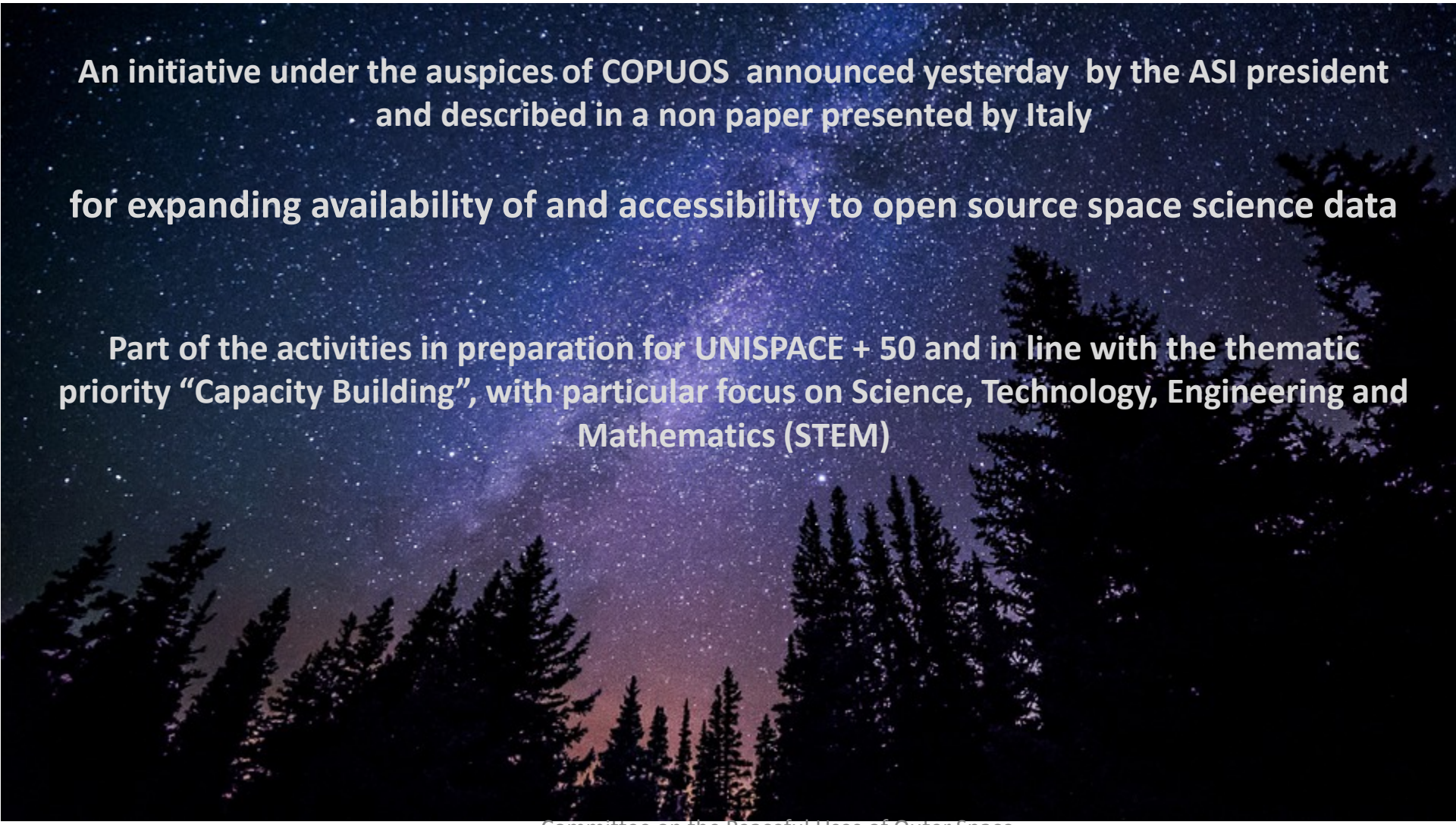
Open Universe

Paolo Giommi
Senior Scientist, Italian Space Agency



An initiative under the auspices of COPUOS announced yesterday by the ASI president and described in a non paper presented by Italy

for expanding availability of and accessibility to open source space science data

