



Az első kéműholdak: az amerikai CORONA program

Molnár Gábor

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CORONA Program

- (1958-)1960-1972
- CORONA Panoráma felvételek
- Felbontás: 12m → 2m
- + ARGON mérőkamera (120m)
- + LANYARD (1963) 2m
- ⋮
- GAMBIT, HEXAGON Terrain (1963-1980)
- HEGAGON HighRes (1971-84)

CORONA Program

- (1958-)1960-1972

Titkosítás feloldása

- CORONA Panoráma felvételek

1995

- Felbontás: 12m → 2m

- + ARGON mérőkamera (120m)

- + LANYARD (1963) 2m

⋮

- GAMBIT, HEXAGON Terrain (1963-1980) 2002

- HEGAGON HighRes (1971-84) 2013

CORONA

- U2 repülések 1960-ig
- Enyhülés, 1963
- SALT egyezmény (1972)

⋮

Al Gore javaslatára Bill Clinton 1995

Antarktisz, Grönland jégtakarója az 1960-as években

Himalájai gleccserek, Közel keleti régészet, Erdőterületek
becslése

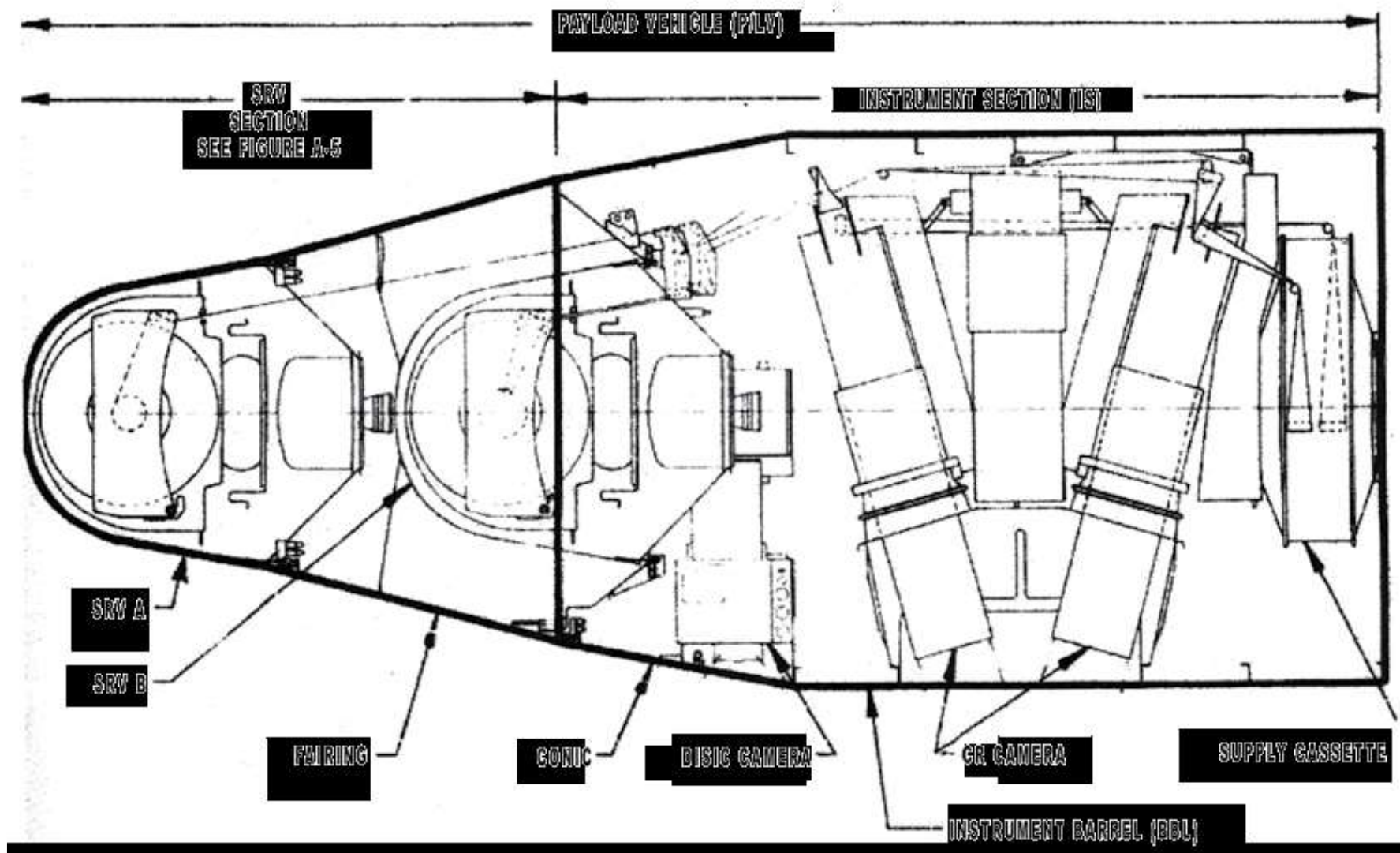
USGS EROS Data Center: <https://earthexplorer.usgs.gov/>

