

Herschel status

HUG#4 meeting, 15-16/12/2011
Göran Pilbratt, Herschel Project Scientist

Launch on 14 May 2009 ...



Launch on 14 May 2009 ...

... today OD#946 will be commencing!





Mission Status

Observing status

- Execution and observing programmes

User Reduced Data

Publications

Communications

AO2

- Time available
- Response and recommendations

'Must do' DDT

HSC news



Mission overview and general status

Overall mission status



Herschel works well and delivers good data



- IOPR#2 held in ESOC in late May 2011 – no major items.
- The odd 'minor issues' (including ground station issues) that do occur are taken care of by operational procedures.
- Occasional 'SEUs' – most of the time without implications.
- Execution of science observations routinely >19 hr/day, a record of 21.17 hr/day for a two-week scheduling 'cycle' has been achieved.
- Status weekly updated on the HSC website under 'Latest News'. Also available are 'Observing Log' and 'Observing Schedule' (scheduled but not yet executed observations). Also HSA of course...
- OT2 process almost finished, final consolidation underway.
- Data processing standard products re-processed (so far three times), and data processing software continuously improved (now HIPE 8.0.1).
- Publication tracking – continuously updated ADS generated list provided on the HSC website. Current total 322 papers.
- User provided data products are increasingly made available.

HERSCHEL SPACE OBSERVATORY

CR raster aka 'gyro propagation'

- Pointing performance, APE etc, well within specs, except SRPE
- Objective to improve SRPE (for nodding etc)
- Works technically... but does not deliver improved accuracy
- Discontinued!



STR focal length corrections

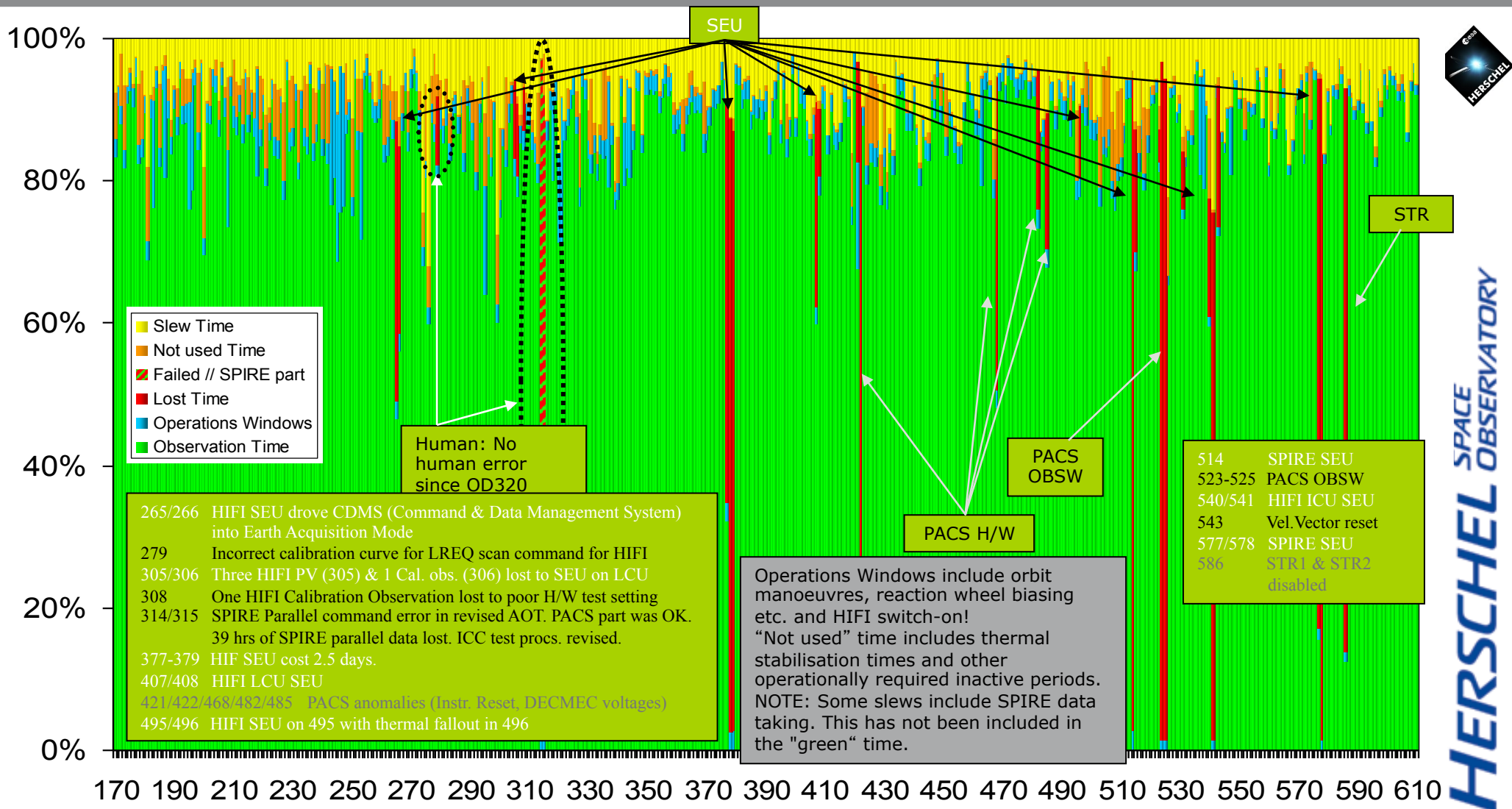
- Affected when STR CCD temperature was lowered (to address the issue of 'speed-bumps' – which it successfully did)
- 1-dimensional focal length correction (f_0)
 - Implemented OD#762 (14 June 2011) - APE improved from ~ 2.4 arcsec to ~ 1.4 arcsec
- 2-dimensional focal length correction (k_1 , f_1)
 - Test-OD on 18 September 2011, made permanent from 26 September 2011 – current APE ~ 1.1 arcsec (but not always...)
- Future pointing activities (APE & AME) are being addressed
 - Guide star catalogue improvement suggested



Observing execution

Observing status OD#170-610 – HUG#4

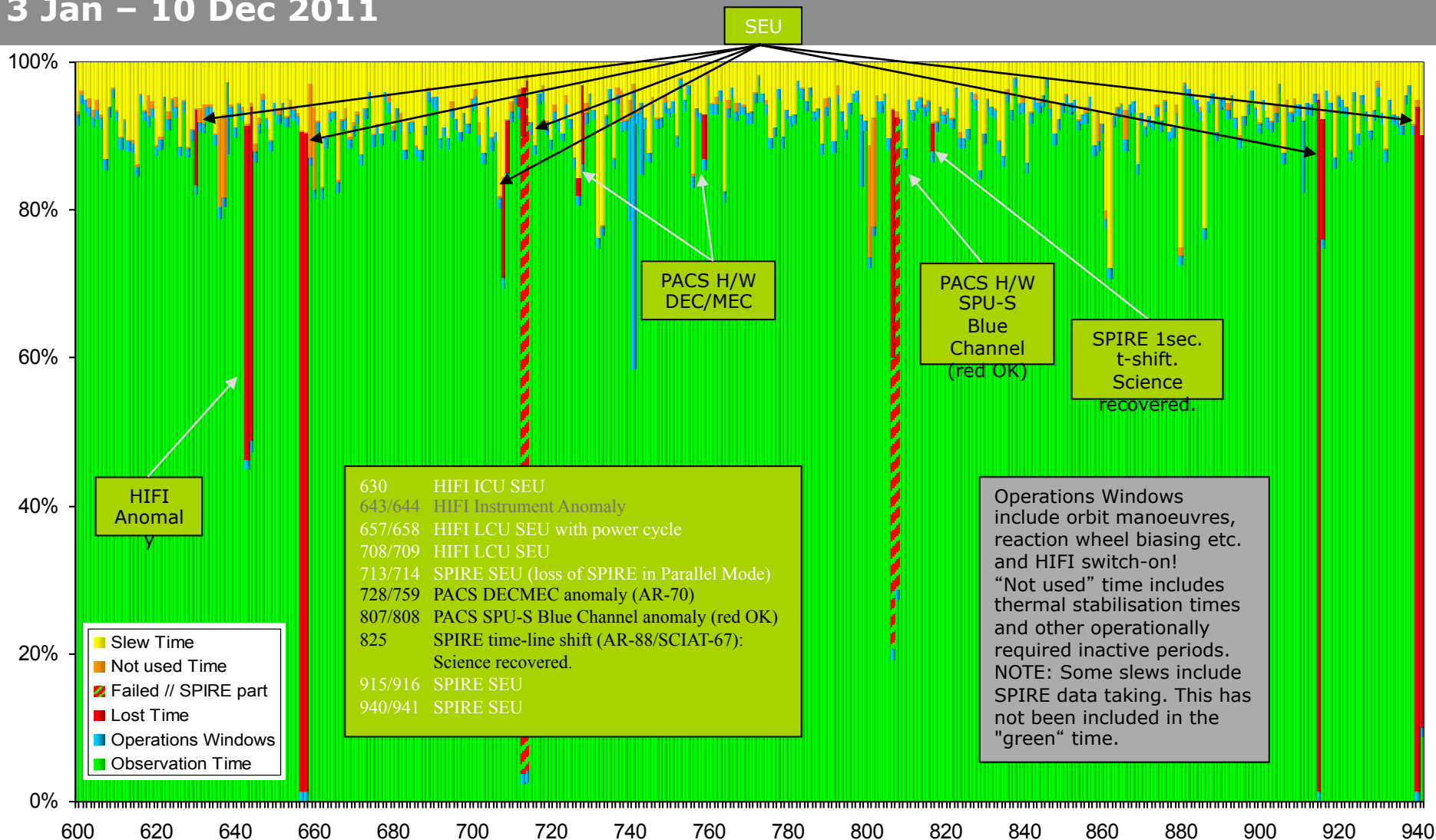
30 Oct 2009 – 14 Jan 2011



Total lost time from OD#170-610 – all sources : ~336hours (~3.9%)