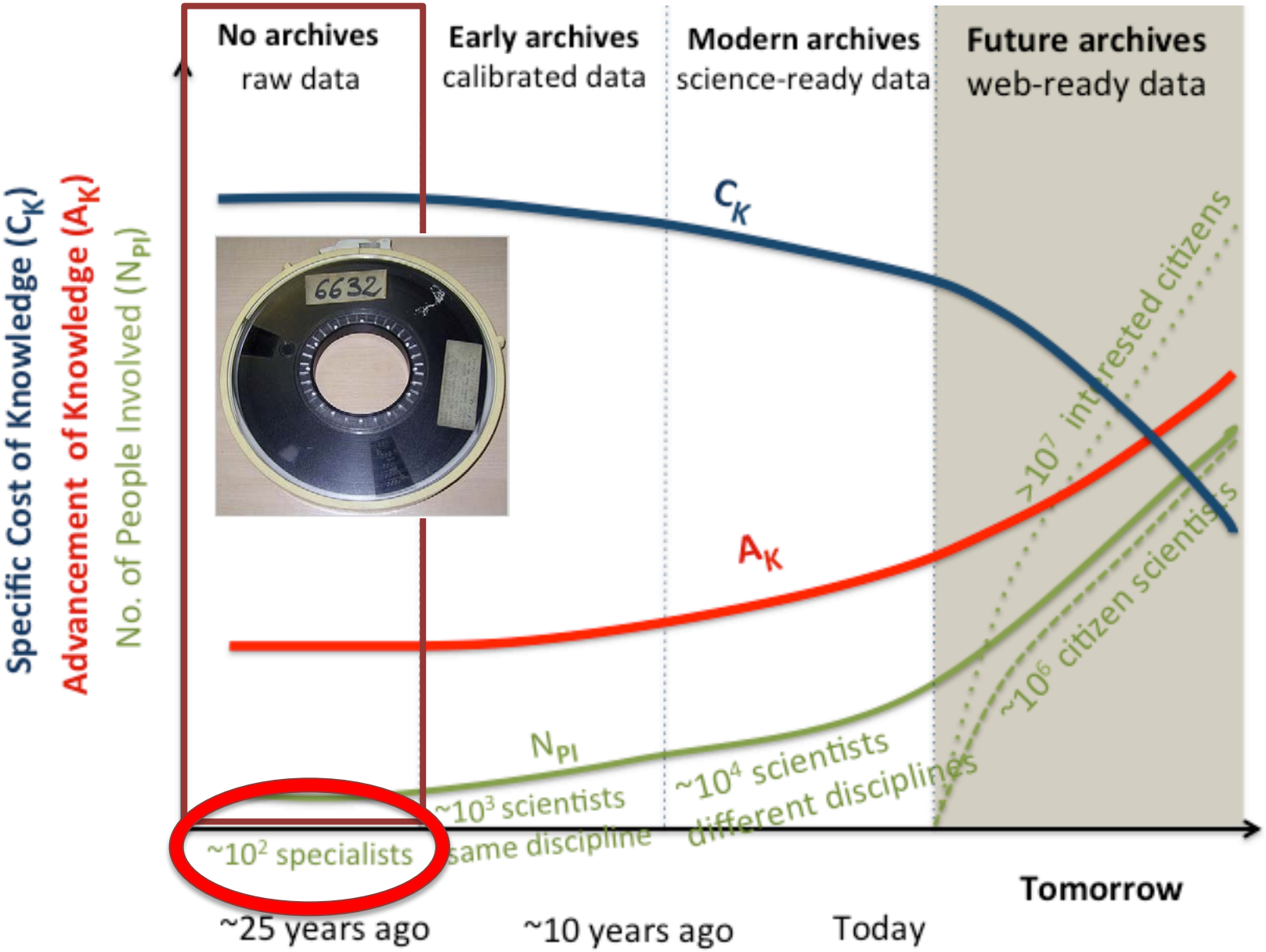
Part of the activities in preparation for UNISPACE + 50 and in line with the thematic priority "Capacity Building", with particular focus on Science, Technology, Engineering and Mathematics (STEM)

