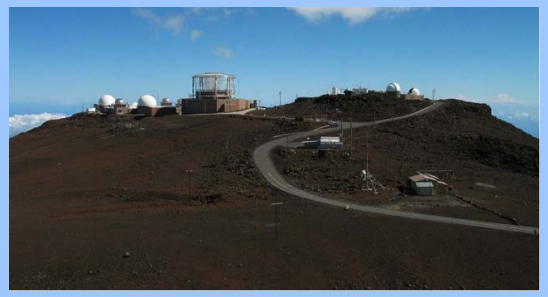
- Pan-STARRS1 (and 2) :
  - http://pswww.ifa.hawaii.edu/pswww/
  - https://star.pst.qub.ac.uk/ps1threepi/psdb/
- PESSTO
  - www.pessto.org
- ATLAS
  - http://atlas.fallingstar.com

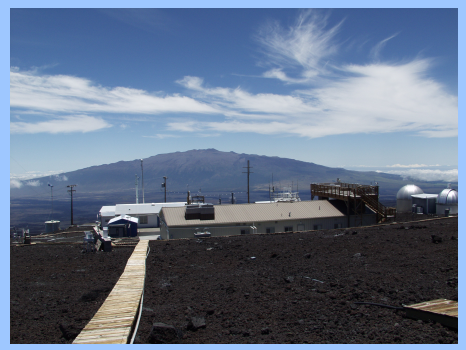
O'ahu

IfA, Manoa

PS1 + PS2
Haleakala
Maui



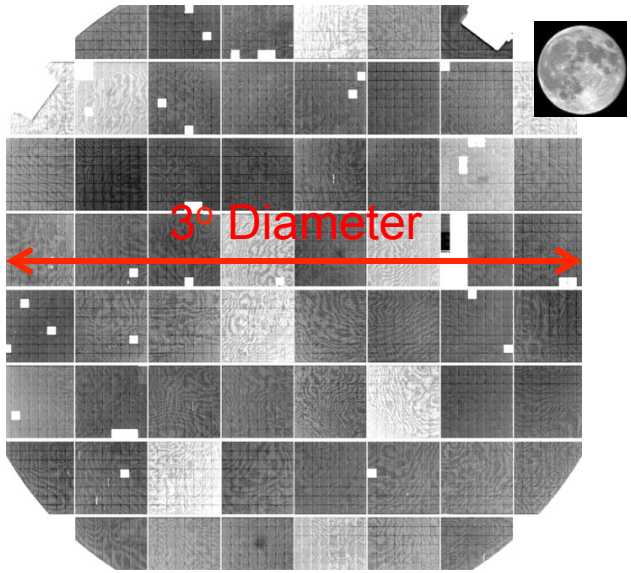
ATLAS1 :
Haleakala
3000m



ATLAS2 :
Mauna Loa
3400m

Big Island

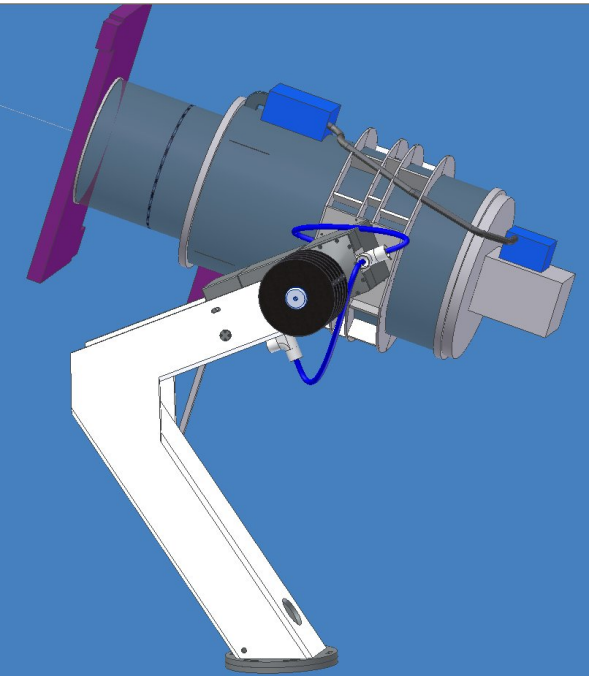
PSST: Pan-STARRS Survey for Transients

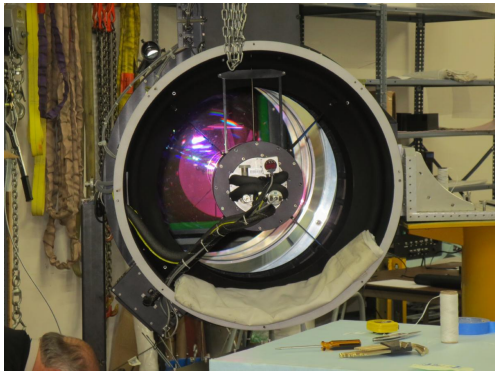


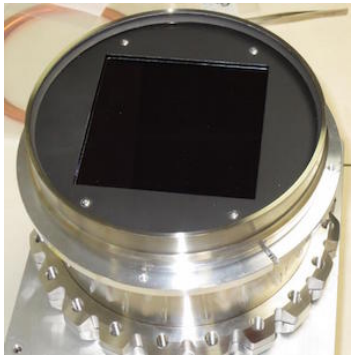
- Two 1.8m telescopes with 1.4Gpc cameras
- Each 7 square degree focal plane (76% fill factor)
- 90% NASA funding until ~2018
- Survey optimised for NEOs for 90% of time