Observing status OD#600-941 – HUG#4

3 Jan – 10 Dec 2011

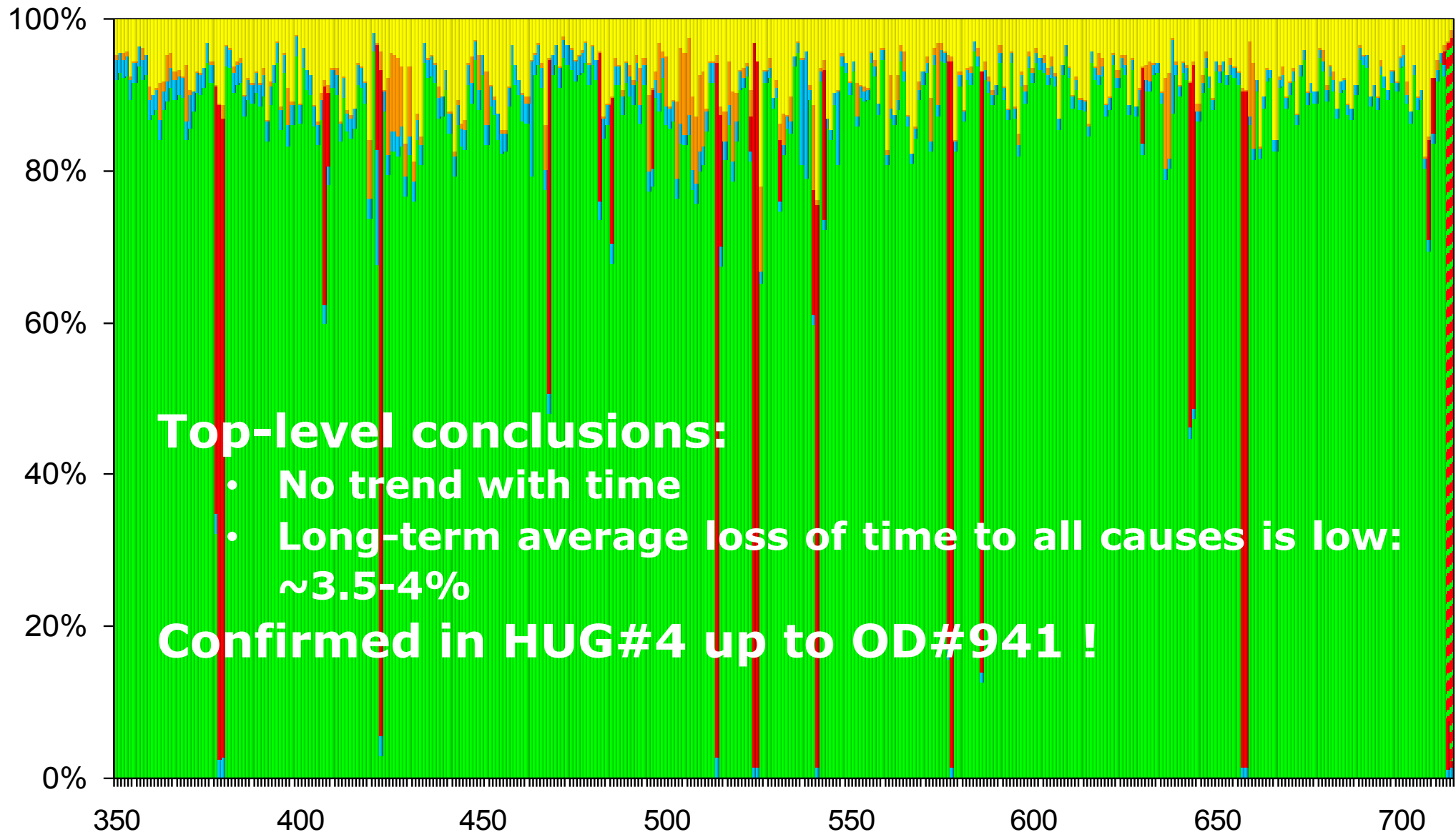


Total lost time from OD#170 to OD#941 – all sources : ~535 hours (3.6%)
Total lost time from OD#600 to OD#941 – all sources : ~200 hours (3.0%)



HERSCHEL SPACE OBSERVATORY

Herschel OD#350 to 714 – HUG#3



Science observing evolution

... since the very first science observation

- 'Early' science due 'lack of HIFI'
- SDP execution mainly in November-December 2009
- Early 2010 – HIFI back, PV & SDP
- Spring SPIRE & PACS spectroscopy modes optimisation
- From around May 2010 'full' Routine Science Phase operations
- Overall PV duration about 5 months

Cycle id	OD#s	Start Date	End Date	<Science>	<Net Sci>	Total
-4	119-132	20090909	20090922	1.01	1.01	282.35
-3	133-146	20090923	20091006	1.33	1.33	274.07
-2	147-160	20091007	20091020	8.61	8.61	260.02
-1	161-174	20091021	20091103	8.02	8.02	294.06
0	175-188	20091104	20091117	11.01	11.01	292.98
1	189-202	20091118	20091201	11.47	11.47	297.42
2	203-216	20091202	20091215	15.39	15.15	302
3	217-230	20091216	20091229	19.08	18.88	318.03
4	231-244	20091230	20100112	18.64	18.55	300.61
5	245-258	20100113	20100126	15.16	15.16	296.22
6	259-272	20100127	20100209	10.53	10.53	306.17
7	273-286	20100210	20100223	7.28	7.15	301.17
8	287-300	20100224	20100309	18.1	18.02	299.73
9	301-314	20100310	20100323	10.8	9.27	289.33
10	315-328	20100324	20100406	15.39	12.53	280.82
11	329-342	20100407	20100420	15.05	12.86	300.15
12	343-356	20100421	20100504	16.66	16.66	312.28
13	357-370	20100505	20100518	17.29	17.1	313.25
14	371-384	20100519	20100601	15.98	15.59	307.83
15	385-398	20100602	20100615	16.17	16.01	309.83
16	399-412	20100616	20100629	16.54	16.45	319.41
17	413-426	20100630	20100713	17.39	16.43	301.21
18	427-440	20100714	20100727	17.49	17.49	290.48
19	441-454	20100728	20100810	18.37	17.98	313.54
20	455-468	20100811	20100824	17.85	17.29	316.45
21	469-482	20100825	20100907	20.71	20.34	326.32
22	483-496	20100908	20100921	18.97	18.37	317.51
23	497-510	20100922	20101005	19.83	19.83	301.2
24	511-524	20101006	20101019	18.16	15.41	298.1
25	525-538	20101020	20101102	19.52	17.7	300.96
26	539-552	20101103	20101116	18.84	17.01	315.95
27	553-566	20101117	20101130	19.21	19.21	320.35
28	567-580	20101201	20101214	18.08	15.32	311.34
29	581-594	20101215	20101228	19.75	18.38	317.54
30	595-608	20101229	20110111	18.64	18.64	317.83
31	609-622	20110112	20110125	20.18	20.18	325.88
32	623-636	20110126	20110208	19.24	19.12	318.7
33	637-650	20110209	20110222	19.54	17.92	317.77
34	651-664	20110223	20110308	20.15	17.16	323.1
35	665-678	20110309	20110322	21.07	21.07	332.78
36	679-692	20110323	20110405	20.76	20.76	326.89
37	693-706	20110406	20110419	19.94	19.94	319.54
38	707-720	20110420	20110503	18.18	14.61	323.95
39	721-734	20110504	20110517	19.3	19.11	317.75
40	735-748	20110518	20110531	17.21	17.21	306.23
41	749-762	20110601	20110614	20.16	20.05	319.39
42	763-776	20110615	20110628	19.47	19.47	321.64
43	777-790	20110629	20110712	20.25	20.25	325.39
44	791-804	20110713	20110726	20.33	20.33	314.51
45	805-818	20110727	20110809	19.85	17.35	318.66
46	819-832	20110810	20110823	20.37	20.37	323.56
47	833-846	20110824	20110906	20.56	20.56	327
48	847-860	20110907	20110920	19.72	19.72	321.23
49	861-874	20110921	20111004	21.17	21.17	327.28
50	875-888	20111005	20111018	19.83	19.83	322.39
51	889-902	20111019	20111101	19.27	19.27	322.64

Science observing evolution

26	539-552	20101103	20101116	18.84	17.01	315.95
27	553-566	20101117	20101130	19.21	19.21	320.35
28	567-580	20101201	20101214	18.08	15.32	311.34
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50	875-888	20111005	20111018	19.83	19.83	322.39
51	889-902	20111019	20111101	19.27	19.27	322.64
Last 13	39-51				19.59	320.59
Last 26	26-51				19.00	320.74
Last 52	0-51				17.25	312.54

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51	889-902	20111019	20111101	19.27	19.27	322.64



Observing programmes

Overall execution status



Herschel works well and delivers good data

- Status weekly updated on the HSC website under 'Latest News'. Also available are 'Observing Log' and 'Observing Schedule' (scheduled but not yet executed observations). Also HSA of course...



Herschel General Information	
Herschel Science Centre Home	▶
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Conferences/Workshops	▶
Press Releases	▶
e-News	▶
Herschel Science Team	▶
Herschel User Group	▶

Herschel Latest News

Status summary: Herschel was successfully launched together with **Planck** on 14 May 2009. Currently Herschel is conducting routine science phase operations. As of OD#939 (9 December 2011), the approximate completion percentages were: 98% KPGT; 98% KPOT; 94% GT1, 40% OT1p1, 1.7% OT1p2, and 0.8% GT2 (remember GT1/GT2 are both an order of magnitude smaller than each of KPGT, KPOT, and OT1).

944^T 01:52:28
Days Hours Minutes Seconds

Elapsed time since launch on 14 May 2009 at 13:12 (UTC).

- The KPs have basically been concluded, we are now executing OT1.

HERSCHEL SPACE OBSERVATORY

Overall execution status



Completion of KP:

- KPGT ~98% – 6/21 programmes completed
- KPOT ~98% – 13/21 programmes completed

Completion of AO1:

- GT1 ~94% – 29/33 programmes completed
- OT1p1 ~40% – 29/176 programmes completed, 150 initiated
- OT1p2 ~1.7% – 28/65 programmes initiated

Completion of AO2:

- GT2 ~0.8% – 1/32 programmes completed, 3 initiated
- OT2p1 ~0% – first observations have been scheduled
- OT2p2 ~0%

Overall execution status



Completion of KPGT (6/21):

- KPGT_cwilso01_1 (9 Jul 2011)
- KPGT_dlutzi_1 (30 Jun 2011)
- KPGT_kmeisenh_1 (27 Sep 2011)
- KPGT_okrause_1 (16 Jun 2011)
- KPGT_vbujarra_1 (28 Nov 2011)
- KPGT_seales01_1 (7 Dec 2010)

Completion of KPOT (13/21):

- KPOT_aedge_1 (13 Feb 2011)
- KPOT_ceiroa_1 (29 Jul 2011)
- KPOT_cmarti01_1 (8 Oct 2011)
- KPOT_delbaz_1 (31 Aug 2010)
- KPOT_eegami_1 (3 Jul 2011)
- KPOT_gsmith01_1 (10 Oct 2011)
- KPOT_jdavie01_1 (1 Dec 2011)
- KPOT_mmeixner_1 (24 Sep 2010)
- KPOT_nevans_1 (24 Sep 2011)
- KPOT_pgolds01_1 (14 Sep 2011)
- KPOT_pvanderw_1 (24 Apr 2011)
- KPOT_smolinar_1 (5 Nov 2011)
- KPOT_wlanger_1 (11 May 2011)



HERSCHEL SPACE OBSERVATORY

Overall execution status



Completion of KPGT (6/21):

- KPGT_cwilso01_1 (9 Jul 2011)
- KPGT_dlutz_1 (30 Jun 2011)
- KPGT_kmeisenh_1 (27 Sep 2011)
- KPGT_okrause_1 (16 Jun 2011)
- KPGT_vbujarra_1 (28 Nov 2011)
- KPGT_seales01_1 (7 Dec 2010)

Completion of KPOT (13/21):

- KPOT_aedge_1 (13 Feb 2011)
- KPOT_ceiroa_1 (29 Jul 2011)
- KPOT_cmarti01_1 (8 Oct 2011)
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- KPOT_nevans_1 (24 Sep 2011)
- KPOT_pgolds01_1 (14 Sep 2011)
- KPOT_pvanderw_1 (24 Apr 2011)
- KPOT_smolinar_1 (5 Nov 2011)
- KPOT_wlanger_1 (11 May 2011)



Remember only ~2% of total observing left to execute!