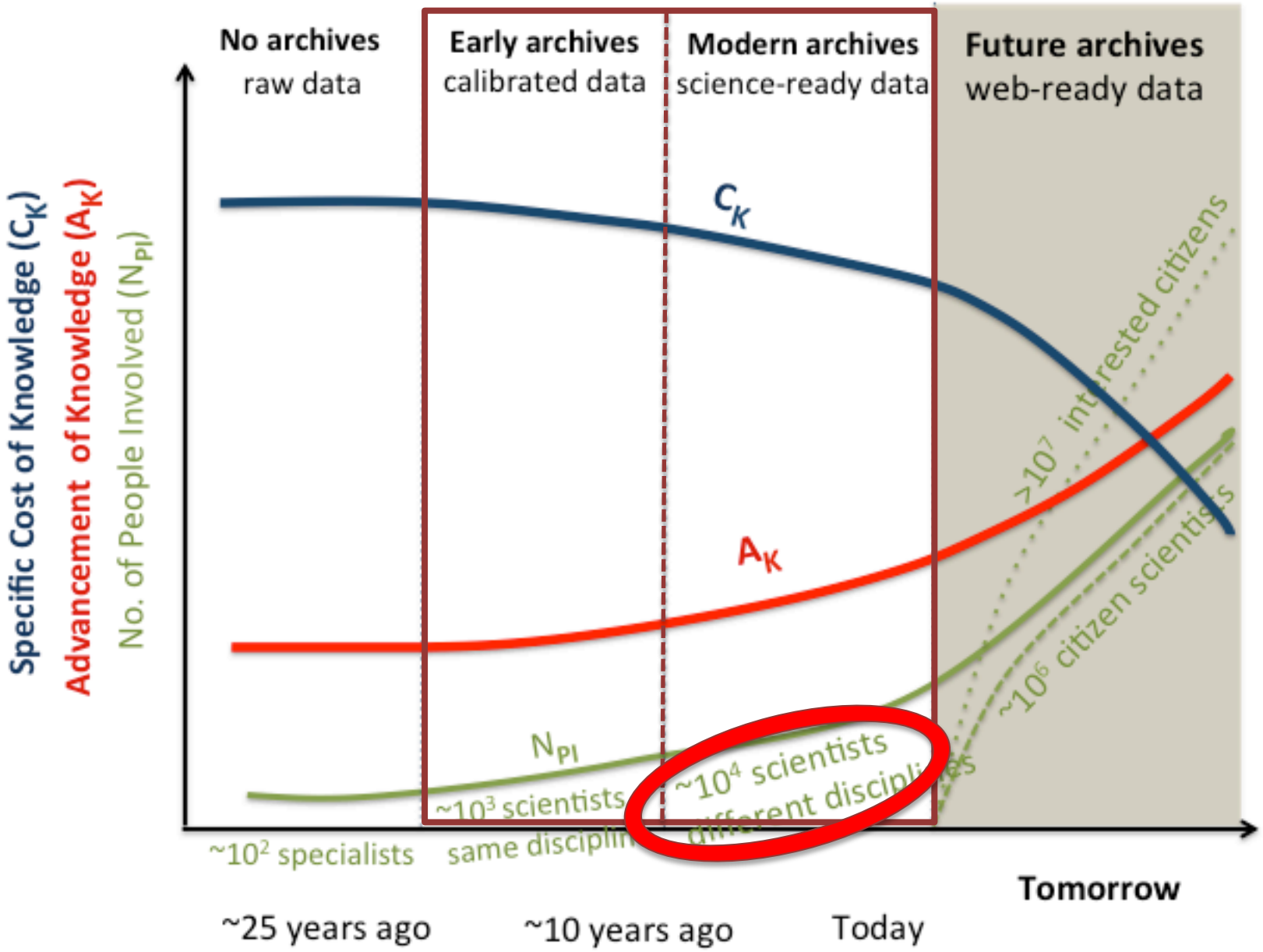
Critical juncture in the history of human civilization:

- computing power, data storage and interconnectivity have become nearly limitless resources potentially available to billions of people in the world;
- **open data access** is a well-established principle of every scientific discipline that drives innovation and productivity;
- **however there is still a considerable degree of unevenness in the services** currently offered by scientific data providers.