- Powerful stationary transient survey
- 3% of time now guaranteed for over-ride, target-of-opportunity

http://star.pst.qub.ac.uk/ps1threepi/psdb/
Huber et al. 2015, ATel 7153
PS Director : K. Chambers
Transients science : S. Smartt, K. Smith, M. Huber, K. Chambers++

ATLAS : Asteroid Terrestrial-impact Last Alert System



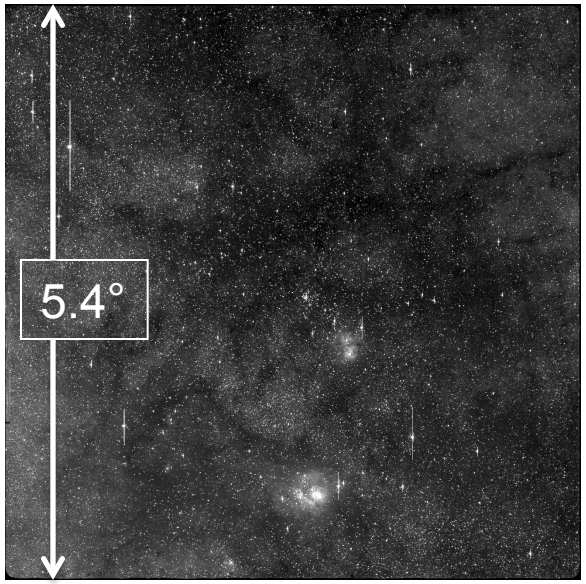




http://atlas.fallingstar.com

NASA funded in full (2 units + ongoing operations)
PI: J. Tonry(IfA)
Project team : J. Tonry, L. Denneau, B. Stalder, A. Heinze, H. Weiland, , A. Sherstyuk, (IfA), A. Rest (STScI), K. Smith, S. Smartt, (QUB)
GW lead : C. Stubbs (Harvard : MoU PI)
Science team : IfA + Harvard + QUB (Smartt/Smith + D. Young)

