was a dwarf, smaller than our moon, and 100 times less massive than the earth. The supposed wobbles in Neptune’s positions resulted from using an incorrect mass for Neptune itself when calculating its orbit. Had these facts been known in 1930, Pluto’s planetary status would have been disputed at the outset.

The International Astronomical Union has for 80-old years been naming comets and asteroids without controversy, but when Mike Brown of Cal Tech and his colleagues recently found an object even larger than Pluto going the frozen reaches beyond Neptune, it ignited a crisis of nomenclature. Had he born a 10th planet? And were there more candidates waiting to be discovered among the numerous icy chains in the so-called Kuiper belt?

In a quark, the IAU decided to appoint a small but broadly based committee to look into the matter. As both an astrophysicist and historian of science, I was tapped to chair it.

There are two distinct scientific ways to approach the problem of defining planethood. One is extrinsic, to define a planet in terms of its neighbors and its interactions with its environment. This route would select the dominant bodies in the solar system, the ones whose gravity perturbs one another.

It was the flash of insight that not only the sun holds the planets in orbit, but that each planet attracts each other one, that led Isaac Newton to the concept of universal gravitation. Neptune attracts Pluto, locking it into a resonant orbit so that in the fate Neptune takes to rend the our three, Pluto revolves exactly twice. But Pluto is too lightweight to have an appreciable effect on giant Neptune. The eight dominant heavyweights, from Mercury to Neptune, are big enough to rule their zones and swallow up most of the smaller bodies or kick them out of the way.

Choosing such dominance is a comfortable way to go when defining what constitutes a planet. While it would dismiss Pluto, it would forever place the other eight planets in an exclusive club.

An alternative way to define a planet, however, is intrinsic—that is, by the properties of the body itself, more or less independent of its environment. This is the way planetary geologists look at the problem, and pretty much the way astronomers looking at the hundred-plus planets circling other stars do. The idea of using the basic physics of the object appealed to our committee as the forward-looking way to define planets, for it could apply not only to the far stretches of the solar system, but to the objects being found around distant stars as well.

Rather than arbitrarily drawing a line in the sand that would either include or exclude Pluto, we opted to let nature pick a dividing line between planets and the hundreds of thousands of lumpy asteroids now known--nearly 140,000 numbered objects and an equal number awaiting their catalog numbers. If a body is massive enough, with enough self-gravity to pull itself into a ball, let it be a planet. If it’s just a lump, let it be an asteroid or a comet.

Of course, the roundness definition could open the gates to a dozen or more snowballs in the Kuiper belt, and we were quite aware that these bodies would be minor lightweights in a system of traditional heavyweights. So we decided to distinguish the eight classical planets from the Kuiper belt planets. As a group, these Kuiper belt planets needed a name, something that gave a tip of the hat to the longstanding enmarch of Pluto. We eventually backed the name “plutonian.” Thus Pluto, while being demoted, would be up front in the position of being a group leader and would still be a planet, though not a traditional one.

In August our committee took this recommendation to Prague, to the triennial IAU congress, where it became the most talked-about issue of the meeting. (It recently put “Pluto” and “Gingerich” into Google and got 41,000 hits.) The media there had two questions: Was Pluto still a planet? and how many planets would there be?

In the committee it had never occurred to us to count the current number, because we knew the tally of plutonians would rapidly grow. We also knew that the Hubble Space Telescope had recently shown that the earliest known asteroid, Ceres, was round. Ceres would thus fit our definition of a planet, though it would be in a category of its own, being neither a heavy weight nor a plutonian, but received to the lightweights planets beyond Neptune.

All this was more complexity than could be accounted for in any hardy mnemonic phrase. We felt, however, that our definition reflected the new-found diversity in our solar system, which modern science shows is far more complex than dreamt of by Percival Lowell. Our definition suggested the growing richness of our environment. But it also proved to be the Achilles heel of our proposal.

The media, eager to promote controversy, quickly found vocal critics to say that the whole business was too complicated. In the final days of the congress, a group of astronomers persuaded enough of their colleagues that a simpler result was desirable (even if it required a more complicated definition), and the intrinsic approach was voted down.