Initiatives are necessary to expand availability and accessibility to open source space science data:

Open Universe proposal


No archives
raw data
Early archives
calibrated data
Modern archives
science-ready data
Future archives
web-ready data
Specific Cost of Knowledge (C_K)
Advancement of Knowledge (A_K)
No. of People Involved (N_{PI})
C_K
A_K
N_{PI}
6632
~10^2 specialists
~10^3 scientists same discipline
~10^4 scientists different disciplines
~10^6 citizen scientists
>10^7 interested citizens
~25 years ago
~10 years ago
Today
Tomorrow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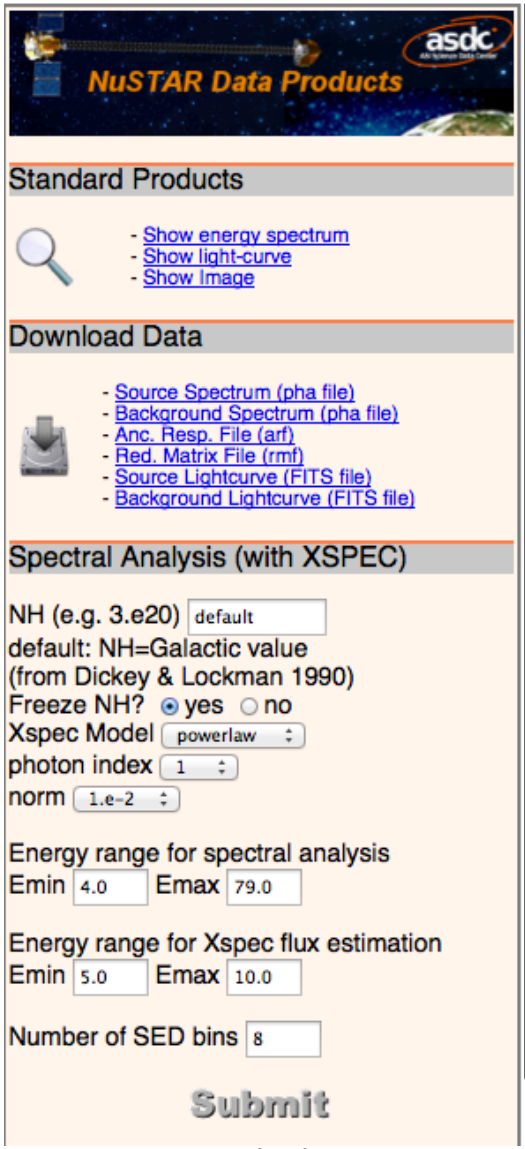
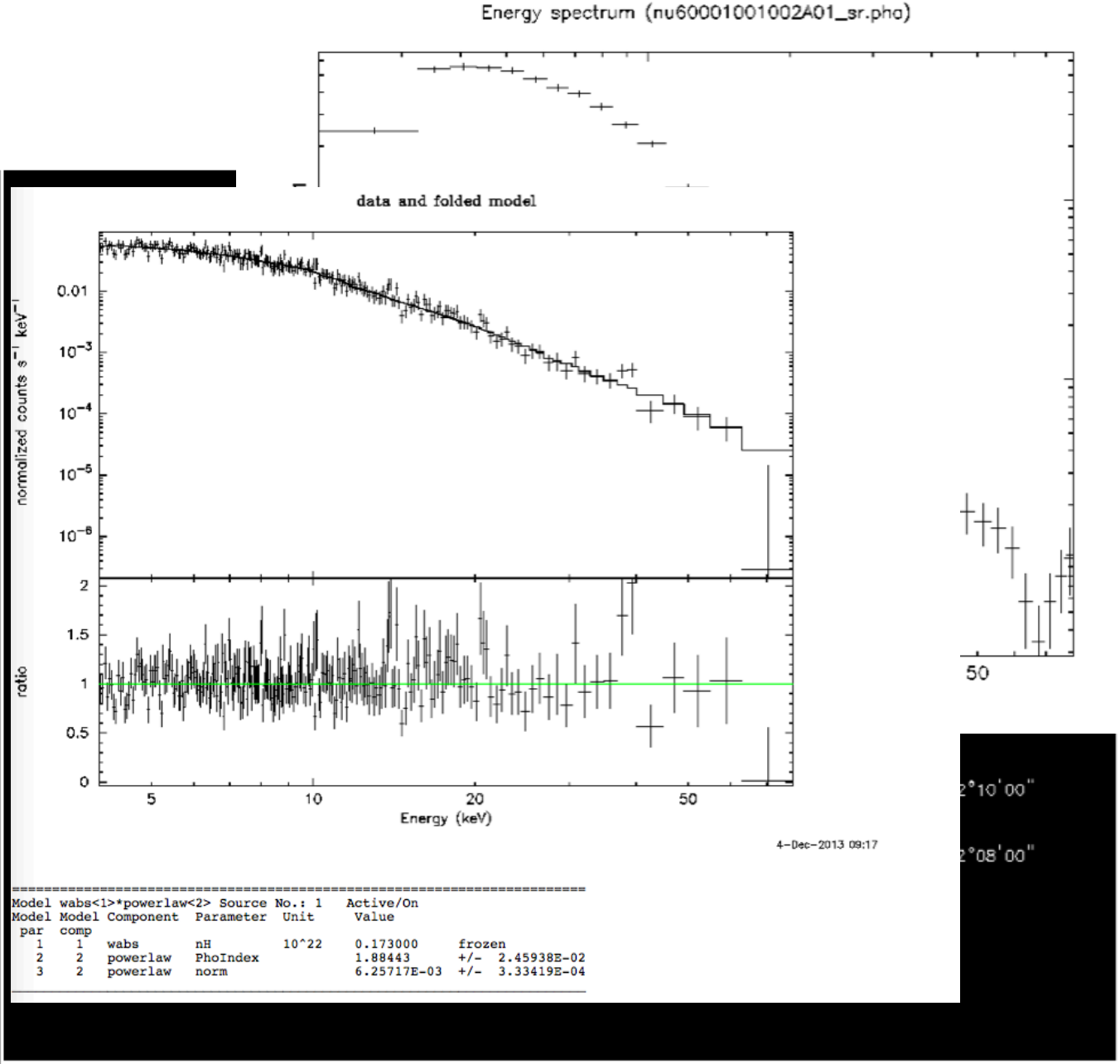
NASA-UK-ASI Swift satellite Data Data plus reduction software