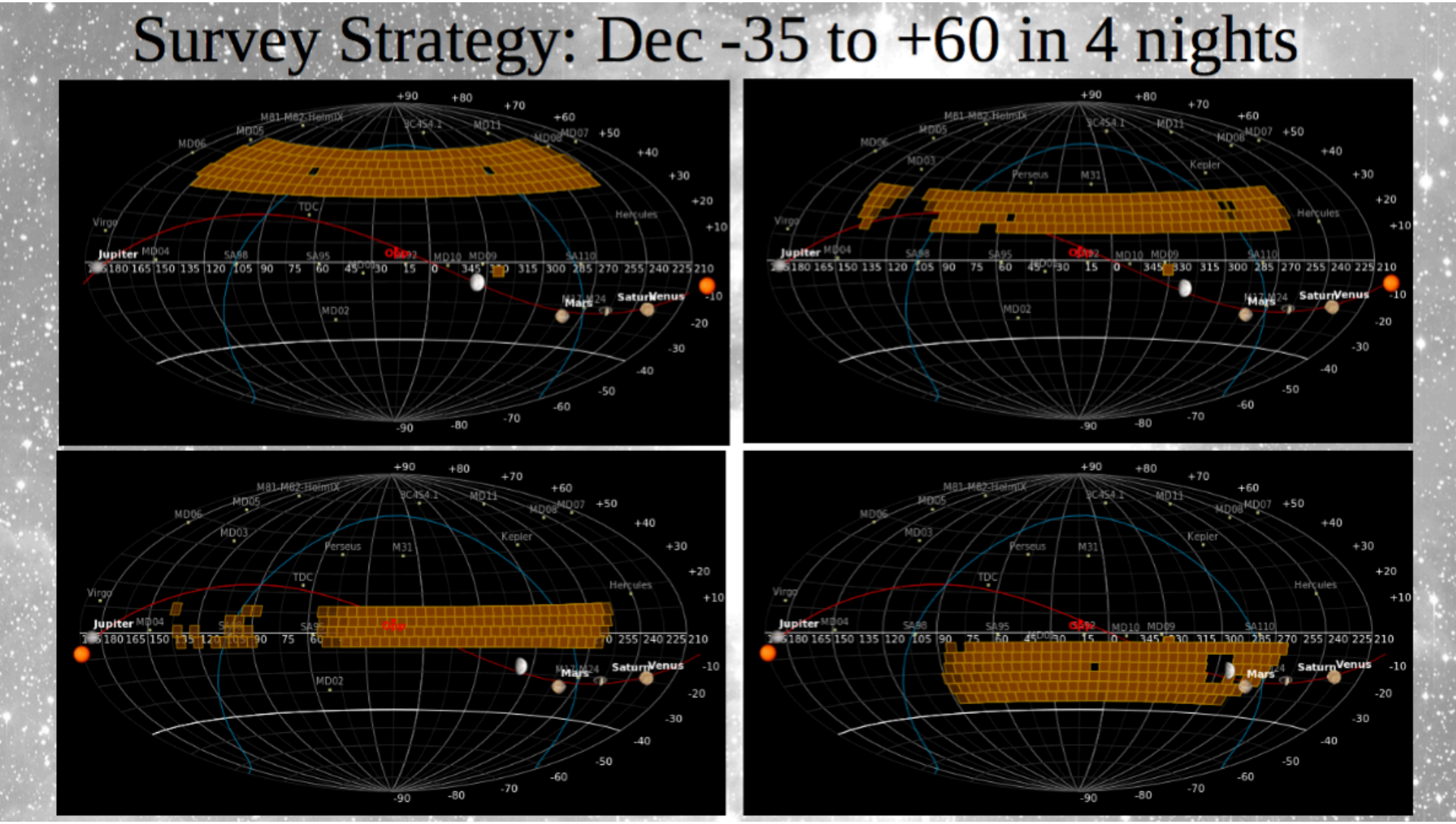
Specs and sky coverage goals



- 2 x 50cm telescopes : 7.5^{o} diameter FOV,
- f/2 Wright-Schmidt telescopes
- Cameras (ACAM) = 10560 x 10560 pixel CCDs (STA 1600)
- CCDs – excellent science grade quality, 7 sec readout
- Plate scale : 9 micron pixels = 1.86 arcsec (with focal length *F = 2)*
- Single image size = 29.2 square degrees

- **Goal 60,000 sq degrees coverage per night to *m ≈ 20***
- ***Each telescope 30,000 sq degrees per night***
- ***Footprint of 15,000 sq degrees (4 times - for NEO tracklets and fast transients)***