HERSCHEL SPACE OBSERVATORY



Data & data products



System Throughput:

- Much improved, a big leap forward:
 - v2.x bulk reprocessing (~ 8 ODs/day)
 - v4.1 bulk reprocessing (< 4 ODs/day)
 - v6.1 bulk reprocessing (~ 20 ODs/day)
 - v8.1 next bulk reprocessing (in spring 2012)
 - codefreeze v8.1 in late Jan 2012
- Have moved to new GRID infrastructure for systematic DP

Herschel Science Archive:

- Will move to 'new technology archive' in near future
- Also 'User Reduced Data' – for now 'outside' HSA

User reduced data



User Reduced Data

The table below provides access to the currently available User Reduced Data sorted by release date:

Proposal ID	Proposal Name	Release Note	User Reduced Data Repository	Related Publications	Latest update
KPOT_krame01_1	Herschel M33 extended survey (HerM33es)	HerM33es-SPIRE data release report	HermesPublicData	PACS and SPIRE photometer maps of M33: First results of the Herschel M33 extended survey (HerM33es) (Kramer et al. 2010)	[18-Oct-2011]
KPGT_soliver_1	HerMES	HerMES consortium provides public release of Herschel data [1-Jul-2010]	HeDaM: Herschel Database in Marseille	HerMES related publications	[19-Sep-2011]
KPOT_mjuvela_1	Galactic Cold Cores: A Herschel survey of the source populations revealed by Planck	ColdCores Release Note	ColdCores Data Repository	Juvela et al. 2010, 2011	[8-Sep-2011]
KPOT_rkennicu_1	Key Insights on Nearby Galaxies: a Far Infrared Survey with Herschel (KINGFISH)	KINGFISH Data Products Delivery - DR1 User's Guide	KINGFISH Data Products repository	The Emission by Dust and Stars of Nearby Galaxies in the Herschel KINGFISH Survey (Skibba et al. 2011)	[8-Sep-2011]
KPOT_jdavie01_1	The Herschel Virgo Cluster Survey (HeViCS)	Data Reduction for HEVICS Public Data Release of 2 Scan Data	The first HeViCS public data release	HeViCS SDP papers in the A&A Special feature: Herschel: the first science highlights	[2-Sep-2011]
KPOT_seales01_2	H-ATLAS	First data release of the Herschel ATLAS [24-Oct-2010]	H-ATLAS SDP images and files H-ATLAS SDP catalogue	PACS maps (Ibar et al. 2010) SPIRE maps (Pascale et al. 2010) 5-band source catalogue (Rigby et al. 2010)	[24-Oct-2010]

Basic guidelines on how to provide your user reduced data products, catalogues and atlases are provided in the document "[Herschel Data Products and Tools Contributor Guide](#)".

Please contact the [Herschel Science Centre Helpdesk](#) if you have any question or if you need further assistance on how to deliver your User Reduced Data. Feedback and comments related to the contents of this web page are welcome.



Publications

Publication tracking



Using ADS (last update on 14/12/2011):

- From 07/2010 (publ date of A&A Herschel Special Issue)
- Abstract should include (and/or): Herschel, PACS, SPIRE, HIFI
- All refereed articles, after checking ('weeding'/adding) now 322 papers
- A publication list is being maintained on the HSC website




Research & Science Home

ESA Public Web Site

Sci-Tech Portal

Herschel Public Web Site

Herschel Sci-Tech Portal



Herschel Science Centre

European Space Agency

Astrophysics Missions


Planetary Exploration Missions

Solar Terrestrial Science Missions

Fundamental Physics Missions

Science Faculty

24-October-2011 18:32:12



Herschel General Information

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Latest News

Mission Overview

Science Instruments

Conferences/Workshops

Press Releases

e-News

Herschel Science Team

Herschel Users' Group

Herschel People

Useful links

Herschel Announcement of Opportunity (AO-2)

Herschel Scientific Publications

Introduction

The de facto way of communicating the scientific results based on Herschel observations is via publications in the refereed scientific literature which is very strongly encouraged. This webpage provides a listing of published refereed Herschel papers, [the applicable rules and guidelines](#) for publishing can be found in elsewhere.

Herschel Publication List

The listing provided here is generated by searching the ADS followed by manual inspection of the 'hits' using the criteria listed below. It is maintained by the Herschel Project Scientist, [to whom feedback can be provided](#).

Herschel Publication List

Publication list



[SAO/NASA Astrophysics Data System \(ADS\)](#)

[Private Library](#) [HerschelPapers](#) (Refereed papers based on Herschel inflight measurements, last modified 14-Dec-2011) for gpilbratt@rssd.esa.int

[Go to bottom of page](#)

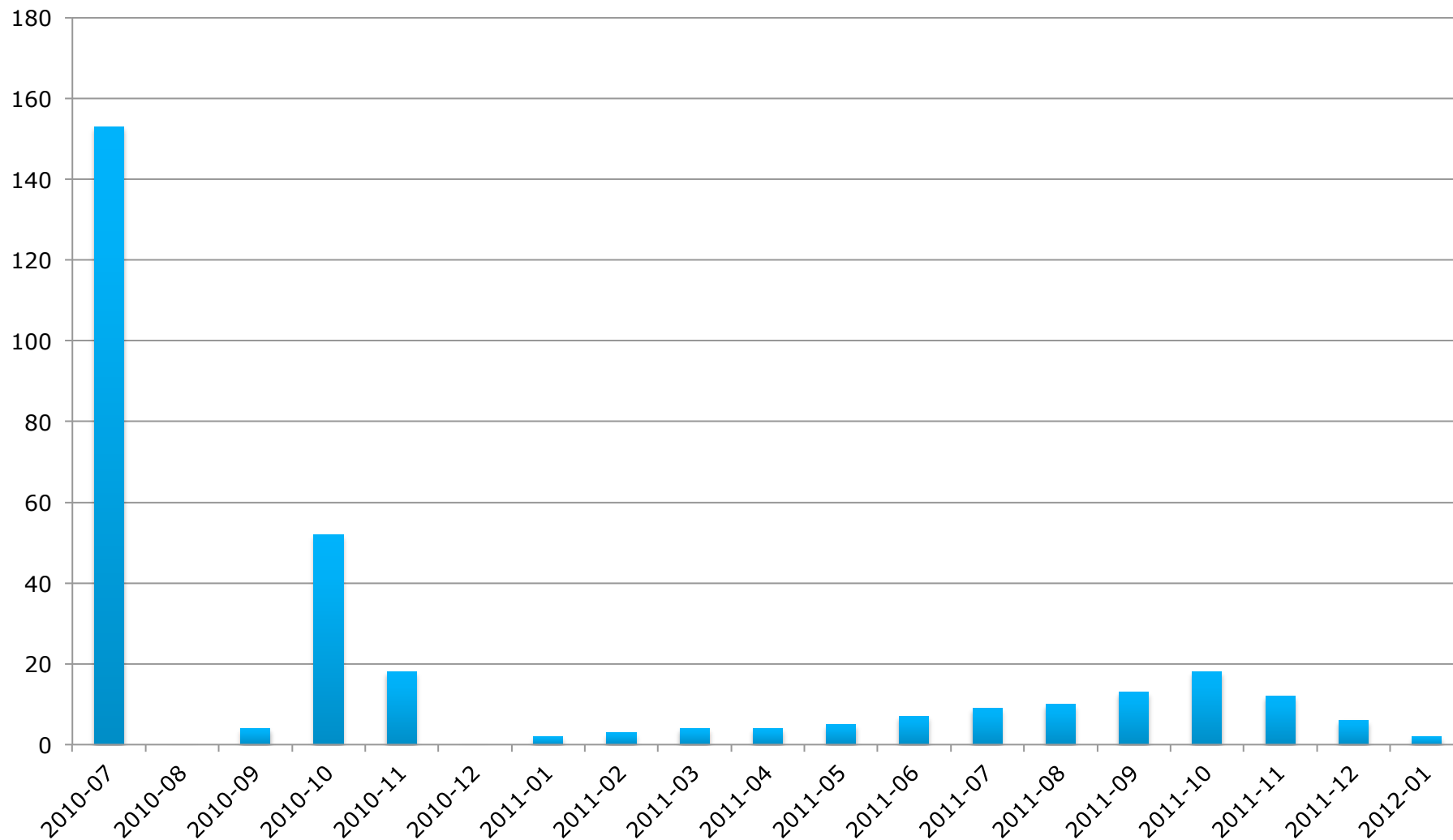
(Note: the link on the library name is a public link to this library)

Selected and retrieved **322** abstracts.

Sort options

#	Bibcode Authors	Score Title	Date	List of Links Access Control Help			
1	<input type="checkbox"/> 2012ApJ...744L...1H Harvey, Paul M.; Henning, Thomas; Ménard, François; Wolf, Sebastian; Liu, Yao; Cieza, Lucas A.; Evans, Neal J.; Pascucci, Ilaria; Merín, Bruno; Pinte, Christophe	1.000 A Herschel Search for Cold Dust in Brown Dwarf Disks: First Results	01/2012	A Z E F X	R	U	
2	<input type="checkbox"/> 2012ApJ...744...28P Plume, R.; Bergin, E. A.; Phillips, T. G.; Lis, D. C.; Wang, S.; Crockett, N. R.; Caux, E.; Comito, C.; Goldsmith, P. F.; Schilke, P.	1.000 A Direct Measurement of the Total Gas Column Density in Orion KL	01/2012	A Z E F	R	U	
3	<input type="checkbox"/> 2011MNRAS.418.2386M Mittal, R.; O'Dea, C. P.; Ferland, G.; Oonk, J. B. R.;	1.000 Herschel observations of the Centaurus cluster - the dynamics of cold gas in a cool core	12/2011	A Z E F X	R	U	

Publication evolution by month



HERSCHEL SPACE OBSERVATORY



Communications



ESA wants to communicate your results

- Provides expertise/resources – science writers, image making
- Provides the channels – websites, mailing lists, etc
- All material can be used by others
- Wants to create win-win situation

Possibilities

- Web-releases – Portal and/or SciTech
- Exceptionally fully fledged press release
 - Press reps invited in person
 - Done in connection with ‘First Results Symp’ in May 2010

Project Scientist is your contact point

- PS will initiate process – applying for resources
- Web-page providing information still to come...

About Herschel...

The infrared Universe...

Spacecraft and telescope...

The mission...


Meet the team...

Multimedia

Herschel images

Herschel videos

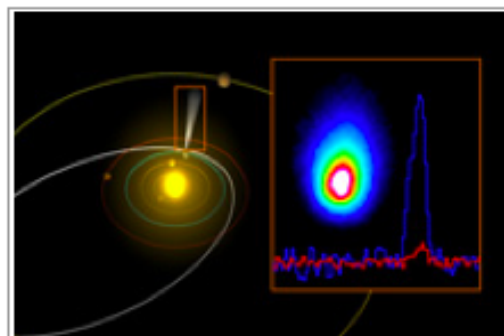
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News



Comet Hartley 2 observed by ESA's Herschel

Did Earth's oceans come from comets?

5 October 2011

ESA's Herschel infrared space observatory has found water in a comet with almost exactly the same composition as Earth's oceans. The discovery revives the idea that our planet's seas could once have been giant icebergs floating through space.

The origin of Earth's water is hotly debated. Our planet formed at such high temperatures that any original water must have evaporated. Yet today, two-thirds of the surface is covered in water and this must have been delivered from space after Earth cooled down.

Comets seem a natural explanation: they are giant icebergs travelling through space with orbits that take them across the paths of the planets, making collisions possible. The impact of comet Shoemaker-Levy 9 on Jupiter in 1994 was one such event. But in the early Solar System, when there were larger numbers of comets around, collisions would have been much more common.

However, until now, astronomers' observations have failed to back up the idea that comets provided Earth's water. The key measurement they make is the level of deuterium – a heavier form of hydrogen – found in water.