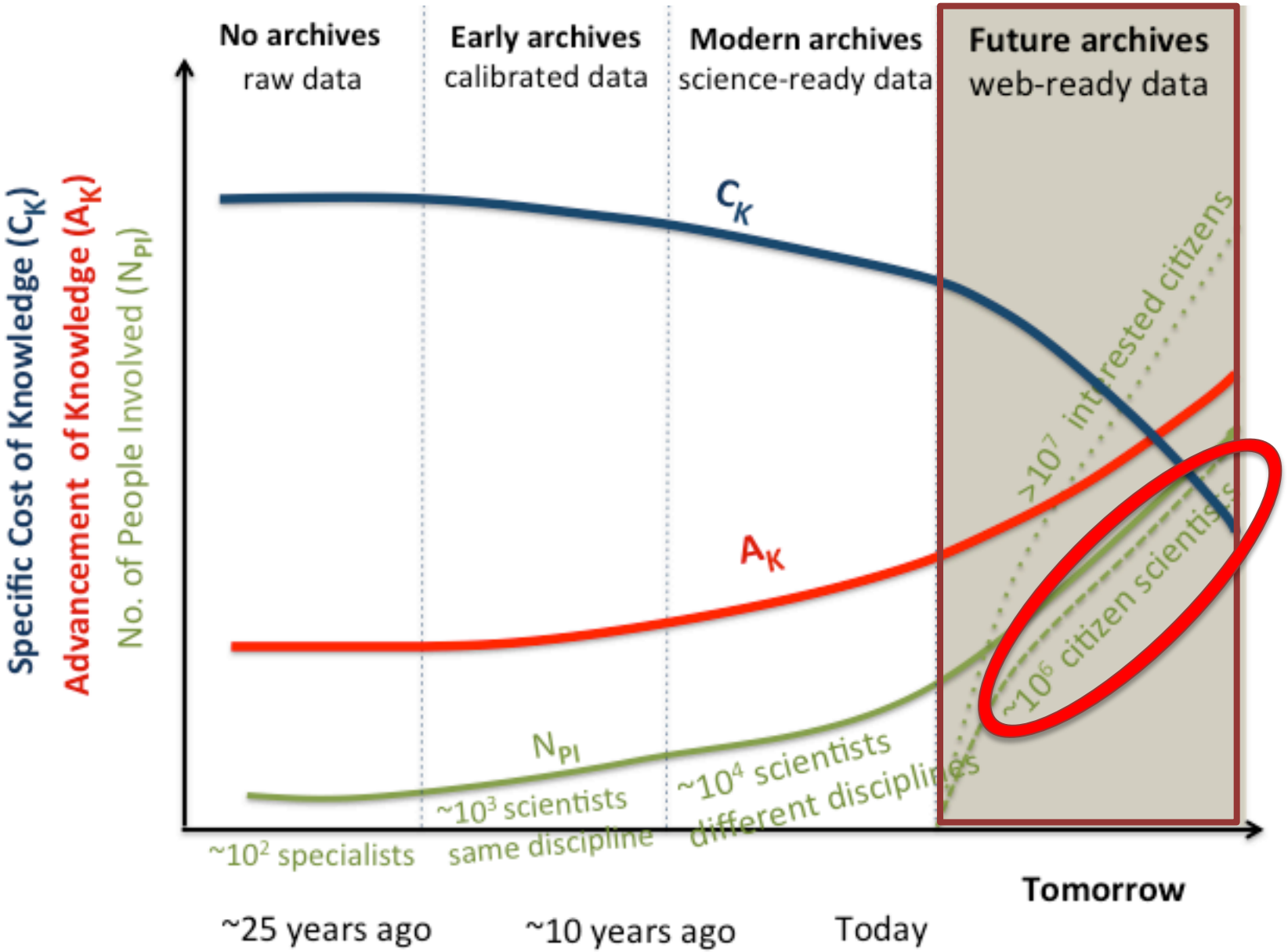
All Files

- **auxil**
  - sw00053675001pat.fits FITS 26 kB (level 3) Corrected attitude file
  - sw00053675001pjb.par ASCII 3 kB (level 1) Job parameter file
  - sw00053675001pob.cat FITS 3 kB (level 1) FITS format tape contents
  - sw00053675001ppr.par ASCII 2 kB (level 1) Processing parameter file
  - sw00053675001s.mkf FITS 30 kB (level 2) Makefilter filter file
  - sw00053675001sao.fits FITS 483 kB (level 1) Attitude/orbit-related filter valu
  - sw00053675001sat.fits FITS 28 kB (level 1) Spacecraft attitude file
  - sw00053675001sen.hk FITS 131 kB (level 1) S/C engineering data
  - sw00053675001sti.fits FITS 3 kB (level 1) UTC corrections file
  - SWIFT_TLE_ARCHIVE.txt.15254.42938434 ASCII 103 kB (level 1) TLE orbit file
- **bat**
  - **hk**
    - sw00053675001bdecb.hk FITS 13 kB (level 1) Housekeeping data
    - sw00053675001bdp.hk FITS 23 kB (level1) BAT DAP housekeeping
    - sw00053675001ben.hk FITS 232 kB (level 1) instrument engineering data
    - sw00053675001bgocb.hk FITS 283 kB (level 1) Housekeeping data
    - sw00053675001bhd.hk FITS 6 kB (level 1) Housekeeping data
  - **masktag**
    - sw00053675001bmt00010004_rw.lc FITS 4 kB (level 1) Mask tagged lightcurves
    - sw00053675001bmt00010005.lc FITS 5 kB (level 1) Mask tagged lightcurves
    - sw00053675001bmt00010005_rw.lc FITS 8 kB (level 1) Mask tagged lightcurves
    - sw00053675001bmt00010051.lc FITS 9 kB (level 1) Mask tagged lightcurves
    - sw00053675001bmt00010051_rw.lc FITS 17 kB (level 1) Mask tagged lightcurves
