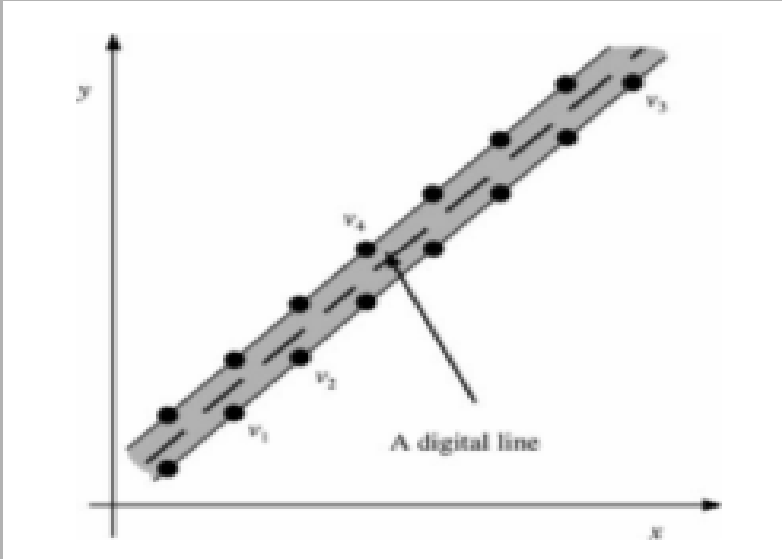




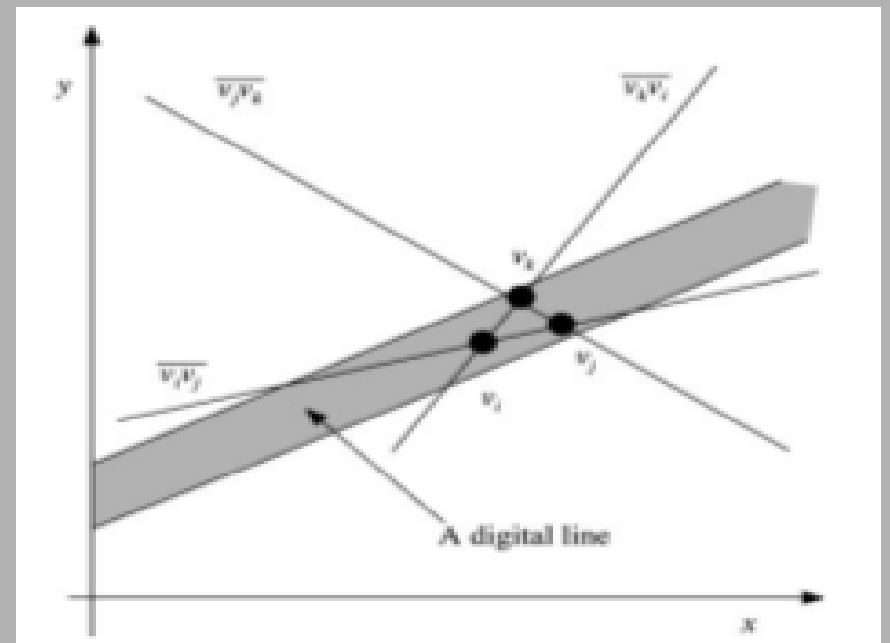
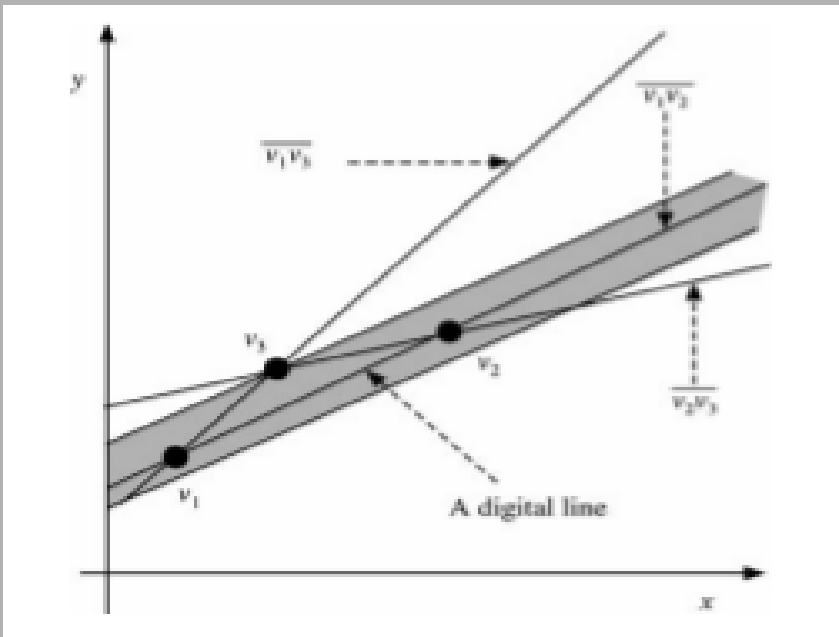
# ARDIŞIK TELESKOP GÖRÜNTÜLERİNDEKİ HAREKETLİ CİSİMLERİN OTOMATİK TESPİTİ