14-Dec-2011



Herschel: ESA's giant infrared observatory



More information

- [Herschel overview](#)
- [Online Showcase of Herschel Images OSHI](#)

Herschel on YouTube

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Related articles

- [Herschel paints new story of galaxy evolution](#)
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HERSCHEL



14-Dec-2011 15:52:45 UT

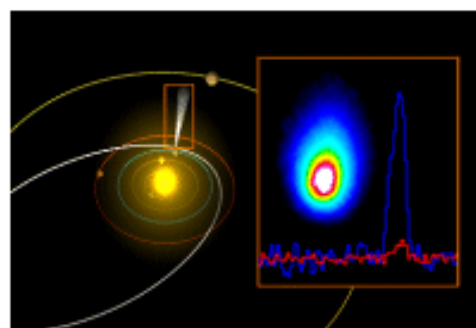
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Herschel finds first evidence of Earth-like water in a comet

05 Oct 2011

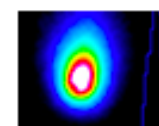
A team of astronomers using ESA's Herschel Space Observatory have discovered the first comet containing water that is similar in isotopic composition to that in Earth's oceans. This detection, in the comet 103P/Hartley 2, shows that contrary to earlier belief, comets may well have played an important role in bringing water to our planet, and that the reservoir of Earth-like water in the Solar System is far larger than suspected.

Today, over 70 per cent of the Earth's surface is covered in water. In our planet's early days, however, its surface was so hot that it caused water and other volatiles to evaporate. Researchers agree that the water currently present on Earth has been delivered at a later stage during the planet's evolution, most likely by comets and asteroids. The relative contribution of each class of object to our planet's water supply is, however, still debated.

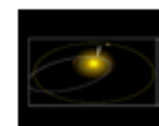


Herschel image and spectrum of comet 103P/Hartley 2 and its orbit.
Credit: ESA/AOES Medialab;
Herschel/HssO Consortium

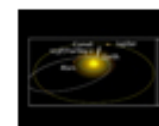
IMAGES AND VIDEOS



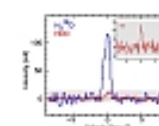
Herschel image and spectrum of Jupiter-Family comet 103P/Hartley 2



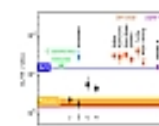
The location of comets in the Solar System



The location of comets in the Solar System [annotated]



Water signatures in Herschel/HIFI spectrum of comet 103P/Hartley 2



The deuterium-to-hydrogen ratio in the Solar

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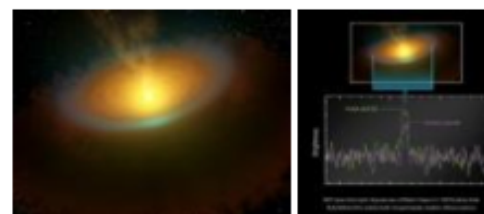
Herschel Latest News

Status summary: Herschel was successfully launched together with [Planck](#) on 14 May 2009. Currently Herschel is conducting routine science phase operations. As of OD#939 (9 December 2011), the approximate completion percentages were: 98% KPGT; 98% KPOT; 94% GT1, 40% OT1p1, 1.7% OT1p2, and 0.8% GT2 (remember GT1/GT2 are both an order of magnitude smaller than each of KPGT, KPOT, and OT1).

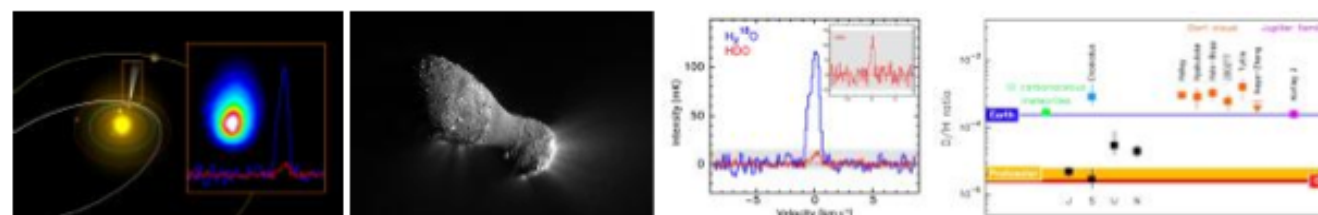


Elapsed time since launch on 14 May 2009 at 13:12 (UTC).

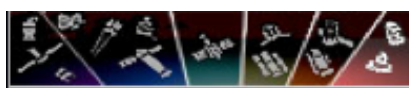
Herschel lifetime assessment. As part of the preparations for the AO OT2 time allocation process a reassessment of the predicted Herschel lifetime using all available information has been conducted. The conclusion is that the period February/March 2013 is the most likely time for when Herschel will run out of helium, precluding any further observing (there is no "warm" Herschel mission). For the implications and latest update on the AO OT2 time allocation see [AO Latest News](#).



Herschel reveals large water reservoir in protoplanetary disc. Observations with Herschel/HIFI of the young (~10 Myr) nearby (~55 pc) T Tauri star TW Hydrae have led to the detection of cold water vapour in its protoplanetary disc ([Hogerheijde et al. 2011](#) and [Perspective](#)). This disc is the nearest known protoplanetary disc with strong gas emission lines. Modelling implies that the amount of detected water vapour is roughly equivalent to 0.005 Earth oceans. It results from photodesorption of water ice frozen onto dust grains, and implies an ice reservoir of thousands of Earth oceans in the giant planet formation zone and further out around TW Hydrae. In the image above left an artist's impression of the disk, and right the HIFI water vapour spectra. For more information and full image captions see the [ESA SciTech](#), the [Space Science Portal](#), and also the (in Dutch) [NOVA](#) webreleases.



Herschel makes a splash and fuels the controversy of the origin of Earth's water. It is generally presumed that the water on Earth was delivered from space by impacting bodies. But by which class of bodies is unclear, and sometimes passionately debated. Based on observed D/H-ratios asteroids have been argued to fit the picture better than comets, now Herschel/HIFI observations show that at least one comet, 103P/Hartley 2, has very similar D/H ratio as the oceans on Earth ([Hartogh et al. 2011](#), and [Nature Online](#)). The debate is reopened! For more information and image captions see the [ESA SciTech](#) and the [Space Science Portal](#) webreleases, and also the feature on the [earlier Herschel observations](#) during the EPOXI spacecraft encounter campaign.

	
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Herschel Press Releases

- [Herschel detects abundant water in planet-forming disc](#), ESA - Space Science News, 20 October 2011 - see also [SciTech News](#)
- [Did Earth's oceans come from comets?](#), ESA - Space Science News, 5 October 2011 see also [SciTech News](#)
- [Herschel probes the dusty history of a giant star](#), ESA - SciTech News, 20 September 2011
- [Herschel paints new story of galaxy evolution](#), ESA - Space Science News, 13 September 2011 - see also [SciTech News](#)
- [Astronomers searching for oxygen can breathe more easily](#), ESA - Space Science News, 1 August 2011 - see also [SciTech News](#)
- [Enceladus rains water onto Saturn](#), ESA - Space Science News, 26 July 2011 - see also [SciTech News](#)
- [Exploding stars can make good dust factories](#), ESA - Space Science News, 7 July 2011 - see also [SciTech News](#)
- [Hot from cold - Unveiling the universe](#), ESA - Euronews - Space, 16 June 2011
- [Raging storms sweep away galactic gas](#), ESA - Space Science News, 9 May 2011 - see also [SciTech News](#)
- [Andromeda's coat of many colours](#), ESA - Space Science News, 27 April 2011
- [Herschel links star formation to sonic booms](#), ESA - Space Science News, 13 April 2011 - see also [SciTech News](#)
- [Herschel finds less dark matter but more stars](#), ESA - Space Science News, 16 February 2011 - see also [SciTech News](#)
- [Andromeda's once and future stars](#), ESA - Space Science News, 5 January 2011 - see also [SciTech News](#)
- [New method reveals gravitationally lensed galaxies in Herschel-ATLAS first survey](#), ESA - SciTech News, 4 November 2010 - see also [SciTech News](#)
- [Recipe for water: just add starlight](#), ESA - Space Science News, 2 September 2010 - see also [SciTech News](#)
- [Small French firm behind Herschel's giant mirror](#), ESA - Space Engineering News, 28 July 2010
- [Herschel and Planck win the French Grand Prix](#), ESA - Space Science News, 10 June 2010
- [Herschel finds a hole in space](#), ESA - Space Science News, 11 May 2010
- [Herschel reveals the hidden side of star birth](#), ESA - Press Release, 6 May 2010
- [Herschel reveals galaxies in the GOODS fields in a brand new light](#), ESA - SciTech News, 6 May 2010
- [Herschel unveils rare massive stars in the act of forming](#), ESA - SciTech News, 6 May 2010
- [Herschel's HIFI follows the trail of cosmic water](#), ESA - SciTech News, 6 May 2010
- [Tracing the Milky Way's hidden reservoirs of gas](#), ESA - Space Science News, 6 May 2010
- [Herschel takes the temperature of an interstellar cloud](#), ESA - Space Science News, 6 May 2010
- [Herschel resolves the cosmic infrared fog](#), ESA - Space Science News, 6 May 2010
- [Herschel reveals the hidden side of star birth](#), ESA Press Release 09-2010, 6 May 2010
- [Replay: Herschel Results Media Event live from ESA/ESTEC](#), ESA Webcast, 6 May 2010, 12:00-13:40 CEST
- [Press invitation to the Herschel First Results Media Day](#), ESA Press Release 08-2010, 27 April 2010
- [Baby stars in the Rosette cloud](#), ESA - Space Science News, 12 April 2010
- [Herschel readies itself for the Orion Nebula](#), ESA - Space Science News, 19 January 2010
- [Inside the dark heart of the Eagle](#), ESA - Space Science News, 16 December 2009
- [Herschel views deep-space pearls on a cosmic string](#), ESA - Space Science News, 2 October 2009
- [HIFI status under investigation](#), ESA - Space Science News, 4 September 2009
- [Herschel and Planck pass in-orbit 'exam'](#), ESA - Spacecraft Operations News, 24 July 2009
- [Herschel images promise bright future](#), ESA - Space Science News, 10 July 2009
- [Herschel and Planck in the classroom](#), ESA - Education News, 23 June 2009
- [Herschel's daring test: a glimpse of things to come](#), ESA - Space Science News, 19 June 2009
- [Herschel cryocover is open](#), ESA - Spacecraft Operations News, 15 June 2009
- [Newly-launched missions extend ESA's radiation map of space](#), ESA - Technical and Quality Management News, 3 June 2009
- [Herschel and Planck commissioning has begun](#), ESA - Spacecraft Operations News, 20 May 2009
- [ESA's Herschel calls home using mobile phone technology](#), ESA - Spacecraft Operations News, 19 May 2009
- [ESA's cosmic explorers in flight: stunning images from ground and space](#), ESA - News, 15 May 2009
- [Herschel and Planck: Near-perfect injection by Ariane](#), ESA - News, 15 May 2009
- [Watch the Herschel-Planck launch \(replay\)](#), ESA - News, 15 May 2009
- [ESA en route to the origins of the Universe](#), ESA - Press Release , 14 May 2009
- [Herschel and Planck talk to Earth](#), ESA - Spacecraft Operations News, 14 May 2009
- [Ariane 5 carrying Herschel and Planck lifts off](#), ESA - Spacecraft Operations News, 14 May 2009
- [ESOC confirms: 'GO' for launch](#), ESA - Spacecraft Operations News, 14 May 2009