    - sw00053675001bmt00010500_rw.lc FITS 4 kB (level 1) Mask tagged lightcurves
  - **pulsar**
    - sw00053675001bpl00000000.fits FITS 21 kB (level 1) Pulsar data file
  - **rate**
    - sw00053675001brt1s.lc FITS 5 kB (level 1) merged rate files
    - sw00053675001brtmc.lc FITS 20 kB (level 1) merged rate files
    - sw00053675001brtms.lc FITS 36 kB (level 1) merged rate files
    - sw00053675001brtqd.lc FITS 8 kB (level 1) merged rate files
  - **survey**
    - sw00053675001bsvpbo0b47g03d1.dph FITS 814 kB (level 1) Calibrated B
    - sw00053675001bsvpbo0b48g03d1.dph FITS 796 kB (level 1) Calibrated B
- **log**
  - sw00053675001bir.html HTML 1 kB (level 1) HTML exposure report
  - sw00053675001per.html HTML 1 kB (level 1) HTML processing error index
  - sw00053675001pfi.html HTML 2 kB (level 1) HTML file list
  - sw00053675001pin.html HTML 2 kB (level 1) HTML Processing index
  - sw00053675001pjl.html HTML 45 kB (level 1) HTML processing job log
  - sw00053675001psu.html HTML 1 kB (level 1) HTML processing summary page
  - sw00053675001uir.html HTML 1 kB (level 1) HTML exposure report
  - sw00053675001xir.html HTML 3 kB (level 1) HTML exposure report
- **uvot**
  - **hk**
    - sw00053675001uen.hk FITS 35 kB (level 1) instrument engineering data
- **xrt**
  - **hk**
    - sw00053675001xbf_rw.img FITS 171 kB (trend) XRT bias image mode data
    - sw00053675001xen.hk FITS 18 kB (level 1) instrument engineering d
    - sw00053675001xhd.hk FITS 47 kB (level 1) Housekeeping data
    - sw00053675001xtr.hk FITS 9 kB (level 1) Housekeeping data