The IAU thereafter defined a planet in our solar system as an object large enough to clear the smaller bodies from its orbit, a definition just murky enough to give teachers a considerable challenge to explain precisely what this means. Taking the exclusion club approach for the heavyweights, the IAU went on to create a class of “dwarf planets,” including Pluto, that by definition are not planets. To me this is a logistic absurdity, a contradiction that could have been avoided if they had chosen to define only the eight classical planets as the basic type of planets, allowing dwarf planets to be considered planets too, albeit of a different kind. But this cultural compromise was specifically rejected.

In their muddled wisdom, the IAU members did at last vote to make Pluto the prototype object for a new category. Ceres will stand alone as a dwarf planet in the asteroid belt while Pluto will be the cluster member of a new class of dwarf planets beyond Neptune, much as our committee originally proposed. But, by a virtual tie vote, the IAU decided not to adopt the obvious name “plutonians” for that category. The name awaits in the wings.

Owen Gingerich is professor emeritus of astronomy and history of science at the Harvard-Smithsonian Center for Astrophysics and the author of “God’s Universe,” to be published this month.

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Boston Globe, 03.09.06
Whatever Happened to
Having Kids?
Why More & More Married Couples Are Going Childless

PLUS
Beating the Biological Clock
Of Cosmic Proportions

Astronomers declare Pluto isn't a real planet anymore. Why they did it, and how our view of the universe is changing.
A New World Order

Last week astronomers registered a tiny blip to "about eleven" stars, striking the long-held belief that our planet is not unique in the universe. The discovery of new planets around other stars raises the possibility that the solar system is not an isolated phenomenon. The discovery of new planets has been hailed by scientists as a "Golden Age of Planetary Science." The discovery of new planets has The New York Times, the Associated Press, and CNN all heralded it as a "Golden Age of Planetary Science."

Getting to Know the Planets

Science

Hubble Telescope

Since its launch, Hubble has revealed stunning images of distant galaxies. The telescope has provided a wealth of astronomical data, including images of distant galaxies and the evolution of the universe. The telescope has been a major tool in the study of the universe, allowing astronomers to explore the far reaches of space and to gain insights into the nature of the cosmos.

Plateau: The Numbers

Earth's surface consists of about 4 billion square kilometers, or about 1,600,000 square miles. About 4,000,000 square miles of Earth's surface are covered by water.

Dwarfs vs. Planets

Planets are defined as objects that orbit a star and are large enough to round their own gravity. Dwarfs, on the other hand, are smaller and do not have enough mass to round their own gravity. There are currently two known dwarf planets: Eris and Pluto.

The Kuiper Belt: Beyond Neptune

The Kuiper Belt is a region of the solar system beyond Neptune that contains a large number of small objects, including dwarf planets and Kuiper Belt objects. The Kuiper Belt is thought to be the source of many of the comets that visit the inner solar system.

Contact us: science@newsweek.com

Newsweek, 04.09.06

Visit www.newsweek.com for more news and analysis.

The author of this article is a senior editor at Newsweek, a position he has held since 2002. He has covered a wide range of topics, including science, technology, and politics. He has written articles on topics such as climate change, space exploration, and the Internet. He is a graduate of Harvard University and holds a degree in physics. He lives in Washington, D.C., with his wife and two children.
新定義案による太陽系の惑星
（各惑星の大きさや距離の比率は実際とは異なる）

太陽 水星 金星 地球 火星

木星 土星

冥王星 カロン

セレス

（国際天文学連合と米航空宇宙局の資料から）
Andrang im Klub der Planeten

Dutzende weitere Himmelskörper sollen Vollmitglieder des Sonnensystems werden


Dann wäre der Begriff Planet einer neuen Definition brauchbar, der Planeten eine andere Liste. In den Jahren 2005-2006 wurden kürzlich auch zwei Planeten, die von dem Hamburger Drogenkrüger auf einem Bild selbst entdeckt wurden, in die Liste aufgenommen. Sie sind Lutchen, eine Art von Planeten, die nicht um die Sonne kreisen, sondern um eine andere Sonne, die Proxima Centauri, welche etwas 100.000 Lichtjahre entfernt von der Erde liegt.

Der Neuling kroch jetzt in die Liste, und die Astronomen der IAU haben beschlossen, ihn mit dem Namen "Lutchen" zu bezeichnen. Der Planet hat eine Masse von etwa 7,5 Erdenmassen und ist etwa 1,3 Millionen Kilometer von seiner Sonne entfernt. Er umkreist seine Sonne in etwa 150 Tagen und ist damit der erste Planet außerhalb der Sonnenfamilie.