Magyarország: Interspect Kft,

<https://mapire.eu/hu/map/corona-hungary/>

CORONA program

	KH-1 (C)	KH-2 (C)	KH-3 (C'')	KH-4 (M)	KH-4A (J-1)	KH-4B (J-3)
Period of operation	18/8/1960	26/10/60-23/10/61	30/8/61-13/1/62	27/2/62-24/3/64	24/8/63-22/9/69	15/9/67-25/5/72
Amount of frames	1432	7246	9918	101743	517688	188526
Mission life (days)	1	2-3	1-4	6-7	4-15	19
Altitude (km)						
Lower (estimated)	192	252	217	211	180	150
Higher (estimated)	817	704	232	415	n/a	n/a
Successful missions	1	3	5	20	49	16
Targets	USSR	Emphasis on USSR		Worldwide/emphasis on denied areas		
Aperture width	5.265°	5.265°	5.265°	5.265°	5.265°	5.265°
Pan angle	71.16°	71.16°	71.16°	71.16°	71.16°	71.16°
Stereo angle				30°	30°	30°
Lens	F/5.0 Tessar	F/5.0 Tessar	F/3.5 Petzval	F/3.5 Petzval	F/3.5 Petzval	F/3.5 Petzval
Focal length (cm)	60.96	~61	60.9602			
Resolution						
Ground (m)	12.20	7.60	3.70-7.60	3.00-7.60	2.70-7.60	1.80-7.60
Film (lp/mm)	50-100	50-100	50-100	50-100	120	160
Nominal ground coverage	15.3x209 to 42x579 (km)	15.3x209 to 42x579 (km)	15.3x209 to 42x579 (km)	15.3x209 to 42x579 (km)	17x232 (km)	13.8x188 (km)
Nominal photoscale in film	1:275,000 to 1:760,000	1:275,000 to 1:760,000	1:275,000 to 1:760,000	1:300,000	1:305,000	1:247,500
Extra imagery	Horizon images only			Stellar, index and horizon images		



KH-4 műhold keresztmetszete,
2 visszatérő kapszula, 2 kamera

"All the News
That's Fit to Print"

The New York Times.

LATE CITY EDITION

U. S. Weather Bureau Report (Page 26) forecasts:
Partly cloudy and warm today; fair
tonight. Some cloudiness tomorrow.
Temp. range: 80-65; yesterday: 71.2-59.4.
Temp.-Hum. Index: low 70's; yesterday: 70.

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Times Square, New York 20, N. Y.

NEW YORK, SATURDAY, AUGUST 20, 1960.

10 cents beyond 30-city rates from New York City
except on Long Island. Higher in air delivery cities.

FIVE CENTS

SPACE CAPSULE IS CAUGHT IN MID-AIR BY U. S. PLANE ON RE-ENTRY FROM ORBIT

FLIERS ARE CITED

Vehicle Is Recovered
8,500 Feet Up in
C-119's 'Trapeze'

By The Associated Press.
HONOLULU, Aug. 19—A United States Air Force plane today caught a space capsule dropped from a satellite. A C-119 Flying Boxcar, on its third attempt, snared the eighty-four-pound capsule 8,500 feet over the Pacific Ocean.