Download Click this button or the one at the top of the page after selecting files.


NuSTAR Data Products
asdc
Standard Products
- Show energy spectrum
- Show light-curve
- Show Image
Download Data
- Source Spectrum (pha file)
- Background Spectrum (pha file)
- Anc. Resp. File (arf)
- Red. Matrix File (rmf)
- Source Lightcurve (FITS file)
- Background Lightcurve (FITS file)
Spectral Analysis (with XSPEC)
NH (e.g. 3.e20) default
default: NH=Galactic value
(from Dickey & Lockman 1990)
Freeze NH? yes no
Xspec Model powerlaw
photon index 1
norm 1.e-2
Energy range for spectral analysis
Emin 4.0 Emax 79.0
Energy range for Xspec flux estimation
Emin 5.0 Emax 10.0
Number of SED bins 8
Submit


Energy spectrum (nu60001001002A01_sr.pha)
data and folded model
normalized counts s^{-1} keV^{-1}
ratio
Energy (keV)
4-Dec-2013 09:17
Model wabs<1>*powerlaw<2> Source No.: 1 Active/On
Model Model Component Parameter Unit Value
par comp
1 1 wabs nH 10^22 0.173000 frozen
2 2 powerlaw PhoIndex 1.88443 +/- 2.45938E-02
3 2 powerlaw norm 6.25717E-03 +/- 3.33419E-04
50
2°10'00"
2°08'00"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The active galaxy MKN 421