Nurdan KARAPINAR, Tolga ATAY, Murat KAPLAN, Yücel KILIÇ

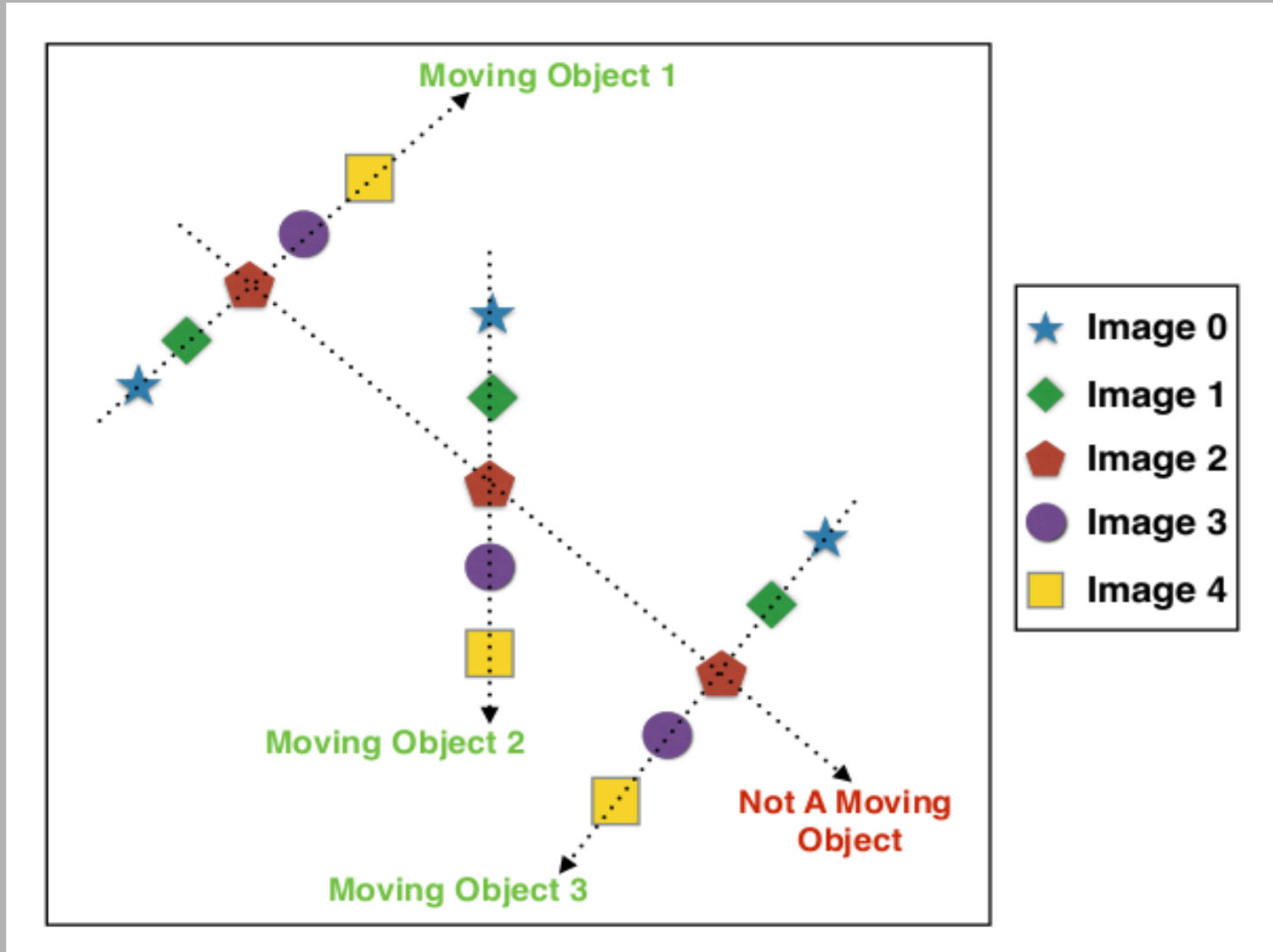
# Doğru Tanıma Algoritması (Teh-Chuan Chen and Kuo-Liang Chung, 2001)



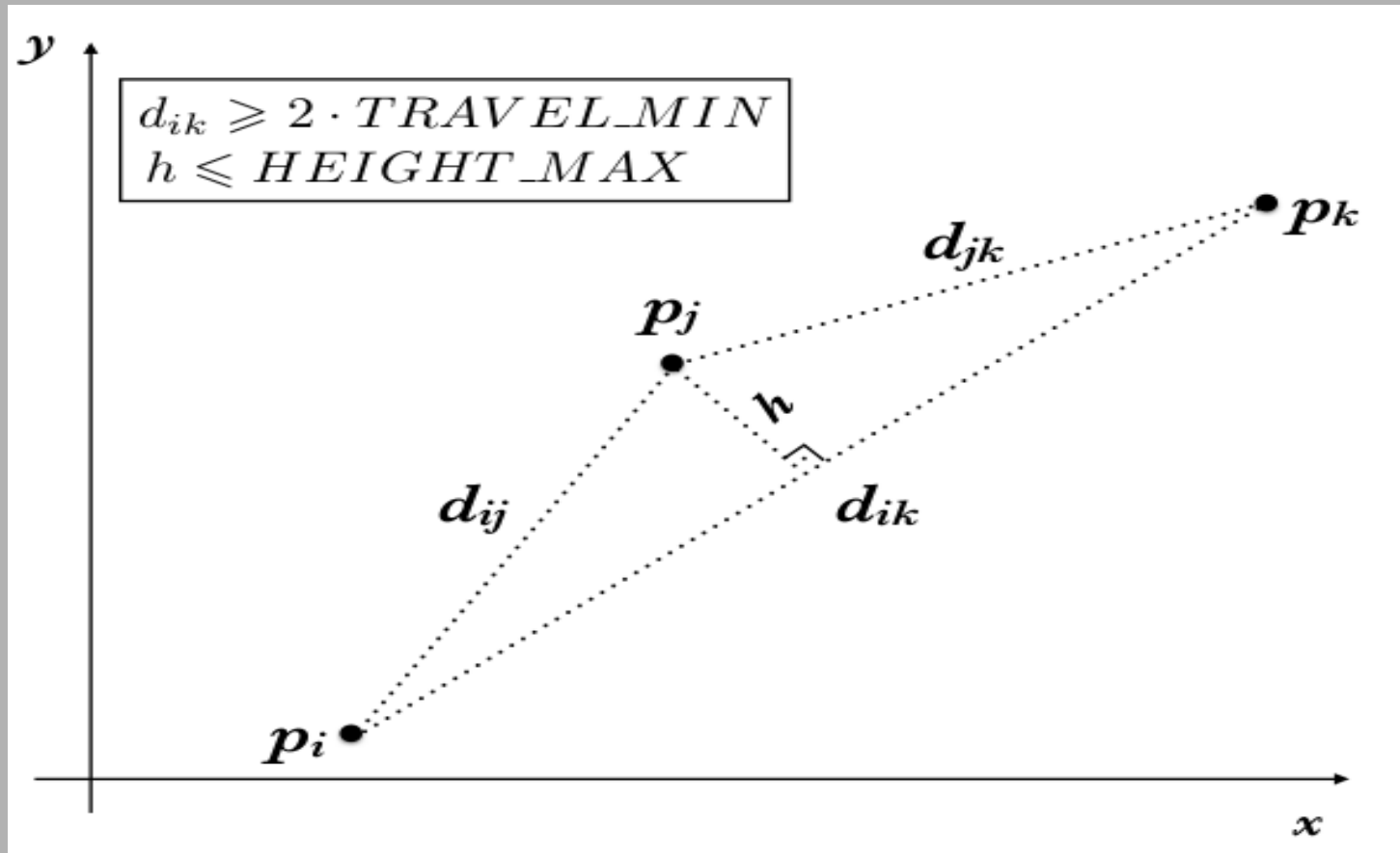
- Önce iki nokta ele alınır.  
Sonra,
- doğrudaşlık kontrolü.
  - karşılaştırma
  - görüntüdeki diğer noktalar için de tekrarlanır.