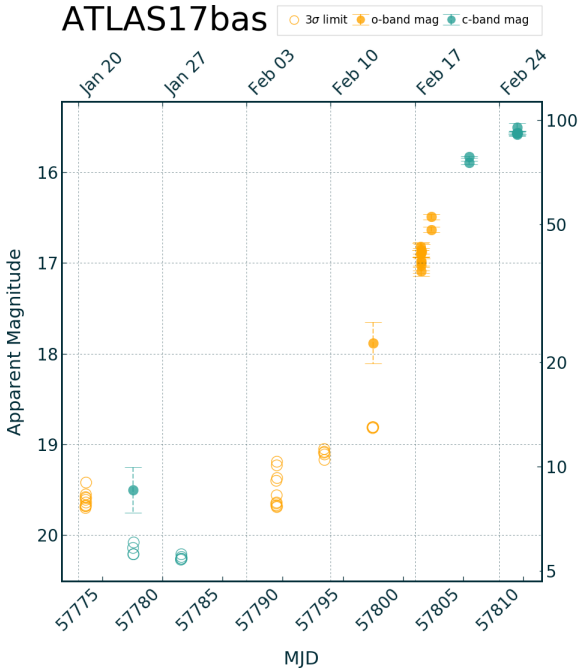
Single telescope survey strategy



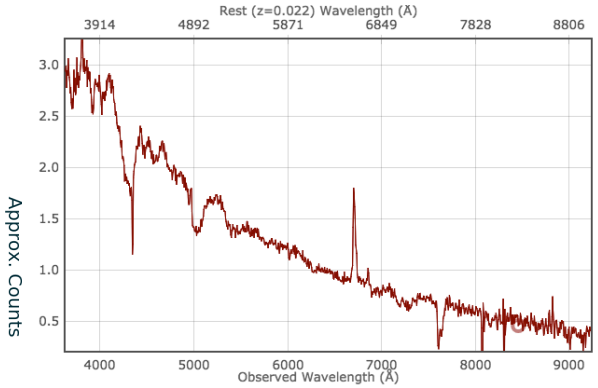
Then repeat ….

2 Telescopes – same footprint, 2 night cadence or

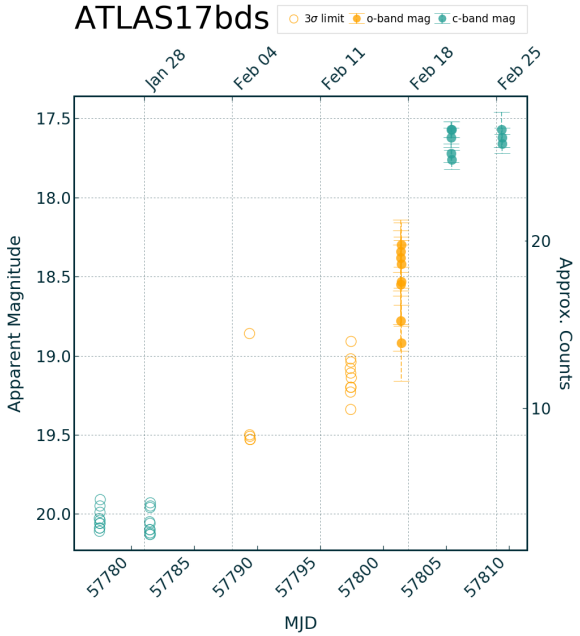
same footprint, c + o simulataneous colour



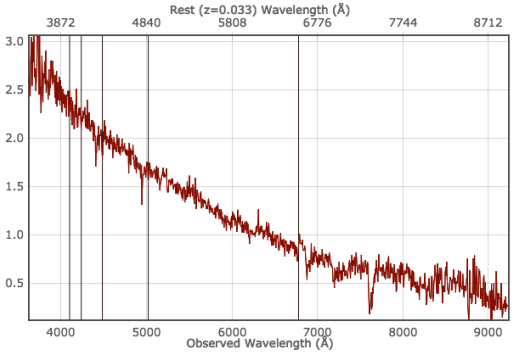
SN2017awzi

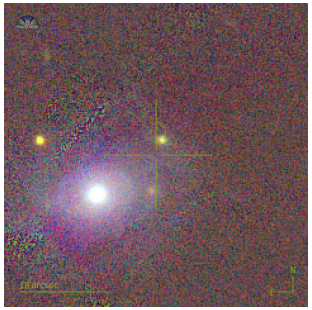


Discovered :57801.478
PESSTO spec :57802.232
SNIa at -10d (SN1991T-like)
Δt = 18hrs
d = 90 Mpc