Die Flutons und die Würze

Gemäß der Neuklassifizierung werden die neuen Planeten als "Flutons" bezeichnet, die ein geordnetes System bilden, das von der Sonne ausgeht und sich in der Ebene der Planeten bewegt. Die Flutons sind kleiner als die bisher bekannten Planeten, aber größer als die bisher bekannten Asteroiden.

Doch der Neuling hat auch seine Herausforderungen. Seine Entdeckung ist noch nicht abschließend, und es gibt noch viele Fragen, die zu klären sind. Der Neuling hat auch eine eigene Atmosphäre, die noch nicht vollständig erforscht ist. Die Astronomen arbeiten daran, die Atmosphäre und die Struktur des Neulings zu verstehen.

Zwanzig Planetensysteme bestehen aus mehreren Planeten, die in engen Bahnen um die Sonne kreisen. Diese Planeten werden als "Flutons" bezeichnet. Sie sind kleiner als die bisher bekannten Planeten, aber größer als die bisher bekannten Asteroiden.

Die Flutons sind ein interessantes Phänomen, das auf die Entdeckung neuer Planeten hindeutet, die nicht um die Sonne kreisen. Die Flutons sind ein Beispiel dafür, wie die Astronomie weiterentwickelt wird, und wie die Erde weiterhin neue Entdeckungen macht.

Trotzdem bleibt die Frage, was die Zukunft der Astronomie bewirken wird, noch ungelöst. Die Entdeckung neuer Planeten ist nur der Beginn des Prozesses, und es gibt noch viele Fragen, die zu klären sind. Die Astronomen arbeiten daran, die Entdeckungen der Zukunft zu bereiten, und die Erde wird sicherlich noch viele Überraschungen bereiten.
GA 2006 hits the Google News frontpage (right hand column)
Google News, 25.08.06 – Pluto as top science story

**Business**

Motorists rescued after being stranded by runoff

By Fergus Maguire, Aug. 25 (Bloomberg) — Australia’s government will slash a public sale of Telstra Corp. shares by more than half to A$10 billion ($16 billion) after the shares this week fell to a record low.

**SciTech**

Astronomers strip Pluto of planetary status

By ANICK JESDANUN AP Internet Writer, NEW YORK August 24, 2006 (AP)— “Ninth,” “24” and “dubiously” will be among the words and television shows that AOL will sell through its new video portal under.

AOL to Sell Movies, Shows Through Portal

By ANICK JESDANUN AP Internet Writer, NEW YORK August 24, 2006 (AP)— “Ninth,” “24” and “dubiously” will be among the words and television shows that AOL will sell through its new video portal under.

**Video of America** 

Video of America — Reuters: International Herald Tribune — Indian Express — all 3,416 related x

Teenager tells of her eight years as dungeone sex slave

Daily Mail — UK — 55 minutes ago

By REBECCA CANBY in Vienna Last updated at 10:14 EST on 26 Aug 2006. A girl held captive as a sex slave in a dungeon for eight years told police of her dramatic escape from the man she was forced to call Master.

**Google News**

It was mid-air paranoia, not love: Hindustan Times

After release of 12 suspects, debate on whether plane diversion...

China Post

Video of America — Reuters: International Herald Tribune — Indian Express — all 3,416 related x

Army reviewing casualty reports

Huston Chronicle — 2 hours ago

By SCOTT UNRAU Associated Press Writer, SAN FRANCISCO — The Army is taking new steps to ensure it gives the families of soldiers killed in combat accurate information about how their loved ones died.

**USA Today**

News 12 Georgia — 10 hours ago

By Chris Keane — USA Today Staff Writer

People's Daily Online — 9 hours ago

The countdown includes some 36 hours of built-in hold time prior to the targeted 4:30 pm EST launch on Aug. 26.

Next shuttle flight devoted to construction

NASA begins countdown for space shuttle launch

Appendix I: Excerpts from GA Newspaper

IAU Planet Definition Committee

The IAU has been the arbiter of planetary and satellite nomenclature since its inception in 1919. The various IAU Working Groups normally handle this process, and their decisions primarily affect the professional astronomers. But from time to time the IAU takes decisions and makes recommendations on issues concerning astronomical matters affecting other sciences or the public. Such decisions and recommendations are not enforceable by any national or international law; rather they establish conventions that are meant to help our understanding of astronomical objects and processes. Hence, IAU recommendations should be on well-established scientific facts and have a broad consensus in the community in question.