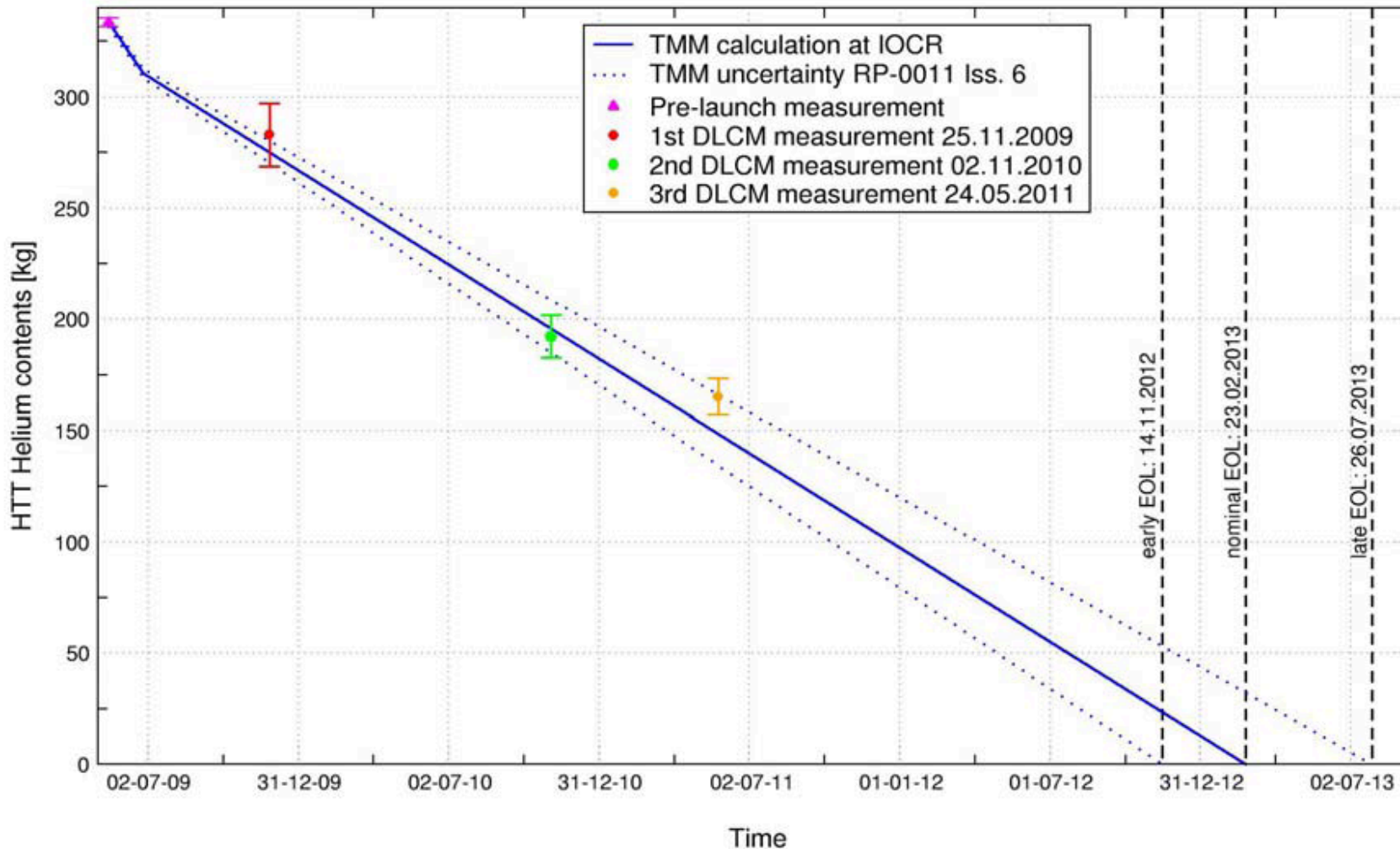


Mission lifetime

Mission (cryostat) lifetime



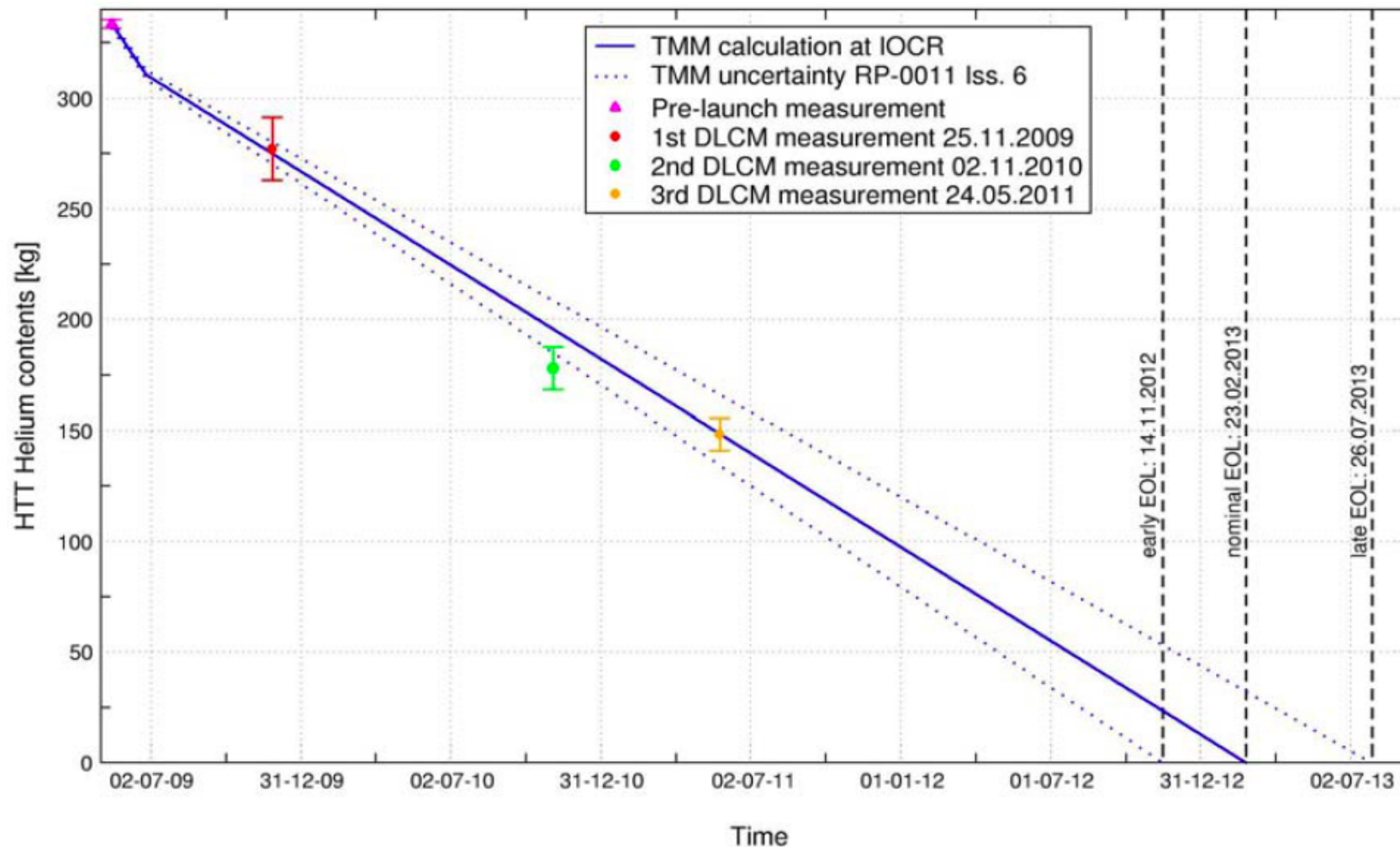
(i) Thermal modelling, and (ii) He mass measurements