# MILD (Multiple Image Line Detection) Görüntülere Uygulaması



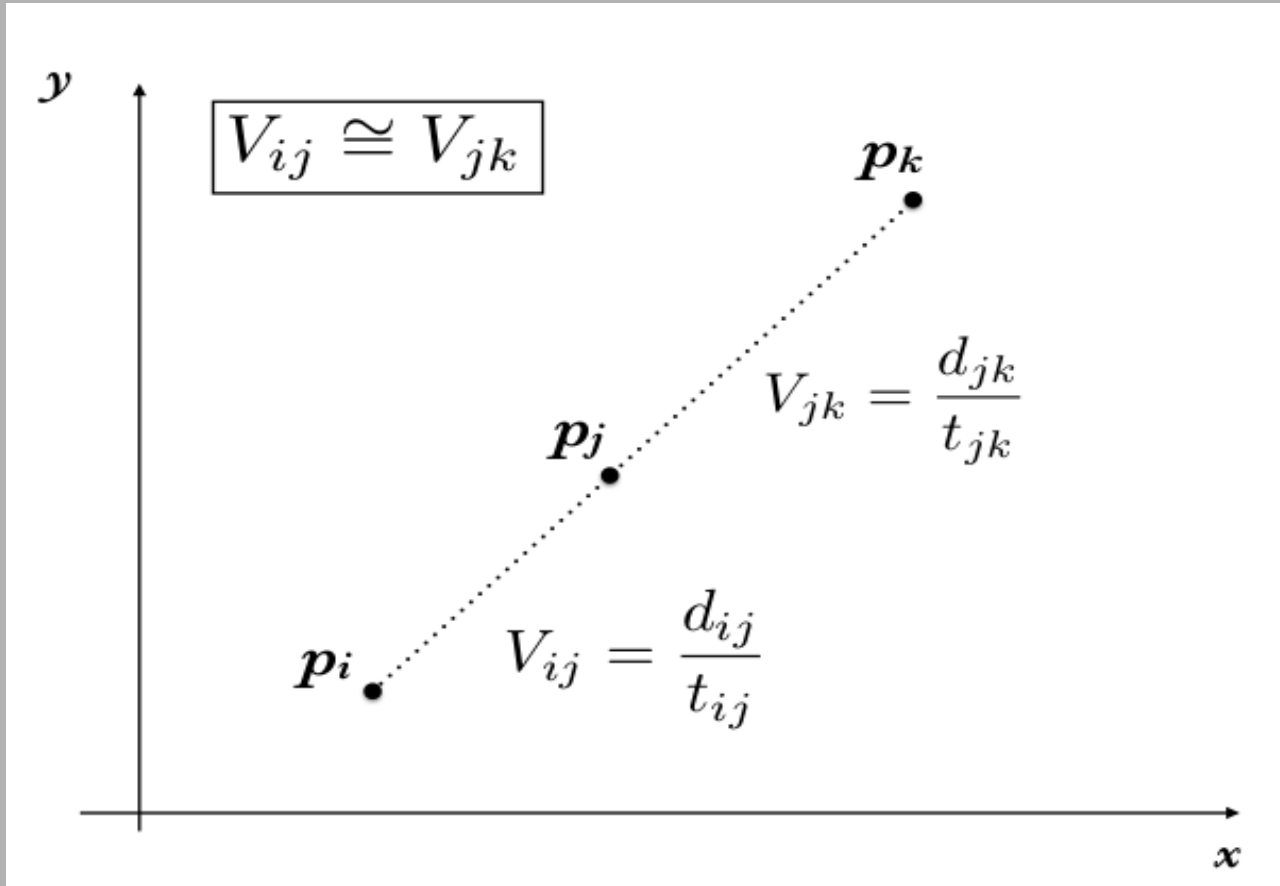
# MILD Astronomik Amacı ve Gelişimi



$$d_{k \rightarrow ij} = \frac{((x_j - x_i)y_k + (y_i - y_j)x_k + x_i y_j - x_j y_i)}{\sqrt{(x_j - x_i)^2 + (y_j - y_i)^2}}$$