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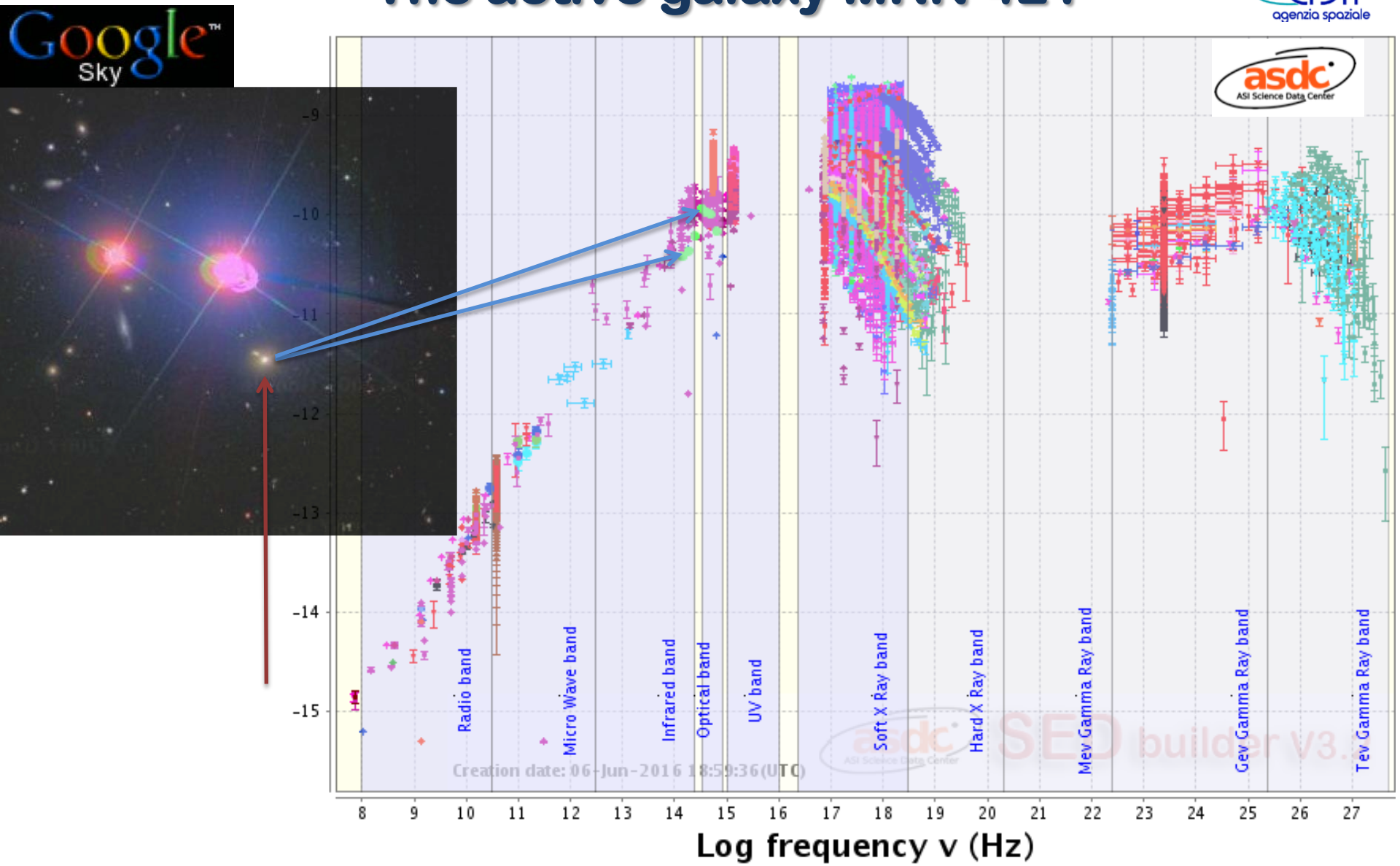

Canadian schoolboy, 15, discovers lost Mayan city

William Gadoury discovered a lost Mayan city in the Yucatan peninsula using Google Earth and star constellations. Many similar discoveries in the sector of space science will be enabled by the “Open Universe” proposal.

Open Universe proposal

Review of space science data services

- Objective criteria
- Technical expertise
- Best practice

Data revolution

- Award of UN Open Data Index
- Technical recommendations for improvement

Open Universe proposal

World-wide objectives

Avalanche of new open data web services for space science

- Education
- Training
- Research
- Science

Beneficiaries

- Research organizations
- Data custodians
- Universities
- Schools
- Citizens

Proposal for a United Nations/ASI workshop to discuss the Initiative

Early 2017

Open to experts and data providers
from all interested countries.
The outcome would be part of the process leading to

UNISPACE+50

within the thematic priority "Capacity Building"
with focus on
Science, Technology, Engineering and Mathematics (STEM)

Thank you very much

For any suggestion please contact me at paolo.giommi@asi.it