HERSCHEL SPACE OBSERVATORY

Mission (cryostat) lifetime – ullage corr esa

(i) Thermal modelling, and (ii) He mass measurements

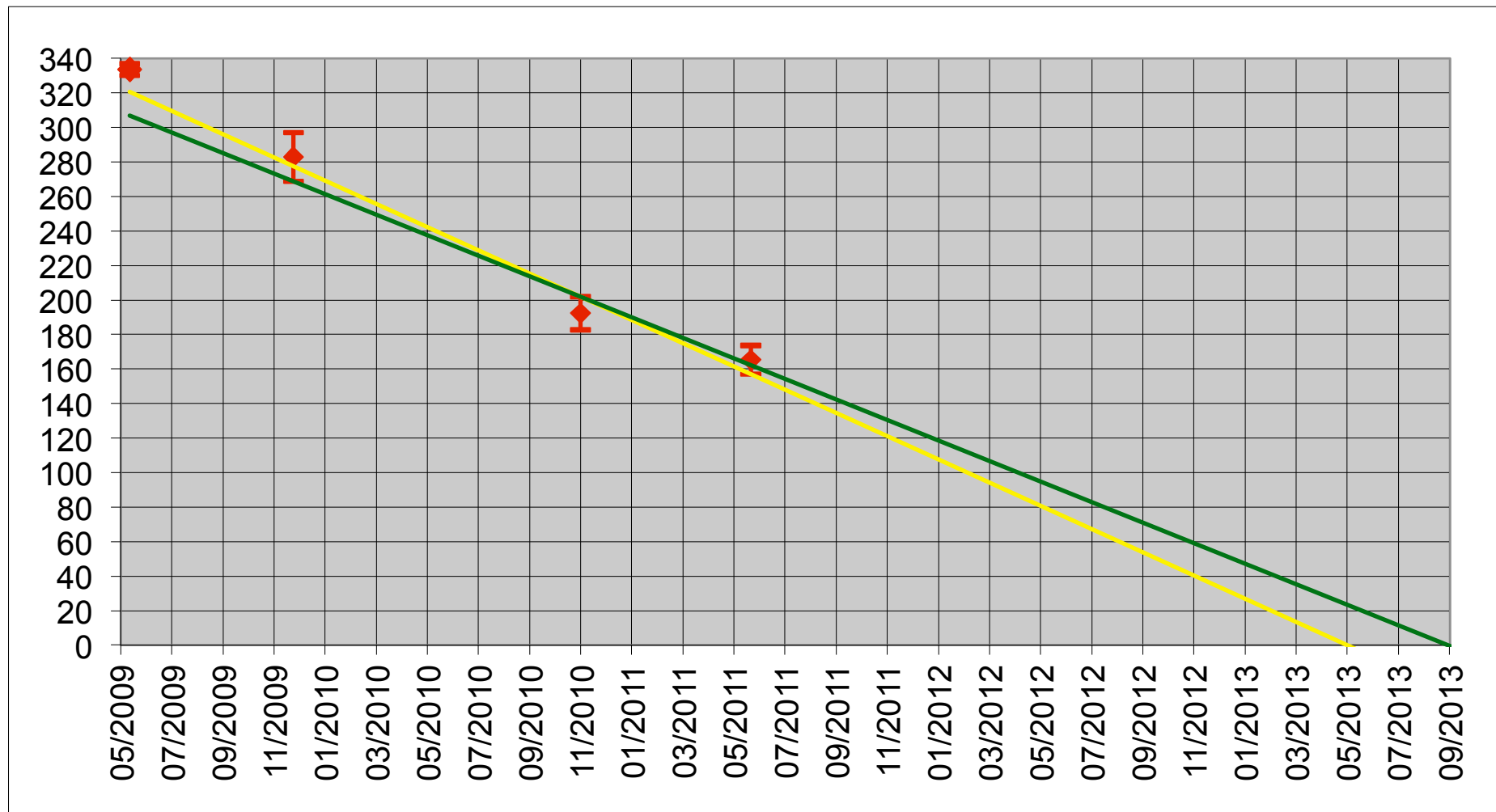


HERSCHEL SPACE OBSERVATORY

Mission (cryostat) lifetime – no ullage



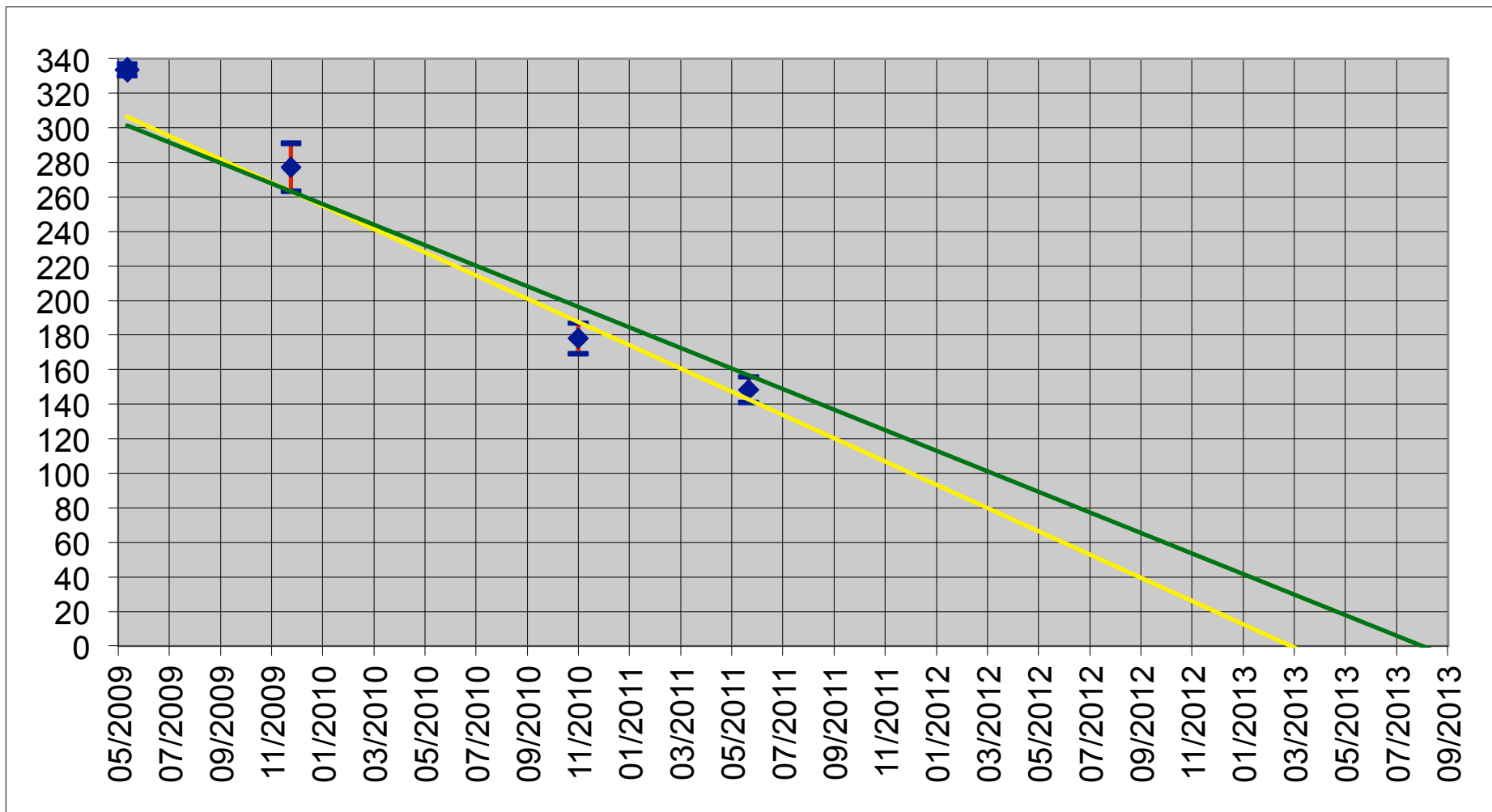
Industry fitting using nominal & $\pm 5\%$ LHe masses from DLCMs



HERSCHEL SPACE OBSERVATORY

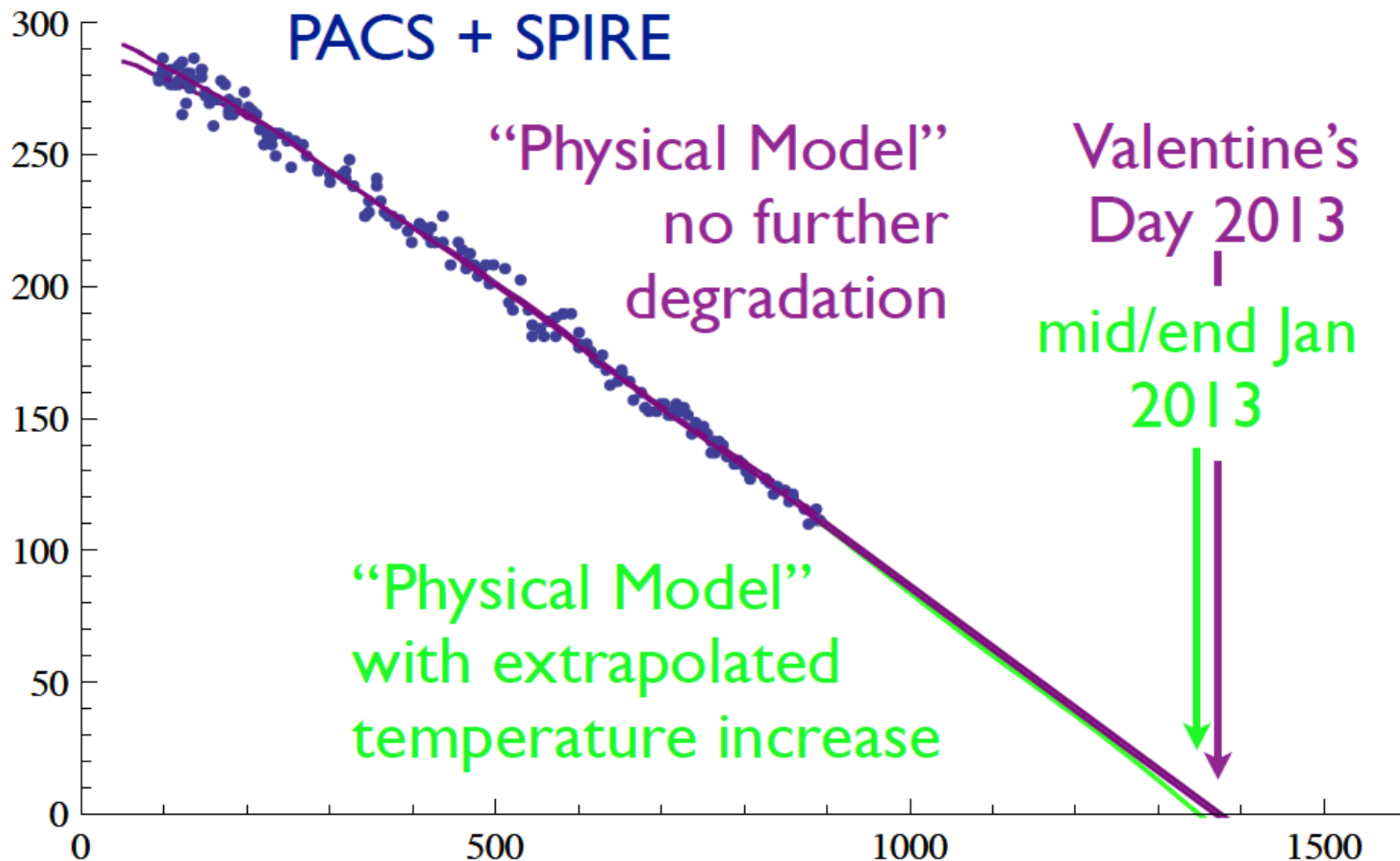
Mission (cryostat) lifetime – ullage corr esa

Industry fitting using nominal & $\pm 5\%$ LHe masses from DLCMs



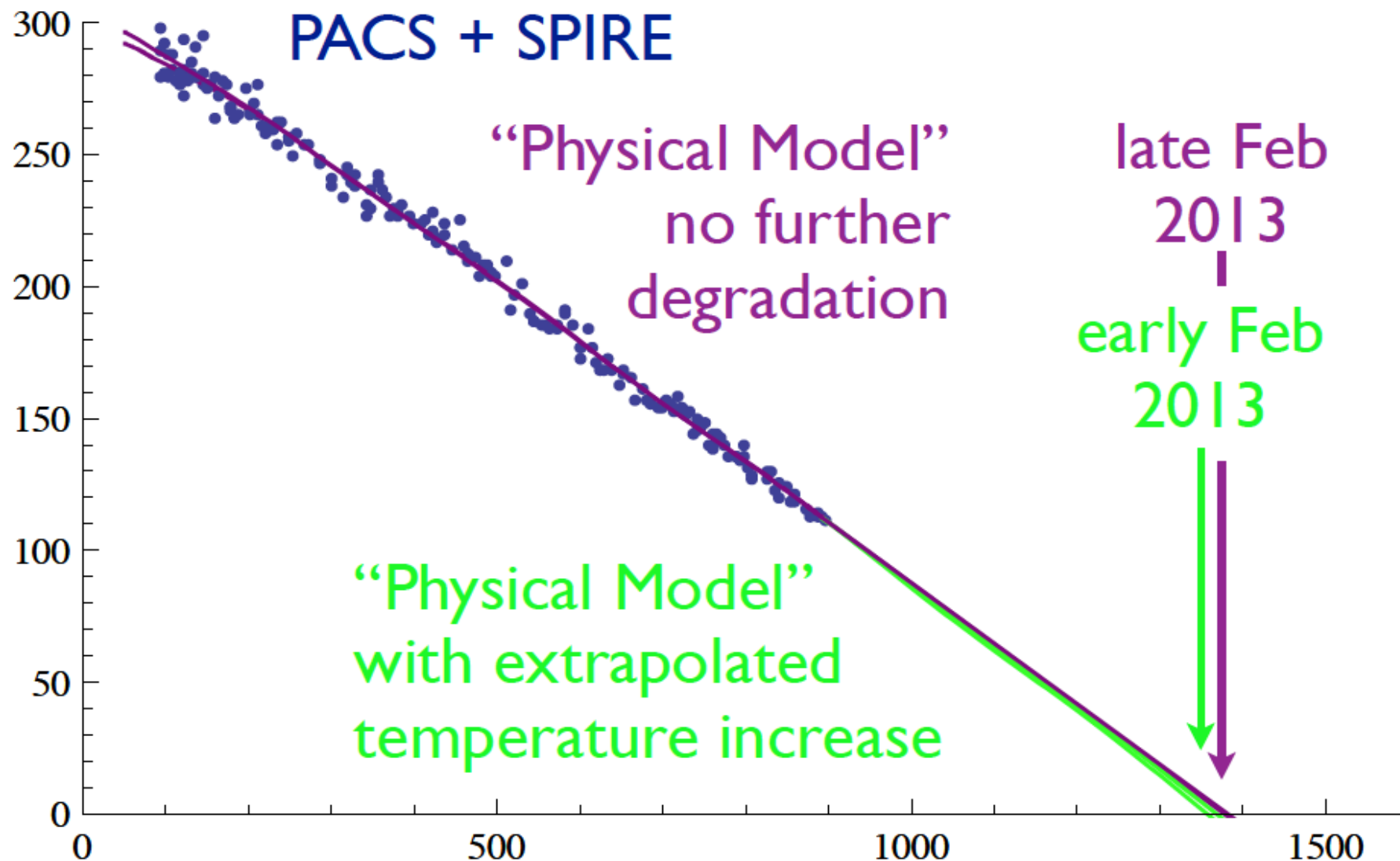
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Cryocooler analysis OD#90-892 (T101)