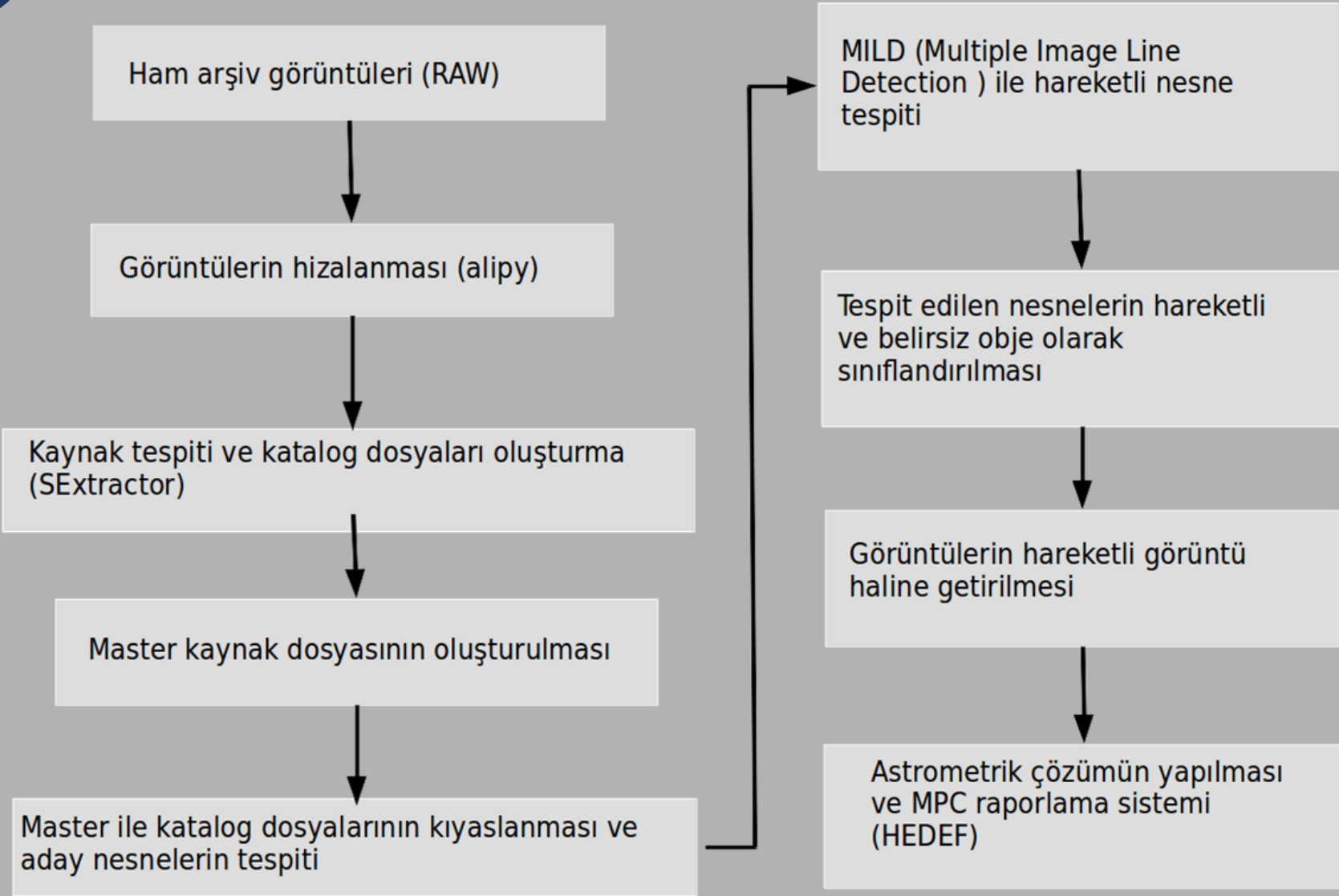
# MILD Astronomik Amacı ve Gelişimi



$$\frac{d_{ij}}{@T_{ij}} \cong \frac{d_{jk}}{@T_{jk}}$$



