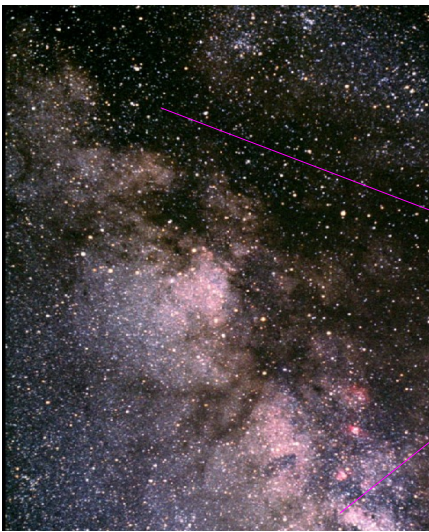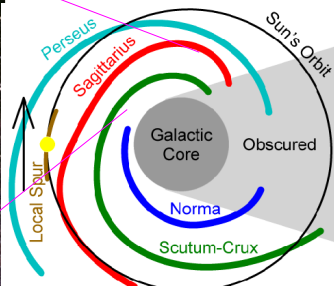# THE SCUTUM SURVEY

A.Camero-Arranz[1], P.Connell[1], A. Segreto, J. Fabregat[1], E. Nespoli[1], S. Martínez-Núñez[3] and V. Reglero[1]

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INTEGRAL Observations

Scutum survey + GPS + GCDE

3044 telescope pointings

67.64x10³ ks

Abstract

The Scutum region has been proposed to be the site of vigorous star formation. Our main goal is to search for new High Mass X-Ray Binaries (HMXRB) candidates, situated in this region of strong absorption which still remain undetected. Data from the Scutum survey performed by INTEGRAL, as well as from the Galactic Plane Scan (GPS) and Galactic Center Deep Exposure surveys have been used. These results are preliminary and therefore will be pursued in the future. The analysis of the data suggest the presence of a few possible new sources, although our results are not conclusive. The identification and follow up studies of the counterparts will be done in the IR bands,

Preliminary imaging results
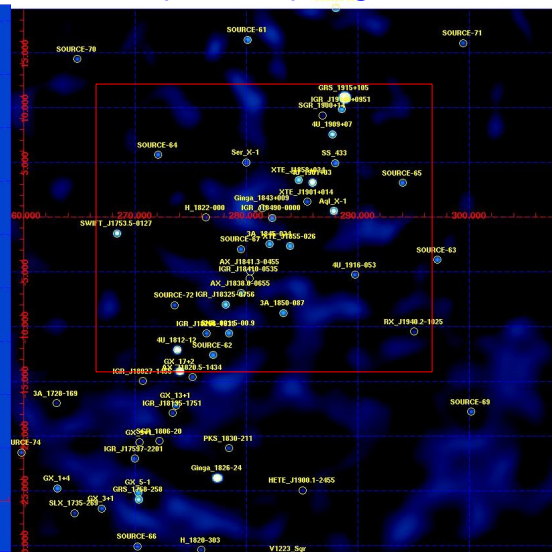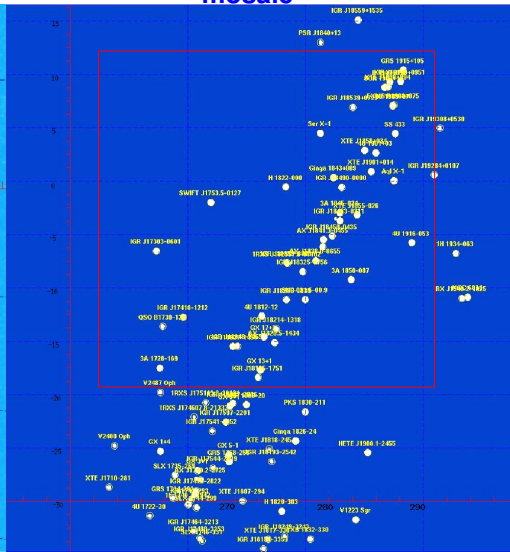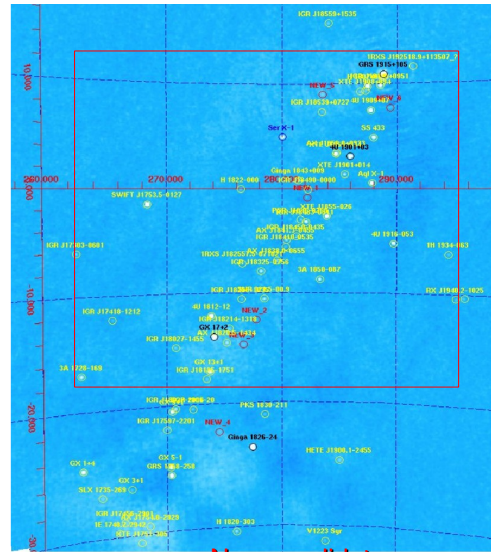
KNOWN sources mosaic results in the 20- 40 keV band:

IBIS/ISGRI	STANDARD SOFTWARE (OSA5.1)	ALTERNATIVE SOFTWARE by A. SEGRETO
	5 known objects	**59 known objects**

visual inspection +.SExtractor software **55**

SPI **46** known objects

JEM-X **20**

IBIS/ISGRI OSA5.1 (20-40keV) mosaic

ISGRI   (20-40keV) A. Segreto mosaic

SPI (20-40 keV) image

New candidates

For an ideal instrument and mosaic map reconstruction method → **skymap variance= 1σ**

For IBIS/ISGRI the detector background (BKG) is projected into the mosaic map of the sky → **skymap variance >> 1σ**

The detection level must be scaled and its threshold determined from the BKG fluctuations in the mosaic map

Our method → local estimation of the source flux and BKG on the initial 20-40 keV OSA5.1 mosaic map

P. Connell software (University of Valencia)

- as well as in combined images in the 15-60 keV range-

With the BKG removed we can output groups of significance maps for different sigma detection thresholds (0,3,4 and 5 sigma)

New IBIS/ISGRI candidates

Energy band (keV)	Mean image sigma level NOISE	Standard deviation OF THE NOISE
15-20	-0.0080	1.93311
15-40	-0.0095	1.67555
15-60	-0.0087	1.58655
20-40	-0.0065	1.10360
20-60	-0.0059	1.10453
40-60	-0.0028	0.98513

new ISGRI histograms

(gaussian μ =0, σ =1)

Now, if sigma ≥ 3.0 (3 STD) we have a possible new candidate

(From the original ISGRI map, the detection threshold was ~30 sigma !!)

Some of the most significant new IBIS/ISGRI candidates

Energy band (keV)	Coordinates (degrees)	sigma level
20–40 keV	(283.621,9.031)	7.3
	(287.392,1.130)	5.3
	(287.543,10.60)	6.7
20–60 keV	(289.16,9.46)	5.7
	(277.736,-10.092)	5.4
	(298.148,2.487)	6.3

New IBIS/ISGRI sources

0.0 sigma threshold (20-40keV) map

(287.32, 1.149)

Sigma

pixels

(283.53, 9.076)

Sigma

pixels