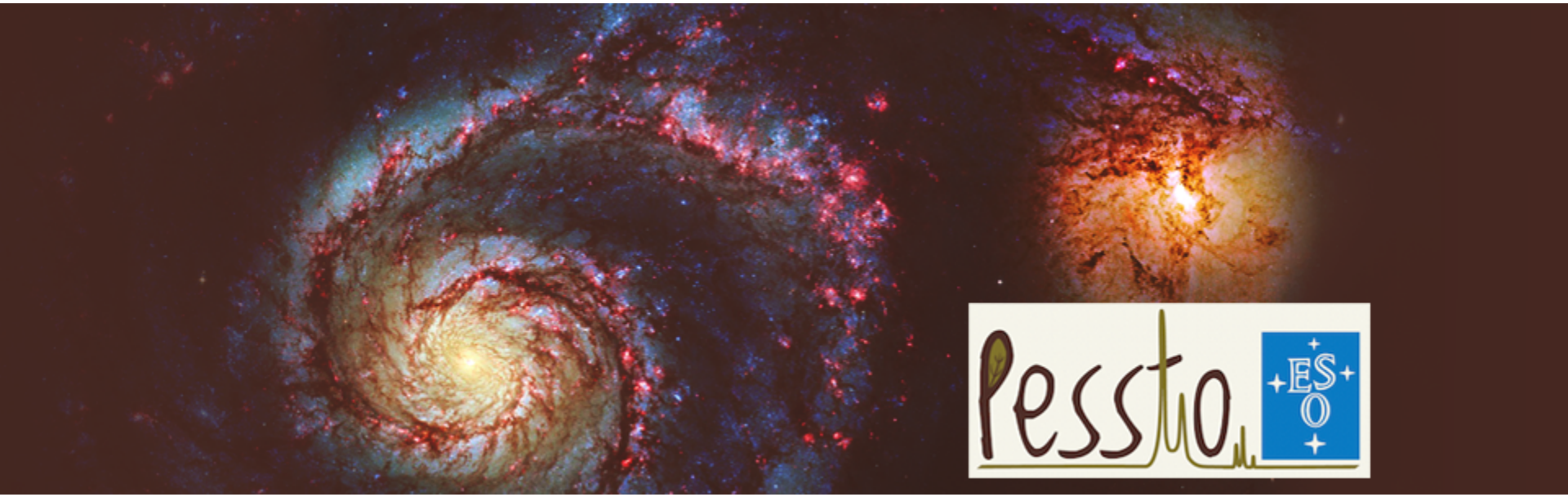
SN2017bei





Disc : 57801.41
PESSTO : 57810.10
d = 135 Mpc
M_c ~ -18
Blue continuum for ~12 days after discovery, what is it ?

Evolved into type II after 17 days



(e)Public ESO Spectroscopic Survey of Transient Objects

www.pessto.org

Stephen Smartt
PI and Survey Director
Queen's University Belfast

European Research Council
erc

PESSTO Scientists : 185

Institutes : 43

PESSTO: The Public ESO Spectroscopic Survey of Transient Objects

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Morgan Fraser[1,5]
Cosimo Inserra[1]
David R. Young[1]
Mark Sullivan[6]
Stefano Benetti[2]
Avishay Gal-Yam[7]
Cristina Knapic[8]
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Stefan Taubenberger[9]
Ofer Yaron[7]

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[2] Osservatorio Astronomico di Padova, INAF, Italy
[3] Las (
Netw
[4] Depa
Calif
[5] Instit
Cam

Science, [7]SSI, Boulder, [8]Liverpool John Moores Univ. [9]INAF – Obs. Capodimonte, [10]Univ. Andrés Bello, [11]Queen's Univ. Belfast, [12]INAF Obs. Padova, [13]RSAA, ANU, [14]OATS–INAF, [15]IAP, [16]ICE, Bellaterra, [17]Univ. de Chile, [18]MPA, [19]IoA, Cambridge, [20]Univ. Oxford Astrophys., [21]INAF – Obs. Roma, [22]FINCA, [23]Stockholm Univ., [24]Dark Cosmology Centre, [25]Weizmann Institute of Science, [26]Gemini

PESSTO, which began in April 2012 as one of two ESO public spectroscopic surveys, uses the EFOSC2 and SOFI instruments on the New Technology Telescope during ten nights a month for nine months of the year. Transients for PESSTO follow-up are provided by dedicated large-field 1–2-metre telescope imaging surveys. In its first year PESSTO classified 263 optical transients, publicly released the reduced spectra within 12 hours of the end of the night and identified 33 supernovae (SNe) for dedicated follow-up campaigns. Nine papers have been pub-

hemisphere surveys that have survey strategies that produce large numbers of young targets in PESSTO's sensitivity range (mag < 20.5). The La Silla QUEST survey searches for supernovae over 1000 square degrees on a 1–2 day cadence, providing PESSTO with 5–10 supernova candidates per night for classification. The rapid cadence allows for young objects to be identified for immediate follow-up and this has been the major feeder survey for PESSTO to date. The SkyMapper telescope is another powerful survey which has just started sky survey operations in earnest in September 2013 and promises a harvest of targets, and accompanying multi-colour light curves. The PESSTO science teams also scour the Catalina Sky Survey public discoveries, and, recently, the Panoramic Survey Telescope and Rapid Response System (Pan-STARRS1) survey discoveries for appropriate targets. PESSTO also welcomes early alerts