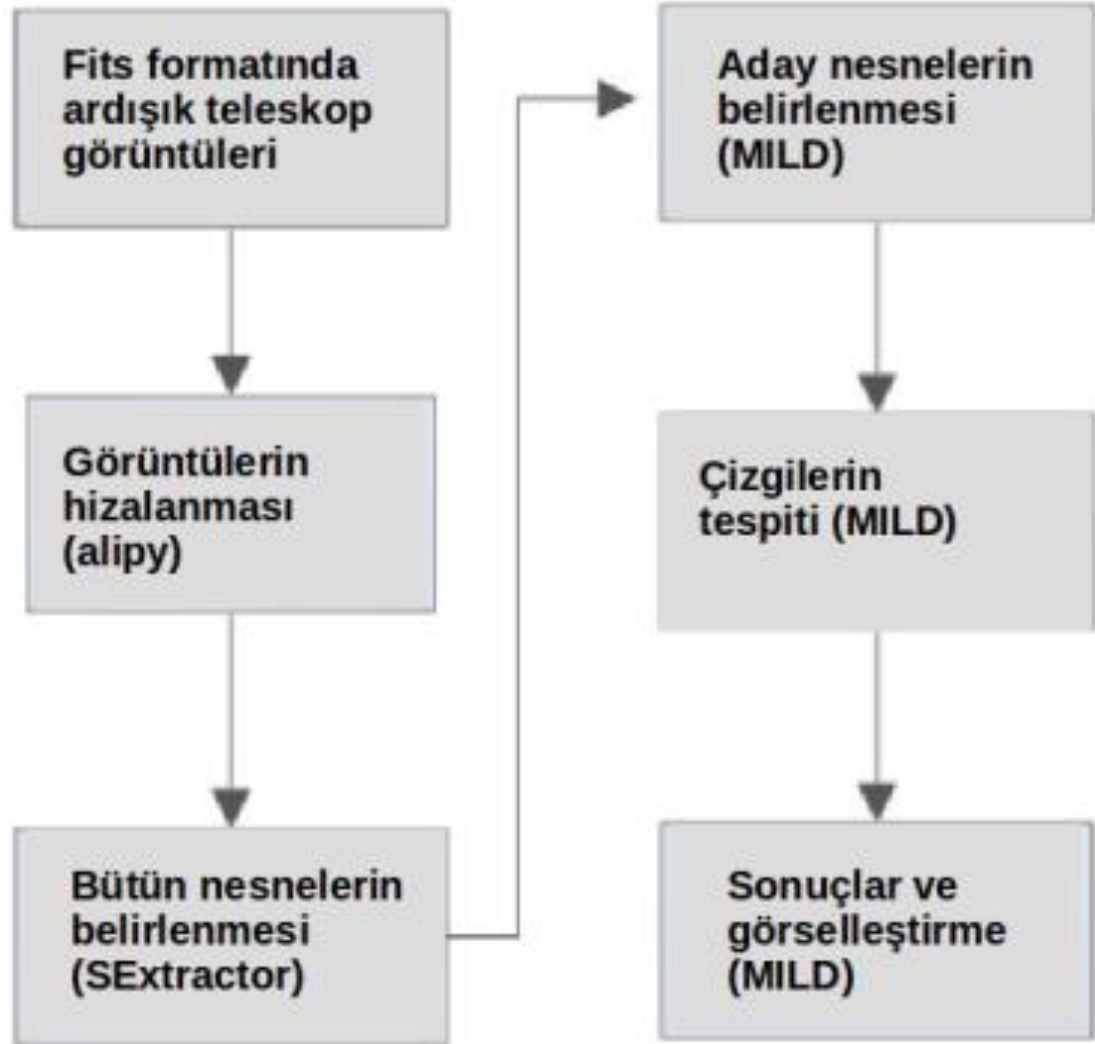
# Geliştirdiğimiz Program





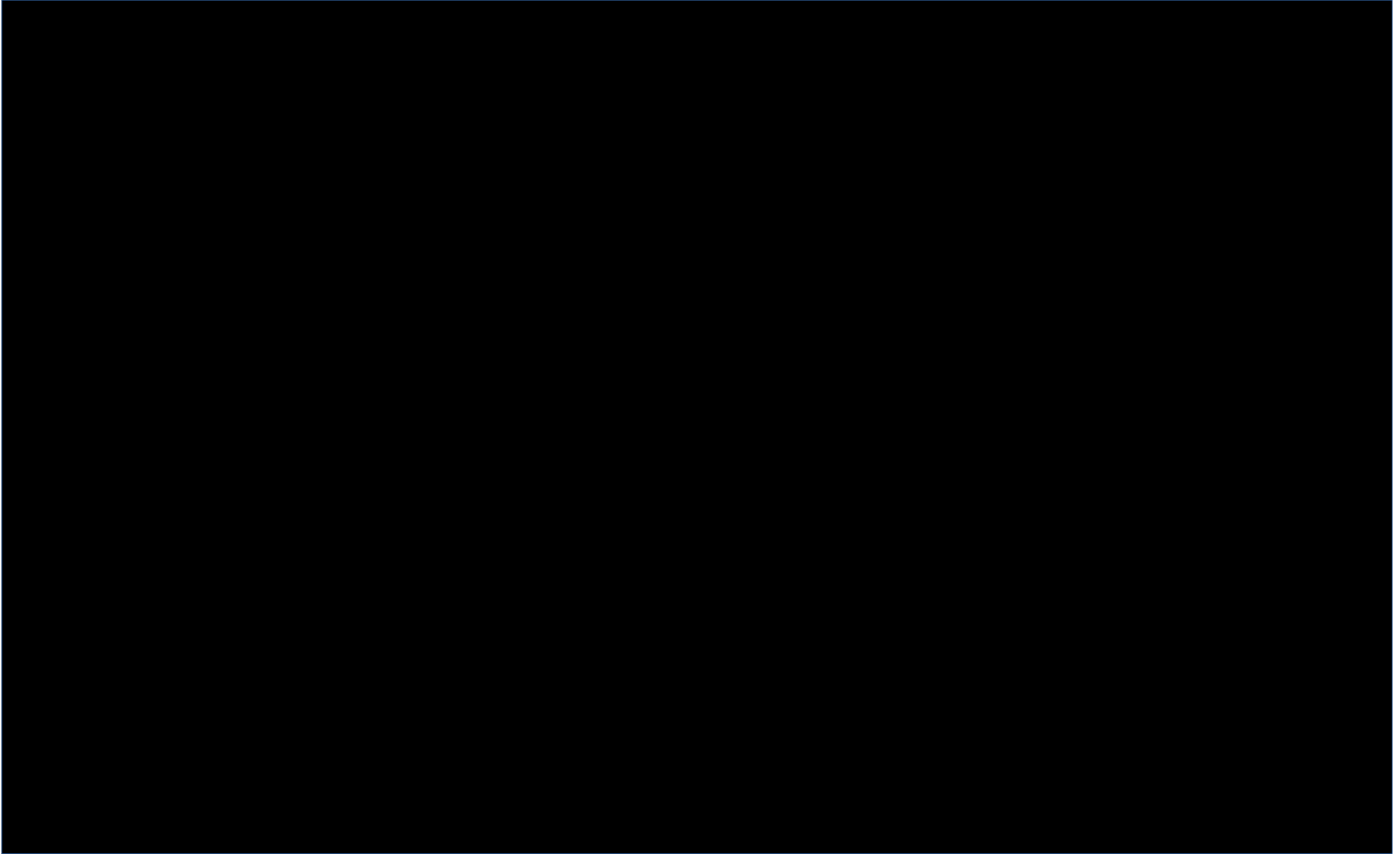
# A-Track: Detecting Moving Objects in FITS images