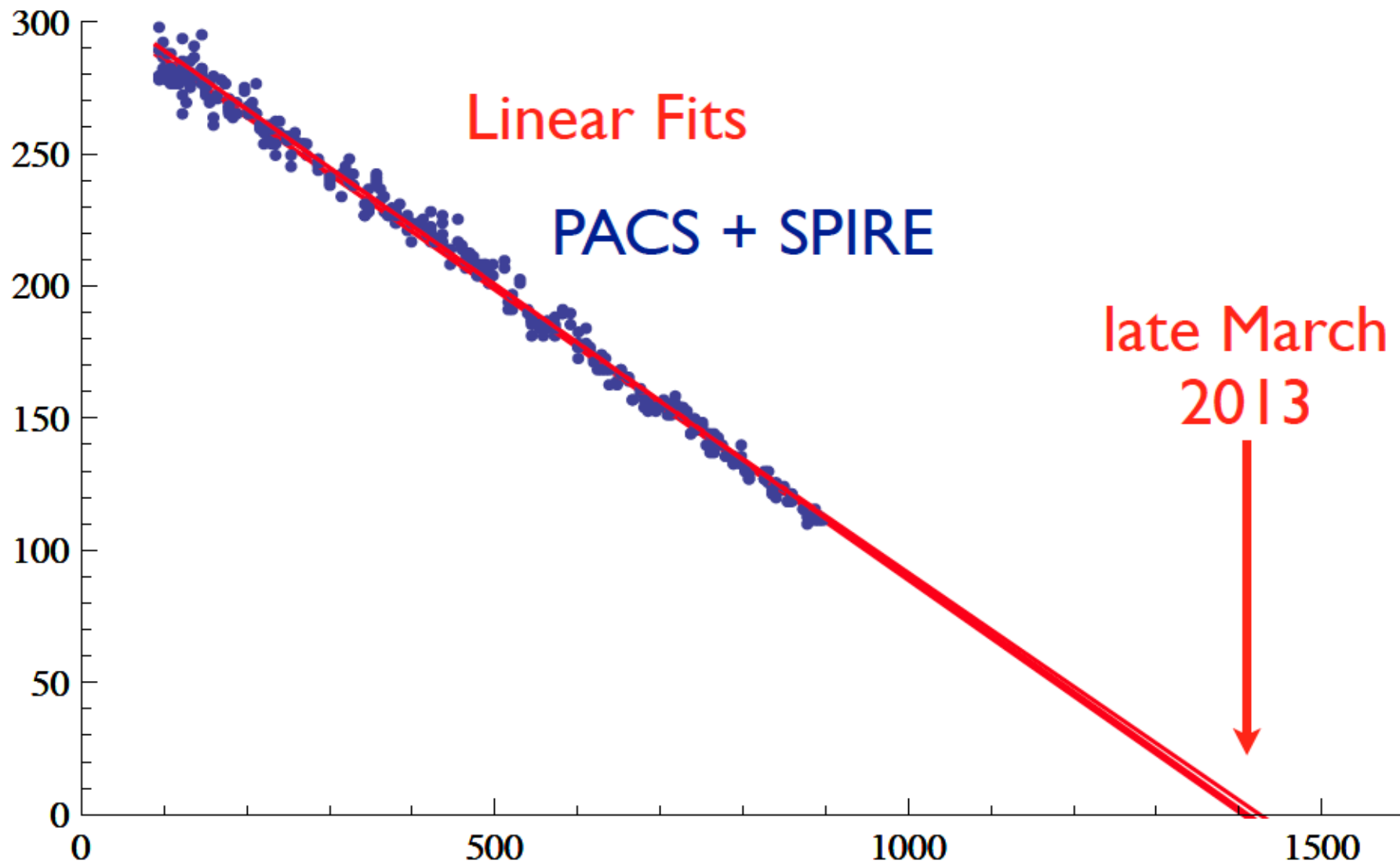
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Cryocooler analysis OD#90-898 (T102)



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Cryocooler analysis OD#90-892/898



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AO OT2 time available

OT2 time available to offer



Observing execution



- Track record for last year:
 - 19.00 hr per day for last 52 weeks
 - 19.59 hr per day for last 26 weeks
- **19 hr per day adopted** for the future

Mission lifetime

- DLCMs & industry analysis indicate end Feb-begin Aug 2013
 - Based on three DLCMs, one(#2) possibly 'dodgy'
- Cryocooler recycling analysis by PACS indicate late Jan-late Feb 2013
- The same with 'forced' linear fit indicate late March 2013
- **Mid-February 2013 adopted**
 - Meant to be 'conservative' – all p1 observations to be 'secure'
- Adding p2 observations for 3 months longer lifetime to mid-May
- Plus the 'normal' 6 months buffer for scheduling efficiency
- DDT not taken into account – expect some

HERSCHEL SPACE OBSERVATORY

OT2 time available to offer – OT2p1



Preliminary time offered for OT2p1 depend on mission lifetime



- See **OT2 Policies & Procedures Section 5.4.1:**
 - Have p1 observations until end June 2012
 - Assume lifetime, example end February 2013
 - Subtract 2 months 'scheduling allowance' (added to OT2p2)
 - Example calculation: $8 - 2 = 6$ months
 - Assume 550 hr/month => **OT2p1 time available 3300 hr**

Recalculation using current best figures

- These numbers assume 19 hr science/day (570 hr/month)
 - Track record last 26/52 weeks: 19.59/19.00 hr/day
- Have p1 observations until mid June 2012
- Lifetime until mid February 2013 (8 months later)
 - 'Realistic' rather than 'conservative'
- Scheduling allowance 2 months
- => **OT2p1 time available: $6 \times 570 = 3420$ hr**

HERSCHEL SPACE OBSERVATORY

OT2 time available to offer – OT2p2



Preliminary time offered for OT2p2 depend on uncertainties



- See **OT2 Policies & Procedures Section 5.4.2:**
 - Need over (extra wrt actual lifetime) allocation: 6-7 months
 - Uncertainty in predicted lifetime: 1-2 months
 - 'Scheduling allowance' (subtracted from OT2p1): 2 months
 - Subtract already allocated OT1p2 time: 3 months
 - Example calculation: $6.5 + 1.5 + 2 - 3 = 7$ months
 - Assume 550 hr/month => **OT2p2 available 3850 hr**

Recalculation using current best figures

- Need over (extra wrt actual lifetime) allocation: 6 months
- Assumed uncertainty in predicted lifetime: 3 months
- 'Scheduling allowance' (subtracted from OT2p1): 2 months
- Subtract already allocated OT1p2 time: 3 months
- Example calculation: $6 + 3 + 2 - 3 = 8$ months
- => **OT2p2 time available: 8 x 570 = 4560 hr**
- In 'nominal' mission $2/11 = 830$ hr executed (18%, for all p2 time)

OT2 time available – summary



The HOTAC should allocate:

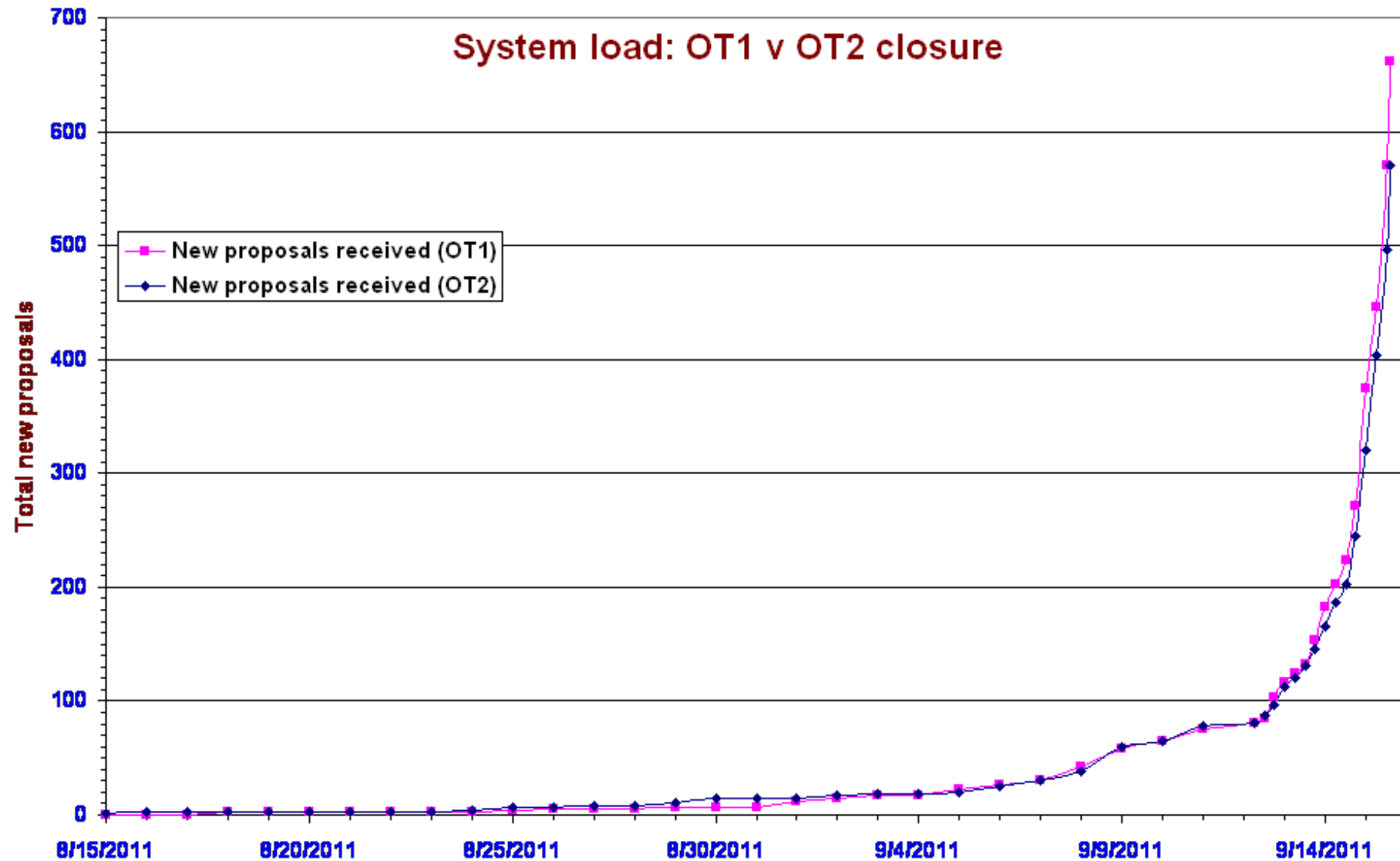
- **OT2p1: a total of 3420 hr**
 - 27% or $1/3.65$ of OT2 response
 - It is expected that all of these observations will be executed
- **OT2p2: a total of 4560 hr**
 - 37% or $1/2.73$ of OT2 response
 - Only a small fraction of of this will be executed
 - Will depend on actual lifetime
 - Since only fraction can be executed, go for highest ranked

Already allocated:

- KPGT + KPOT: <11,000 hr
- GT1 + GT2: <1,000 hr
- OT1p1: ~5,000 hr
- => **Total p1 time allocated: a bit below 17,000 hr**
- In addition <1,500 hr OT1p2 time allocated

AO OT2 response

OT2 vs OT1 proposals

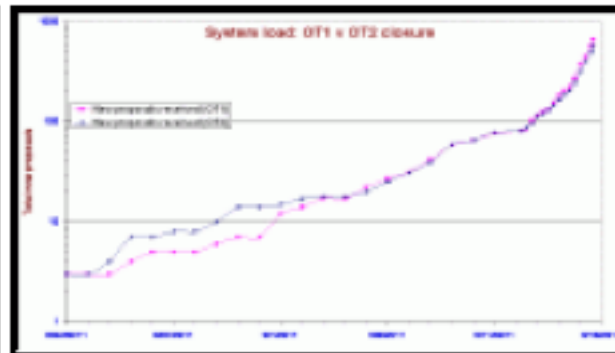


HERSCHEL SPACE OBSERVATORY

AO OT2 – from HSC Latest News



Herschel OT2 Announcement of Opportunity released! The second and final in-flight Open Time (OT2) Announcement of Opportunity (AO) process has started. The **OT2 call has been released** on 9 June 2011, with proposal submission deadline on 15 September 2011 at 12:00h UT. See the menu on the left, check the **AO Latest News** regularly.