A&A 579, A40 (2015)
DOI: 10.1051/0004-6361/201425237

Astronomy & Astrophysics

PESSTO: survey description and products from the first data release by the Public ESO Spectroscopic Survey of Transient Objects⋆,⋆⋆

S. J. Smartt[1], S. Valenti[2,3], M. Fraser[4], C. Inserra[1], D. R. Young[1], M. Sullivan[5], A. Pastorello[6], S. Benetti[6], A. Gal-Yam[7], C. Knapic[8], M. Molinaro[8], R. Smareglia[8], K. W. Smith[1], S. Taubenberger[9], O. Yaron[7], J. P. Anderson[10], C. Ashall[18], C. Balland[11], C. Baltay[12], C. Barbarino[13,14], F. E. Bauer[15,16,17], S. Baumont[11], D. Bersier[18], N. Blagorodnova[4], S. Bongard[11], M. T. Botticella[13], F. Bufano[19], M. Bulla[1], E. Cappellaro[6], H. Campbell[4], F. Cellier-Holzem[11], T.-W. Chen[1], M. J. Childress[20,32], A. Clocchiatti[15,16], C. Contreras[43,44], M. Dall'Ora[13], J. Danziger[8], T. de Jaeger[23,37], A. De Cia[7], M. Della Valle[13], M. Dennefeld[21], N. Elias-Rosa[6,22], N. Elman[12], U. Feindt[39,40], M. Fleury[11], E. Gall[1], S. Gonzalez-Gaitan[23,37], L. Galbany[23,37], A. Morales Garoffolo[22], L. Greggio[6], L. L. Guillou[11], S. Hachinger[33,34,6], E. Hadjiyska[12], P. E. Hage[11], W. Hillebrandt[9], S. Hodgkin[4], E. Y. Hsiao[44,43], P. A. James[18], A. Jerkstrand[1], T. Kangas[36], E. Kankare[1], R. Kotak[1], M. Kromer[26], H. Kuncarayakti[23,37], G. Leloudas[25,7], P. Lundqvist[26], J. D. Lyman[45], I. M. Hook[27,28], K. Maguire[29], I. Manulis[7], S. J. Margheim[30], S. Mattila[24], J. R. Maund[1], P. A. Mazzali[18], M. McCrum[1], R. McKinnon[12], M. E. Moreno-Raya[42], M. Nicholl[1], P. Nugent[31,41], R. Pain[11], G. Pignata[19,16], M. M. Phillips[43], J. Polshaw[1], M. L. Pumo[6], D. Rabinowitz[12], E. Reilly[1], C. Romero-Cañizales[15,16], R. Scalzo[20], B. Schmidt[20], S. Schulze[15,16], S. Sim[1], J. Sollerman[26], F. Taddia[26], L. Tartaglia[6,38], G. Terreran[1,6], L. Tomasella[6], M. Turatto[6], E. Walker[12], N. A. Walton[4], L. Wyrzykowski[35,4], F. Yuan[20,32], and L. Zampieri[6]

(Affiliations can be found after the references)