1. atrack.py
2. sources.py
3. asteroids.py
4. visuals.py
5. atrack.config





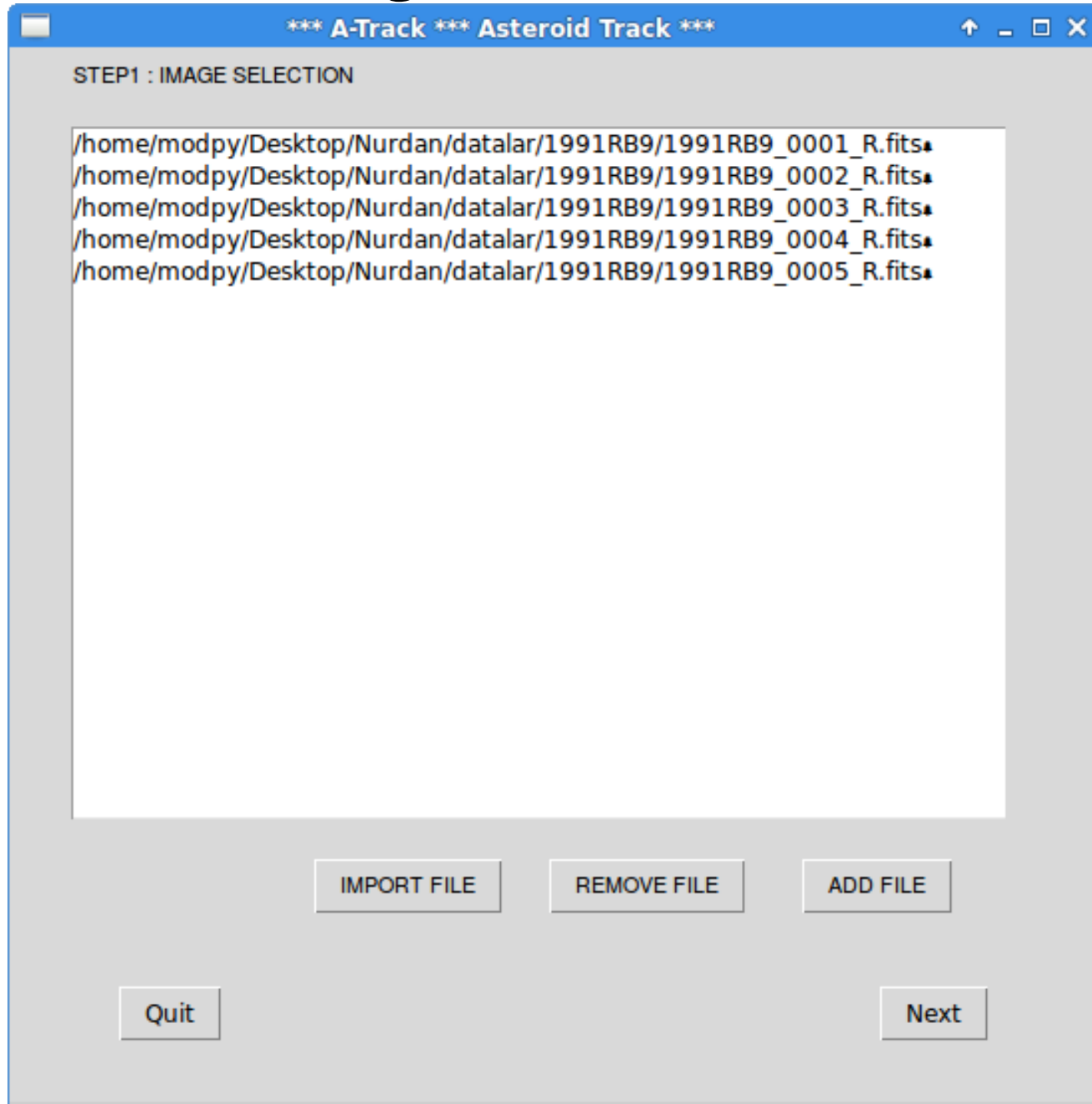
# A-Track Nasıl Çalışıyor ?