Herschel AO OT2 proposal submission closed. The proposal submission deadline for the second in-flight Open Time (OT2) Announcement of Opportunity (AO) was on 15 September 2011. The preliminary outcome is a total of 531 proposals received, altogether requesting 12455.4 hours of observing time. These numbers are still TBC, and more detailed information will be posted after consolidation. Pictures left to right: Cumulative proposals received, same but log scale, and the winner of the poll, the HSC webmaster Jean Matagne (left) receiving his prize from the poll organiser David Ardila.

Herschel AO OT2 response consolidated. The consolidated response to the AO OT2 is a total of 531 proposals requesting 12486.4 hours of Herschel observing time. Time request fractions in science areas and instrument use are similar to OT1. PACS is requested for slightly more than half the time, SPIRE and HIFI share the majority of the rest, plus some Parallel mode. Overall there are equal amounts of photometry and spectroscopy requested. The proposals are provided to the Herschel Time Allocation Committee (HOTAC) for scientific assessment.

OT2 response in more detail



Proposals overall OT2/OT1 response total / now

- Number of proposals: 531 / 576 / 530
- Requested time: 12,486.4 / 20,943.9 / 12,467.9

Proposal time pressure OT2/OT1 per science area (%)

- ISM/SF/SS: 37.8 / 41.5
- Stars/SE: 8.4 / 9.1
- Galaxies/AGNs: 31.1 / 31.9
- Cosmology: 22.7 / 17.5

Proposal time pressure OT2 per instrument (%)

- PACS tot/phot/spec: 55.5 / 31.0 / 24.5
- SPIRE tot/phot/spec: 20.4 / 12.4 / 7.9
- HIFI tot/1-5/6-7: 18.0 / 13.0 / 4.9
- Parallel tot: 6.2
- Total phot/spec: 49.6 / 50.4

HERSCHEL SPACE OBSERVATORY

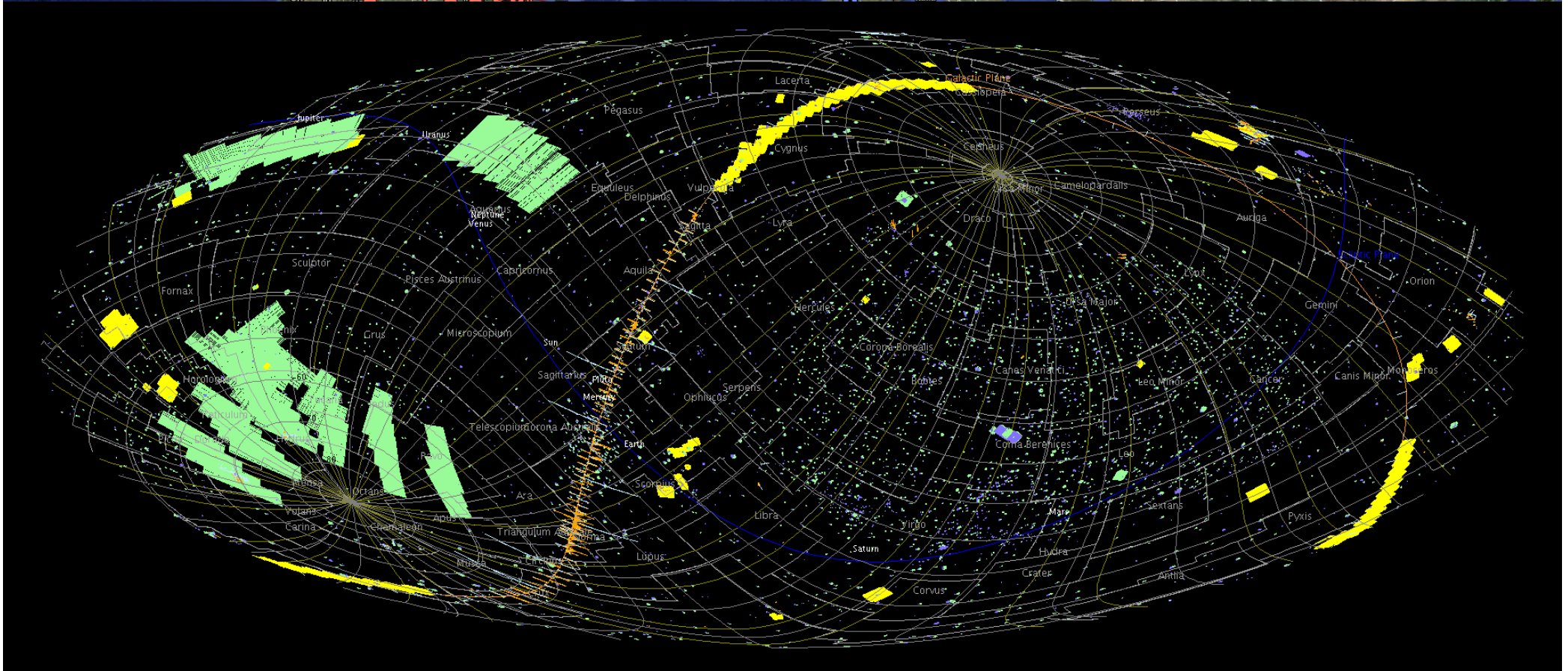
OT2 response in summary



On the sky

HERSCHEL SPACE OBSERVER

OT2 response in summary



OT2 recommendation – science areas



Science area	Time req (hr)	Time req (%)	OT2p1 alloc (hr)	OT2p1 alloc (%)	OT2p2 alloc (hr)	OT2p2 alloc (%)
ISM/SF/SS	4705.1	37.7	1339.9	39.2	1593.8	38.2
Stars/SE	1047.7	8.4	265.4	7.8	292.1	7.0
Gals/AGNs	3881.4	31.1	1040.8	30.4	1371.7	32.9
Cosmology	2833.7	22.7	773.9	22.6	913.0	21.9
Total	12467.9	99.9	3420.0	100.0	4170.6	100.0

Subject to final consolidation! When the OT2 'phase 2' consolidation has been completed the OT2 outcome will be publicly posted on the HSC website.

OT2 recommendation – instruments



Instrument	Time req (%)	OT2p1 alloc (%)	OT2p2 alloc (%)
PACS	55.5	47.2	63.6
SPIRE	20.4	18.0	13.0
SPIRE/PACS-parallel	6.1	10.4	5.4
HIFI	18.0	24.4	18.1
Total	100.0	100.0	100.1

Subject to final consolidation! When the OT2 'phase 2' consolidation has been completed the OT2 outcome will be publicly posted on the HSC website.



'Must do' DDT

'Must do' DDT – idea for feedback



Background

- All Herschel observing time has been allocated
- – except there is 'room' for some DDT
- Has something important been overlooked?
- 'Necessary' follow-up only Herschel can do?
- Want to create win-win situation for observatory – community

Idea/suggestion

- Assess totality of allocated time for 'gaps' (small committee)
- Could consider asking for suggestions from community
- If 'must do' observations are identified
 - Assign DDT as 'community service' observations
 - All such observations would have no proprietary rights

Devil probably in the details

- Details not yet worked out
- Feedback from the HUG invited



HERSCHEL SPACE OBSERVATORY



HSC news

Personnel

- System engineer/Dep HSCOM Larry O'Rourke left for Rosetta
- Elena Puga joined the Inst & Cal Scientists team (June 2011)
- Replacement DP QA engineer José Marcos in place
- One DP team member left, two SW maintenance engineers shared with Rosetta, reducing them to 25% HSC
- Veronica Orozco (mission planner) on maternity leave from Feb 2012 – replacement from same company to be trained
- Student to be hired to establish connections between observations and publications

Travel

- Severe travel cuts (30% mentioned) foreseen for 2012 (this is part of a larger scheme of reducing ESA 'internal costs')



POP planning

Background

- Post-Operations Phase (POP) is an integral mission phase
- Helium boil-off is an important milestone – no more observing (no ‘warm phase’) but most(?) science yet to come
- Helium boil-off also is ‘funding milestone’ – not all actors are presently funded for much beyond in-flight operations

Mission operations centre

- MOC – is funded for ~3 months beyond boiloff

Science operations partners

- HSC – in principle funded for 15-20 fte for ~5 years, but new financial rules... increasing the cost for each fte significantly
- SPIRE ICC – not funded for much beyond boil-off
- PACS ICC – in principle funded for ~3 years
- HIFI ICC – in principle expects funding for ~3 years
- NHSC – funding requested for 5 years (25 -> 3 ftes)



Mission level objectives – the four ‘pillars’



Towards community

- Community support for ongoing data exploitation
- Create, advertise, and deliver the Herschel legacy archive

‘Internally’

- Derive lessons learned and items for future use
- Enable personnel to perform their own science exploitation

Mission level objectives captured in Sec.2 in HSC plan

Beyond POP – the Legacy Science Phase

- The Herschel legacy archive will be maintained indefinitely
- No ‘Herschel-specific’ activities are funded

POP planning – ‘phases’



Run-down phase

This is the only (last!) time we have the MOC

- Get everything you need from MOC
- Life beyond MOC review/milestone

Main phase

This is when it all happens – this is the main POP phase

- The four ‘pillars’ – 3 pages in Sec.2 in the HSC plan
- Life beyond ‘Centre X’ reviews/milestones

Handover phase

This is the end

- Deliver and publisize the Legacy Science Archive
- Life beyond Herschel after Herschel review/milestone



HERSCHEL SPACE OBSERVATORY

POP planning – (purpose of) plans



Each SGS Centre provides its plan

Common mission level objectives captured in HSC plan

- Each Centre addresses its 'share' of the objectives
- HSC plan fulfills dual role of 'central' plan – also contains implicit requirements on partners

Role/use of plans

- To be used for funding requests
- To be used to for implementation
 - Capture of objectives – completeness
 - Priorities setting
 - Planning
- A plan can be read/reviewed/improved by others
- Timescale for completing is spring 2012

HUG feedback is invited!





THANK YOU!