Received 29 October 2014 / Accepted 17 April 2015

Smartt et al. 2015

PESSTO in a Nutshell

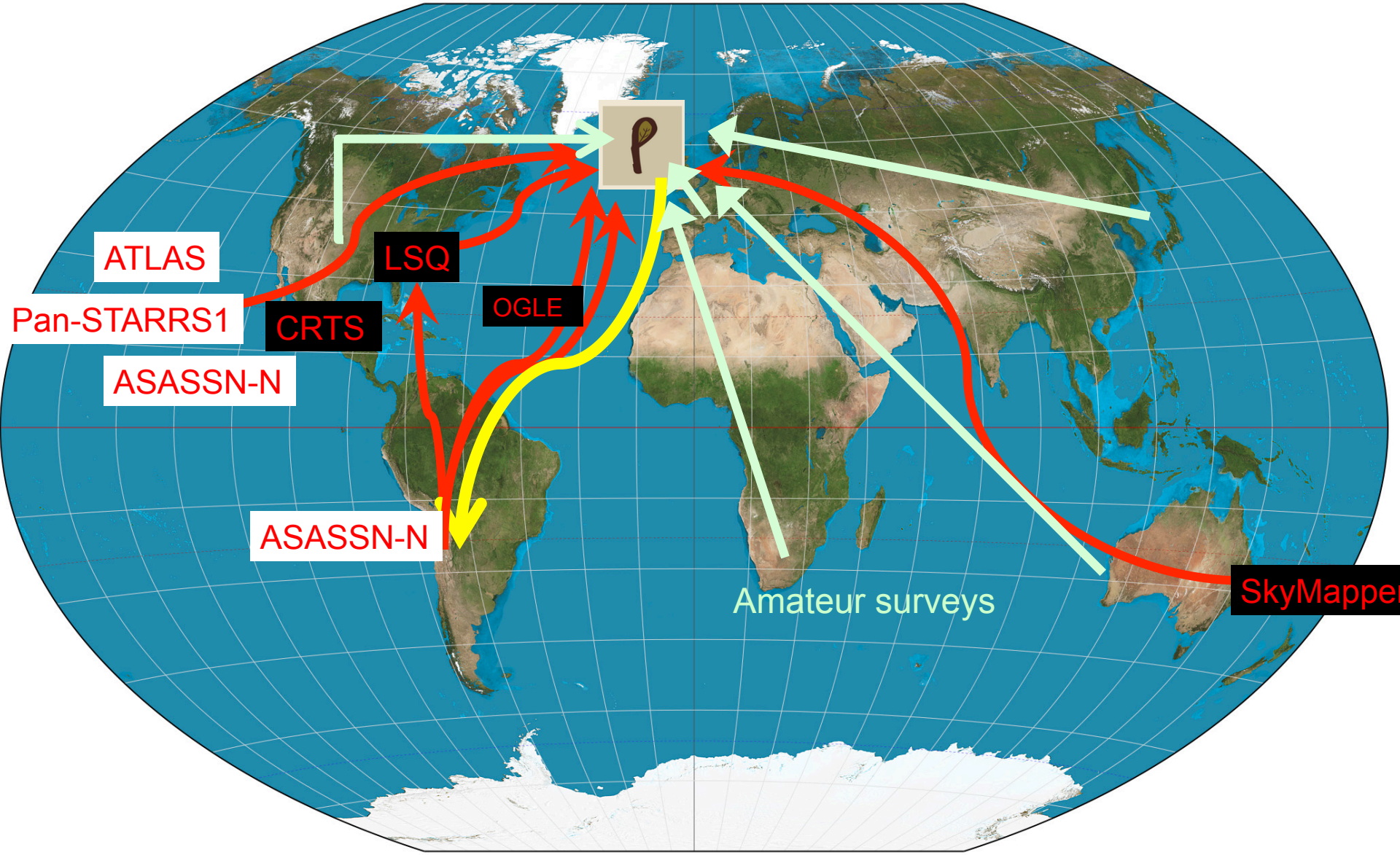
- ESO NTT : 90n per year : 9 months, 10n per month
- 5 yrs (2012-2017)
- Classify ~2000 (1135) SNe – all spectra reduced, classified and released within 24hrs
- Follow approx 150 (238) with spectroscopic and photometric time series coverage
- Goal of 100 papers within 2 yrs of survey end (PESSTO + archive): 52 published or under review

(current status in red)