# A-Track – GUI Program





# A-Track – GUI program

\*\*\* A-Track \*\*\* Asteroid Track \*\*\*

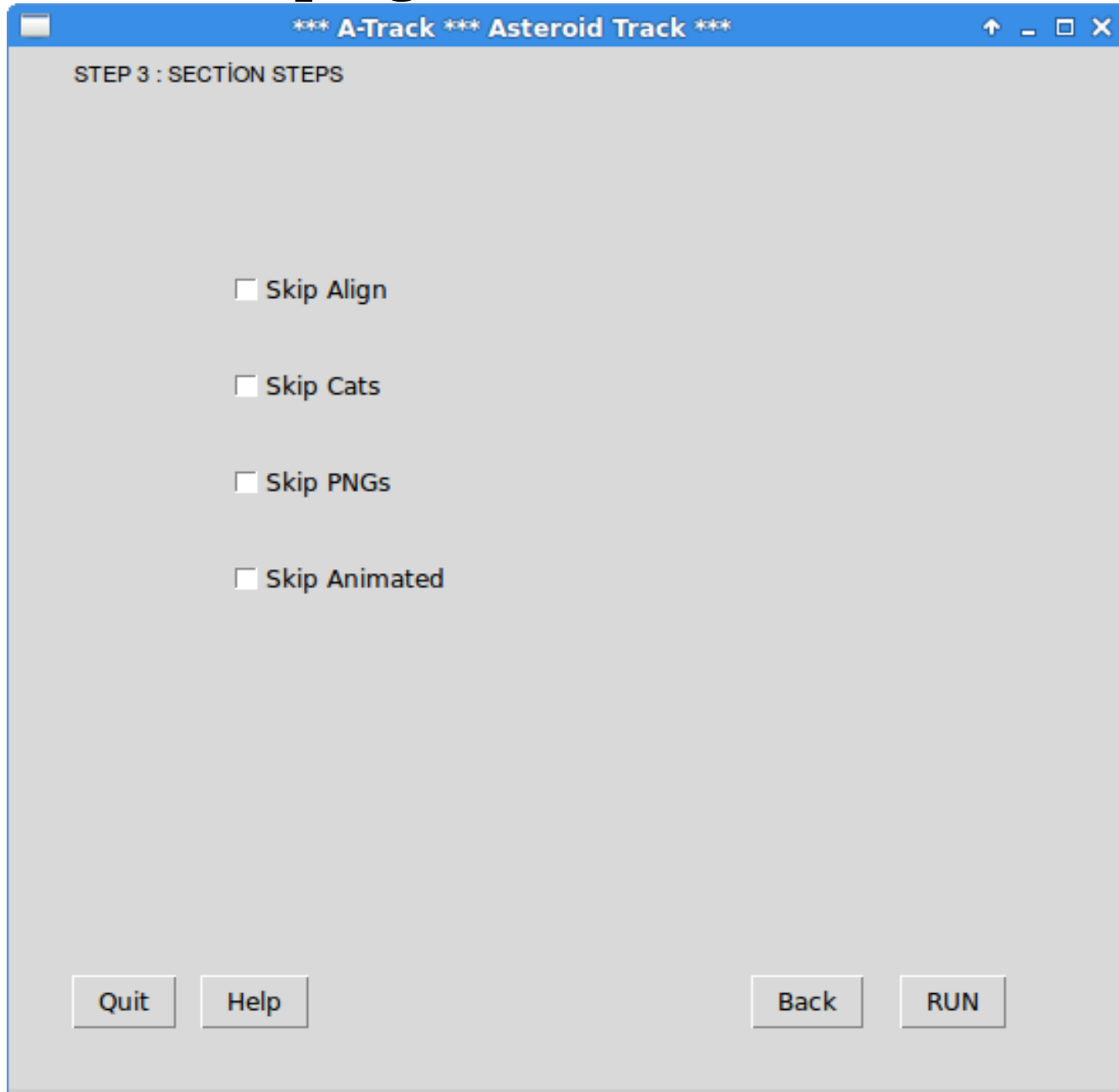
STEP 2 : PARAMETERS

DETECT_THRESH	3	1-3 (sigma)
ANALYSIS_THRESH	3	integer (n ≤ 32)
DETECT_MINAREA	1	3-50
PIXEL_SCALE	0.31	arcsec
SEEING_FWHM	1.5	arcsec
PHOT_AUTOPARAMS	"2.5, 3.5"	min_radius
BACK_SIZE	64	<width>,<height>
BACK_FILTERSIZE	3	<width>,<height>
DEBLEND_NTHRESH	16	arcsec
SATUR_LEVEL	60000	ADU
DEBLEND_MINCONT	0.00001	arcsec
GAIN	0.55	e-/ADU
rerun	True	True or False
keepcat	True	True or False
verbose	False	True or False
FWHM_MIN	1	float
FLUX_MAX	500000	integer
ELONGATION_MAX	1.8	integer
SNR_MIN	10	integer
TRAVEL_MIN	0.5	pixelscale
HEIGHT_MAX	0.1	floats
SCALE	0.31	floats
V_MAX	0.03	px/min
TOLERANCE	1.0	floats
SPEED_MIN	0.1	px/min

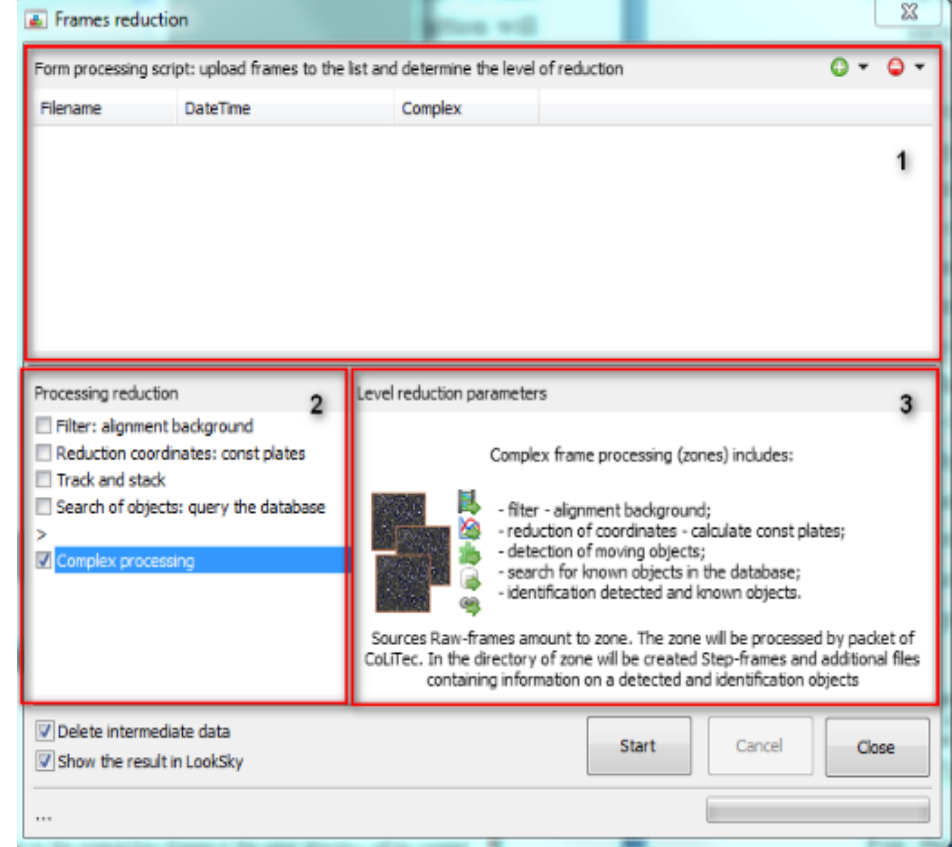
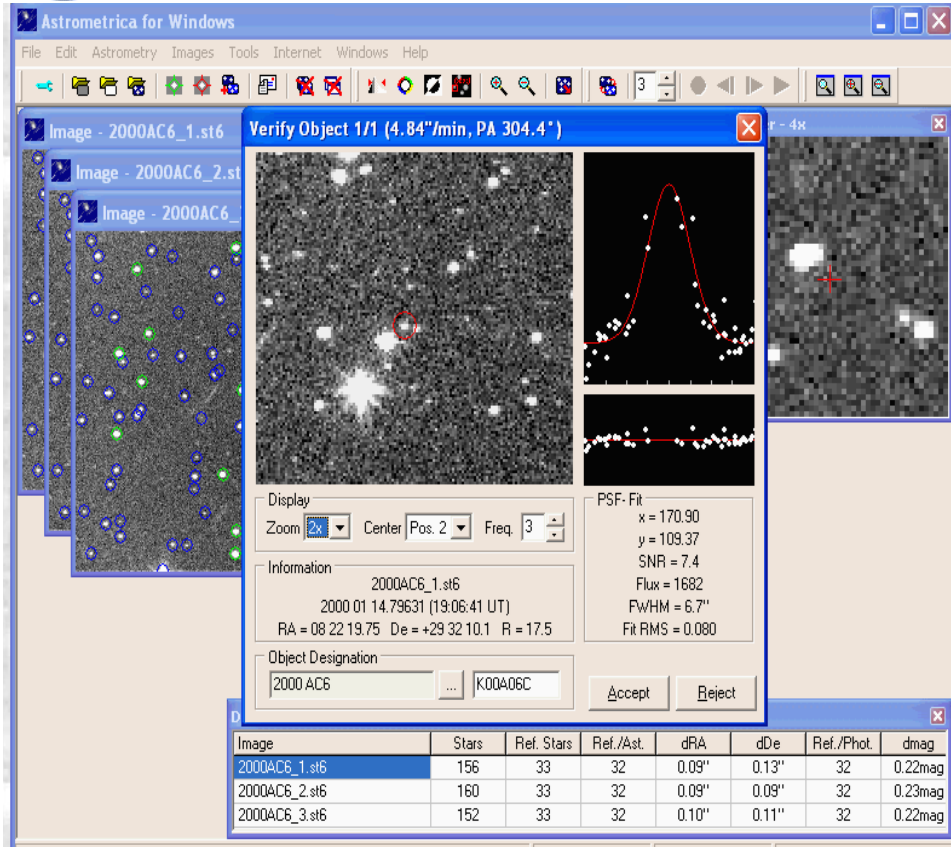
Quit      DEFAULT      Back      Next