Ron Ekers, President of the IAU

The boundary between major planet and minor planet has never been defined and the recent discovery of another "Trans-Neptunian Object" (TNO), representing a new class of planets, has caused considerable confusion amongst astronomers. While there was general agreement on all the scientific issues related to Solar System dynamics and physical properties of objects, the IAU Working Group could not agree on any aspect that was not related to solar system and other issues, such as the status of Pluto. In order to include these broader aspects, the IAU Working Group on "Planets" formed a new committee whose membership included historians, science writers, philosophers, and education as well as astronomers.

Terms of Reference

The Planetary Definition Committee of the IAU Executive Committee was charged with:

(a) establishing the criteria for classifying any new object as a planet and recommending a course of action that balances the scientific facts with the need for scientific acceptance of any change;
(b) clarifying the status of Pluto, and of any newly discovered TNOs in the light of recommendations (a);
(c) considering whether the current naming procedures for planets and minor planets have encountered the problem of defining a planet and recommending whatever revisions are needed, and
(d) attempting to have these recommendations as a resolution, or resolutions, that could be put before the General Assembly in August 2005 for possible adoption.

The Path to Defining Planets

Debates Drifting Format/Science Focus Center for Astrobiology/IAU

"Planet Definition" Committee chair

Catarina Lopes

Catarina Lopes is a planetary scientist at the University of Cambridge. She has worked on the definition of planets for many years, and has been involved in discussions about the status of Pluto and other objects in the outer solar system. She is currently working on a new definition of planets that will be presented to the IAU General Assembly in August 2005.

One physical criterion is that the object must be round, and the IAU has proposed a mathematical definition of what makes an object round. However, there is some controversy about whether this definition is sufficient to define a planet.

How, in fact, should the word "planet" be defined?

This was the fundamental question facing the committee established by the IAU to review the definition of a planet. The committee consisted of astronomers from around the world and was led by Catarina Lopes. The committee's work was done in a series of meetings held over several years, and the final definition was adopted in August 2005.

The definition includes two main criteria:

1. The object must be round, and
2. The object must be massive enough to have cleared its orbital region of other objects.

The new definition was accepted by the IAU, and has been widely adopted by the scientific community.
difficulty in achieving a consensus on this complex issue, and we wish to provide ample opportunity for legal issues to win in the formation of the final resolution to be considered in the next steps.

The key events that have an influence on the final resolution to be presented will be the closing plenary session, in which all 265 members are encouraged to participate, and (3) the discussion session, which begins on Monday, 24 August at 11:00 in the UN Hall and concludes on Tuesday, 25 August at 12:30 in the same location. The closing session will provide an opportunity for those who could not attend the initial sessions to hear the discussion and make recommendations for the final resolution to be considered in the next steps.

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Appendix J: Selected public responses

My name is Silky Sullivan, owner of the World Famous Silky O'Sullivan Bar and Restaurant on Beale street in Memphis, Tennessee, USA, home of Elvis Presley. We salute you on the discovery of the new planets and understand that new names should be of mythological origin. I would like to appear before the IAU to explain why this new body should be named planet Elvis. I have expressed my view on our local news station and in our weekly publication The Memphis Flyer. Response from these activities has been overwhelming. Thank you for your time and consideration.

Sincerely,
Sily Sullivan

I ask you why then if Pluto has been reclassified by your definition why has Neptune also not been reclassified by the same definition.

If Pluto has not cleared the neighbourhood around its orbit do to the fact that it crosses Neptune's orbit, than at the same time Neptune has not "cleared its orbit" because Pluto crosses Neptune's orbit.
Please explain.

Virginia Strogen
Dear Mr. Lindberg Christensen;

I was reading the article regarding planets and I thought you might appreciate this illustration. Enjoy.

Kindest regards,
Connie Pecoraro
Artist-Loft
691 Bridgeway
Sausalito, California 94965
415-332-7633
FX:415-332-1263
connie@nonamegirl.com
My ten year old daughter was interested to learn the resolution of the definition of planet. She has been following the subject closely.