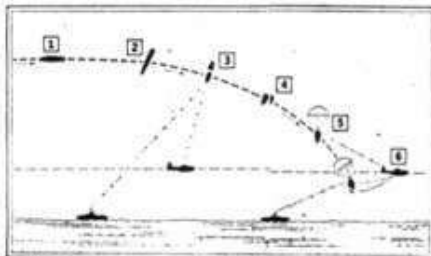
The device that caught the capsule was a trapeze-like hook dangling from the plane's belly. It snared the shrouds of the parachute carrying the capsule toward the ocean.

The capsule had been ejected over Alaska by Discoverer XIV on its seventeenth orbit at 116 to 502 miles above the earth.

Capt. Harold E. Mitchell, 35 years old, of Bloomington, Ill., who was awarded the Distinguished Flying Cross immediately on his return to Hawaii said the plane's first pass had missed the capsule by six inches. The second one missed by two to three feet.

Succeed on Third Try

The third pass got it at a point 200 miles south of the 200-by-60-mile area where it had been predicted to fall. The moment of the catch was



RECOVERY: While orbiting earth (1), satellite is tilted by gas jets into re-entry position (2). Capsule is separated, slowed by retro-rocket (3) and started down (4). Then a parachute opens (5). The satellite's radio guides planes to scene, where one aircraft (6) snags capsule.

Russians Orbit a Satellite Carrying 2 Dogs and TV

By WALTER SULLIVAN
Special to The New York Times.

MOSCOW, Aug. 19—The Soviet Union launched an earth satellite today weighing more than five tons as an important step in its man-in-space program. On board, according to the announcement,

were experimental animals including two dogs plus television equipment to enable ground stations to watch their behavior.

The announcement hinted that an attempt might be made to recover the capsule containing the animals.

[In Stockholm, two Soviet rocket experts said that the two dogs "are to be brought 'Difficulty of Business'

SECURITY COUNCIL MEETS TOMORROW ON CRISIS IN CONGO

Lumumba Lays 'Blackmail'
to Hammarskjold, Who
Assails Incidents

Two Hammarskjold documents
will be found on Page 6

By LINDESAY PARROTT
Special to The New York Times.
UNITED NATIONS, N. Y., Aug. 19—The Security Council was called today to meet at 12:30 P. M. Sunday in emergency session to consider the deepening crisis in the Congo.

The summons was sent by Armand Berard of France, president for this month of the eleven-nation body. The Congolese delegation will be headed by Deputy Premier Antoine Gizenga, special representative of Premier Lumumba.

The Council meeting, originally scheduled tentatively for tomorrow, had been postponed for twenty-four hours to give the Congolese delegation time to confer with representatives from other African states before making their appearance at the Council table. As non-members, the delegation may speak but not vote in the Council.

Congolese Aides Arrive

The Congolese delegation landed at Andrews Air Force Base, Maryland, at 8 P. M. [The party flew on to New York just after midnight.]

What is at issue is whether the Council will endorse the moves made in the secessionist Province of Katanga by Secretary General Dag Hammarskjold. The Congolese Premier has asserted that Mr.

POWERS GETS A 10-YEAR SENTENCE; SOVIET ASSERTS PENALTY IS MILD, BUT EISENHOWER FINDS IT SEVERE



PILOT IS SENTENCED: Francis Gary Powers listening yesterday to the reading of his sentence in Moscow. At left is Mikhail I. Grinyov, Soviet lawyer for the defense. Like other interior photos of the trial, this one is from Tass, Soviet press agency.

U-2 TRIAL ENDED

3 Years to Be in Prison
—Rest May Be Spent
Working in Russia

Excerpts from plea and text
of the verdict, Page 2.

By OSGOOD CARUTHERS
Special to The New York Times.

MOSCOW, Aug. 19—Francis Gary Powers was found guilty today of espionage for the United States and sentenced to ten years' loss of liberty.