# A-Track – GUI program



# Kapalı Kaynak Kodlu ve Ücretli Yazılımlar



## Astrometrica:

- Kullanıcı müdahalesi gerekiyor.
- Dışarıdan destek gerekiyor.

## CoLiTeC:

- Seçilen görüntülerin uygun olup olmadığını işlem
- Çalışma süresi çok uzun.
- Çok fazla sayıda yanlış tespit yapıyor.



# 3 Programın Karşılaştırılması

VERİ İSİMLERİ	RA DEC	GÖZLEM ZAMANLARI	A-TRACK TRUE DETECTION	A-TRACK FALSE DETECTION	ASTROMETRİCA TRUE DETECTION	ASTROMETRİCA FALSE DETECTION	CoLiTeC TRUE DETECTION	CoLiTeC FALSE DETECTION
11922	04 00 59.4 22 50 45	Tarih : 2013-12-06 Zaman : 01:34:06.16	3	1	4	1	0	0
2000 EV136	09 12 19.3 20 14 05	Tarih : 2014-02-06 Zaman : 01:13:51.47	4	1	3	1	0	0
7283	12 26 33.1 02 37 37	Tarih : 2015-04-13 Zaman : 20:27:17.44	4	0	2	0	0	0
79213	21 40 09.4 18 06 29	Tarih : 2015-08-05 Zaman : 22:27:11.58	2	0	0	0	0	0
7719	06 32 23.9 20 26 46	Tarih : 2014-11-03 Zaman : 21:02:39.12	1	4	0	0	0	1
Arago	05 56 15.2 42 31 25	Tarih : 2015-03-08 Zaman : 17:56:34.71	2	0	1	1	0	0
30192	17 18 26.5 13 48 50	Tarih : 2015-08-18 Zaman : 21:07:15	5	7	0	0	2	> 15
33915	20 39 08.1 08 18 37	Tarih : 2014-07-27 Zaman : 19:35:46.29	0	0	0	0	5	Çok sayıda
89187	21 10 52.1 07 02 22	Tarih : 2014-07-27 Zaman : 19:11:40.82	2	3	1	2	3	9
2000 CA30	05 47 52.2 20 41 24	Tarih : 2014-02-05 Zaman : 18:31:33.85	7	0	0	0	0	2
43288	14 52 58.7 07 12 50	Tarih : 2014-05-11 Zaman : 20:54:30.61	13	0	2	0	3	5
TOPLAM ZAMAN			~1 DAKİKA		~8 DAKİKA		~1 SAAT	



# A-Track Programını Nereden İndirebilirim?

<https://github.com/akdeniz-uzay/A-Track>

```
python3 atrack.py [--help] [--ref ref_image] [--skip-align] [--skip-cats]
                [--skip-pngs] [--skip-gif] [--version]
                fits_dir
```

positional arguments:

fits\_dir            FITS image directory (full path)

optional arguments:

--help                            show this help message and exit  
--ref ref\_image    reference FITS image for alignment (full path)  
--skip-align        skip alignment if alignment is already done  
--skip-cats        skip creating catalog files if they are already created  
--skip-pngs        skip creating PNGs  
--skip-gif         skip creating animation file  
--version           show version

Yayınımız ; **A-Track: A new approach for detection of moving objects in FITS images**

**T. Atay, M. Kaplan, Y. Kilic, N. Karapinar [ doi:10.1016/j.cpc.2016.07.023 ]**

**Beni dinlediđiniz iin teŖekkürler...**