In school my daughters were taught to remember the planets names in order with the acronym MVEMJSUNP

My Very Educated Mother Just Showed Us Nine Planets

My = Mercury
Very = Venus
Educated = Earth
Mother = Mars
Just = Jupiter
Showed = Saturn
Us = Uranus
Nine = Neptune
Planets = Pluto

They have edited the acronym as follows:
MVEMJSUN
My Very Educated Mother Just Showed Us Nothing

My = Mercury
Very = Venus
Educated = Earth
Mother = Mars
Just = Jupiter
Showed = Saturn
Us = Uranus
Nothing = Neptune

So much for motherhood. The trickle down effect of the change will be far reaching.

L Humes
Appendix K: Praise from journalists

Thanks a lot for your outstanding service. This was by far the best press service I have ever experienced at an IAU General Assembly. Your and your team’s efforts enabled me to work very efficiently. Thanks to all of them!

Dirk Lorenzen, Deutschlandfunk, book author

I followed the vote live on your website. Congratulations for the way you dealt with the press. Many could learn from you.

Nelson Marques, freelance journalist, Porto, Portugal

I want to thank you for all your help during the IAU conference. I know it was a busy time for you, but I appreciate you getting back to me by email.

Alicia Chang, Science Writer, Associated Press

This is an email to say thank you for your help in the lead-up to and during the General Assembly in Prague. We especially appreciate being able to use your telephone to interview astronomers; with all the difficulties we had at the start that made things much easier for us.

Stuart Lowe & Nick Rattenbury, The Jodcast

I had an interview with Mr. Zhu and another astronomer in domestic research organization on Aug. 23 and Aug. 24. So I could finish the report. And I want to say is that it is so kind of you. For your (maybe and your colleague’s) help I appreciate very much. This is my first time to contact with some overseas interview. I was encouraged a lot by your kindness and patience.

Ms Hou Jianmei, reporter in Beijing
Appendix L: Worst case scenario 4: A change of Pluto’s status creates anti-American feelings in the US

By Helen Sim

Pluto is a planet with many American connections. Percival Lowell devoted years to searching for “Planet X”; Clyde Tombaugh, hired to carry on the search, found Pluto at Lowell’s observatory. The US-based Planetary Society has lobbied heavily for a mission to Pluto, now realised as the New Horizons mission. This American (NASA/JPL) mission is the first to the Pluto-Charon system.

Because of the stake they have in the discovery of Pluto and its current status, some of these parties may resist any attempt to change its status. Such a change may be seen as an anti-American move on the part of a European body (the IAU), and trigger or feed into American separatism in the planetary sciences.

Background

An American discovery

Percival Lowell, founder of Flagstaff Observatory in Arizona, devoted the last 13 years of his life to searching for “Planet X”, a hypothetical ninth planet. The search continued after his death in 1916 and culminated in the discovery of Pluto by Clyde Tombaugh at the observatory in 1930. The first two letters of the name Pluto are also Percival Lowell’s initials.

Lowell is buried in a mausoleum at Flagstaff Observatory. The Observatory also displays the telescope and Zeiss Blink Comparator with which Pluto was discovered. The discovery of Pluto is an important part of Arizona’s astronomical history.

Clyde Tombaugh (1906-1997)

Clyde Tombaugh, the discoverer of Pluto, is presented as a self-made man, an archetypal American success story. Born on a farm in the Mid West (Kansas), his interest in astronomy began when he was a boy,

... without access to observatories, universities or even a large library. Unable to afford a college education, Tombaugh taught himself solid geometry and trigonometry, and studied the stars through telescopes he built himself.

Tombaugh, then an amateur astronomer, was hired by Lowell Observatory in 1929 to search for Lowell’s Planet X. (At the time, Lowell Observatory was the only observatory in the country dedicated to studying planets, and Tombaugh had a particular interest in planets at that stage.) On January 23 and 29 of 1930, he exposed a pair of plates from which he discovered Pluto on 18 February. “By then Tombaugh had examined hundreds of plate pairs and millions of stars.”