ePESSTO in a Nutshell

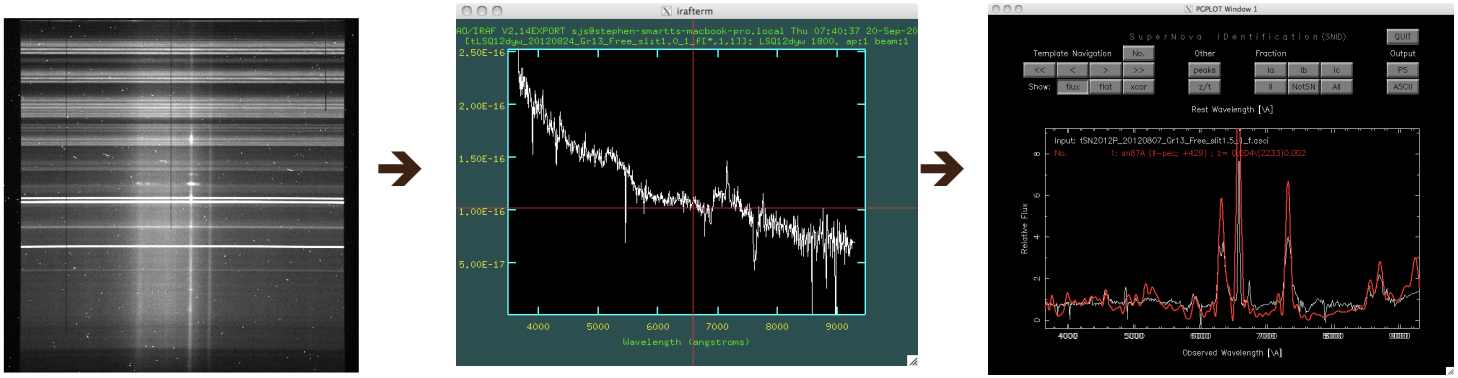
- "extended" PESSTO
- 2017 – 2019
- 90n per year : 9 months, 10n per month
- Extended in time and extended science goal
- Nuclear transients, TDEs, GRBs,

- ESO Large Programme – not Public survey, but mostly the same as PESSTO

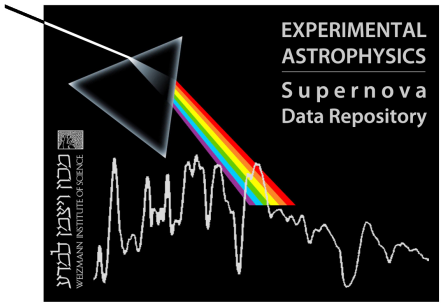

ATLAS
Pan-STARRS1
ASASSN-N
LSQ
CRTS
OGLE
ASASSN-N
Amateur surveys
SkyMapper

12hr turnaround : NTT to public data

Observers (La Silla):



Data Team (Europe/Chile):



http://wiserep.weizmann.ac.il/

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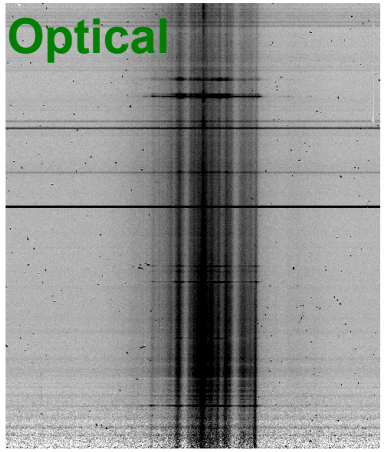
PESSTO spectroscopic classification of optical transients

ATel #8139; *H. Campbell (Cambridge), J. Lyman (Warwick), M. Fraser (Cambridge), J. Anderson (ESO), C. Inserra (QUB), I. Manulis (Weizmann), K. Maguire (QUB), S. J. Smartt (QUB), K. W. Smith (QUB), M. Sullivan (Southampton), S. Valenti (LCOGT), O. Yaron (Weizmann), D. Young (QUB)*
on 7 Oct 2015; 16:39 UT
Distributed as an Instant Email Notice Supernovae
Credential Certification: Morgan Fraser (mf@ast.cam.ac.uk)

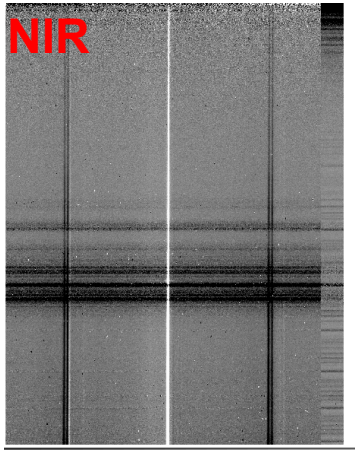
Subjects: Optical, Supernovae, Transient

Extra Data products : 2D

EFOSC2
Optical



SOFI
NIR



- 3 public releases of 1D calibrated spectra
- 2D spectra frames – flux calibrated, wavelength calibrated for all targets
- User can re-extract, flux calibrated spectrum
- Detrended, astrometrically calibrated images also available (+ acquisition images)