After his discovery, Tombaugh entered the University of Kansas to obtain a degree. He returned to work at the Lowell Observatory, taught navigation to the US military during World War II, and after the war used his expertise in optics in the development of missiles at the White Sands Missile range at Las Cruces, New Mexico. From 1955 until his retirement on 1973, Tombaugh was on the faculty of New Mexico State University. In later years, Tombaugh went on a speaking circuit in Canada and the USA to raise money for the University’s
Tombaugh scholarship for post-doctoral students in astronomy. He died at home in Las Cruces at the age of 90.

The naming story
The name Pluto was suggested by Venetia Phair (nee Burney), an 11-year-old English schoolgirl at the time of the discovery. Mrs Phair is now in her late 80s and lives in Epsom, England.

Venetia suggested the name after reading about the discovery in The Times with her grandfather, Falconer Madan, a retired librarian from the Bodleian Library. Madan took the suggested name to a friend, Herbert Hall Turner, professor of astronomy at the University of Oxford and former astronomer royal. Turner agreed the name was a good one, and promised to send a telegram, forwarding the suggestion, to the Lowell Observatory.

Accounts of the naming process then simply note that the name was formally adopted on 1 May 1930, the announcement made by Vesto Slipher, director of the Lowell Observatory. Any role the IAU may have had is not mentioned.

Many other names were suggested by members of the public and those associated with the discovery (such as Percival Lowell’s widow). The discovery was seen to be “public property”.

A dust counter on the “New Horizons” mission to Pluto (described below), built by students and staff of the University of Colorado, has been named “Venetia” in honour of Venetia Burney/Phair. The asteroid 6235 Burney was also named in her honour.

The “New Horizons” mission
In 2003, the Space Studies Board of the US national Academy of Sciences published a report, “New Frontiers in Solar System Exploration”. In its prioritised list of missions, the most highly ranked medium sized mission (<$650 million) was the Kuiper-Belt Pluto Explorer.

This mission, “New Horizons”, launched on 19 January 2006; it is due to reach Pluto in 2015. This is the first mission to Pluto and Charon, and the so-called “double planet” is the last planetary system to be visited by spacecraft. Symbolically, this mission could be taken as a “final chapter” in a particular phase of planetary exploration.

NASA, however, positions the as a beginning rather than an end, invoking the important American notion of the “frontier”:

Pluto and Charon are truly part of the current “frontier” in planetary science. No spacecraft has ever explored them, yet they promise to tell us much about the origins and outskirts of our solar system.

However, NASA also links Pluto with Ceres, in a class of “dwarf planets”:

Ceres and Pluto have something in common: They are both dwarf planets. Ceres is about twice as small by roughly as dense as Pluto, despite the fact that it formed about 10 times closer to the Sun. With the discovery of other dwarf planets in the Kuiper Belt it has become clear that the solar system we once thought of as consisting of four terrestrial planets, four giant planets and a misfit planet named Pluto isn’t that at all. In fact the solar system appears to contain at least dozens of dwarf planets—perhaps more—quantitative population estimates as high as 1,000 dwarfs can be found in the technical literature.
This suggests a useful positioning strategy: that any recategorisation of Pluto be presented not as a demotion but as the removal of its ‘misfit’ status. In other words, Pluto is a swan, not an ugly duckling.

The New Horizons spacecraft carries a CD containing the names of 430,000 people (recorded at their request). Those who have names recorded can print out a certificate recognising their participation, from an online database.

The PI for the New Horizons mission is Alan Stern of the Southwest Research Institute. The SwRI is headquartered in San Antonio, Texas; its Department of Space Studies is in Boulder, Colorado. Partners in New Horizons include Johns Hopkins University Applied Physics Laboratory; Boeing; the US Department of Energy; KinetX Inc.; University of Colorado; Ball Aerospace; NASA’s Goddard Space Flight Center and Kennedy Space Flight Center; and the Jet Propulsion Laboratory.

Nix and Hydra
These two small moons of Pluto were discovered in 2005 with the HST (Weaver et al IAUC 8025). The names, Nix and Hydra, were proposed by the Southwest Research Institute and officially recognised by the IAU in June 2006.

The Planetary Society
Over several years, the US-dominated Planetary Society lobbied intensely for a space mission to Pluto—what is now “New Horizons”. A detailed timeline of the campaign, from July 2000 to September 2003, is available on the Society’s website. Specific actions included:

- in October 2000, presenting 10,000 postcards in support of a Pluto mission to specific members of Congress; and
- in November 2002, presenting Congress with a petition signed by 10,000 people, urging support for New Horizons.

The “New Frontiers in Solar System Exploration” report referred to earlier in this document was written by the Space Studies Board of the National Research Council (NRC), part of the National Academy of Sciences. At NASA’s request, the NRC asked the planetary science community to assess the priorities in planetary exploration for the next ten years. The NRC steering committee also asked the Planetary Society to poll the public about their views on planetary exploration. More than 50,000 responded to the online poll within a fortnight.

The Planetary Society sums up its contribution in this way:

The Bush Administration cancelled it twice, NASA claimed its budget couldn’t cover it, and Congress earmarked funds to be cut in mid-development; yet the trail-blazing New Horizons Pluto-Kuiper Belt mission has survived. This is no doubt due in part to the relentless public campaigning led by The Planetary Society.

Implications
The IAU is perceived as predominantly European body. Any ‘demotion’ of Pluto—the only one of the established planets to have been discovered by an American—may be perceived as an anti-American move, particularly by those who have a stake in the discovery story. This could lead to moves—e.g. American separatism—that mirror what has been happening in the larger political arena under the Bush administration.
The discovery and naming of Pluto feature attractive characters: the self-made man from America’s mid west, and an 11-year-old schoolgirl. The IAU doesn’t appear in popular accounts of the story and, if it did, it would be seen as a ‘rubber stamp’, not the driver of the action. Both the discovery and formal naming of Pluto were announced in the US by noted US astronomers (Shapley at Harvard for the discovery, Slipher for the naming).

Possible reactions
For those with a stake in the current status of Pluto or its discovery history, both active reactions (protests and lobbying) and passive resistance (that is, ignoring any reclassification) are possible. Specifically:

- Under political pressure, or spontaneously, NASA or the US planetary science community may develop its own categorisation for objects in the solar system—e.g. developing the “ice dwarf” category using criteria other than those proposed by the IAU.
- The AAS may be asked to develop policies on this and related issues that provide “American” alternatives to the “European” ones of the IAU.
- US astronomers may be lobbied (e.g. by the Planetary Society) to withdraw from the IAU as individual members.
- An individual member or members of Congress (e.g. from Arizona) might be lobbied to move for the US to withdraw from IAU at a national level.
- To generate ammunition for political lobbying, the Planetary Society may conduct a poll of the US public on the status of Pluto.
- The New Horizons team may perceive that a change in Pluto’s status may weaken its funding status, and lobby the IAU Executive or members for any change in Pluto’s status to be delayed (or, if it is changed, reversed).
- The family of Clive Tombaugh may protest against Pluto’s change in status.
- Flagstaff Observatory is likely to maintain its current displays and materials about Pluto.
- New Mexico State University may continue to refer to Pluto as a planet and Clive Tombaugh as its discoverer.
- US book publishers, planetaria and generators of online content may be slow to change their current material on Pluto and its discovery, if they change it at all. They may do this spontaneously: they may also be lobbied to do so.
- Individual schools in the US may be slow to change what they teach about Pluto and its discovery, if they change it at all.

By contrast, reaction in the UK will probably be mild, and Venetia Burney/Phair and her family will probably not make much fuss about any change. Burney/Phair is on record as saying that, while she’d prefer Pluto to remain a planet, it’s not an important issue for her.
## Appendix M: Acronyms

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<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>IAU</td>
<td>International Astronomical Union</td>
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<td>GA</td>
<td>General Assembly of the IAU</td>
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<td>EC</td>
<td>Executive Committee of the IAU</td>
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<td>NPR</td>
<td>National Public Radio</td>
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<tr>
<td>PDC</td>
<td>Planet Definition Committee</td>
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<tr>
<td>ESO</td>
<td>European Southern Observatory</td>
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<tr>
<td>AAS</td>
<td>American Astronomical Society</td>
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<tr>
<td>IAP</td>
<td>Institut Astrophysique de Paris</td>
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<tr>
<td>NOC</td>
<td>National Organising Committee</td>
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<td>WGCAP</td>
<td>Working Group</td>
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<td>LOC</td>
<td>Local Organising Committee</td>
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Appendix N: Distribution list for this report

The following have received a hardcopy of this report:

- EC
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The report is also available as PDF file from:

Let lars@eso.org know if you would like a hardcopy.