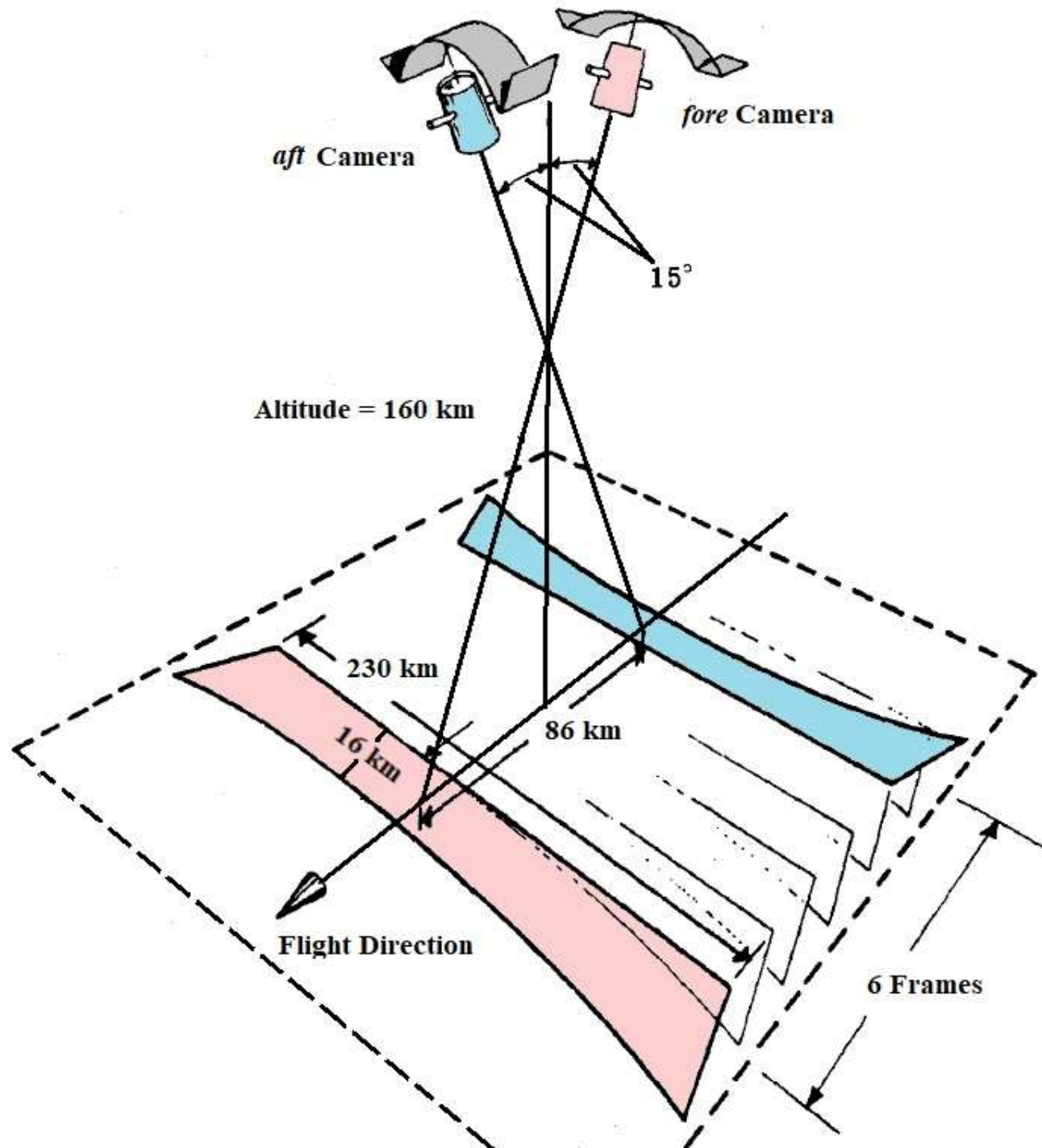
The first three years will be spent in prison, the Soviet's highest military tribunal ordered.

This apparently meant that the pilot, who was 31 years old Wednesday, would be released from prison and sent to a remote and restricted area of the Soviet Union to work out the remaining seven years of the sentence.

It is possible that the Soviet authorities will decide later on to grant him time off for good behavior—after interest in the case has died down.

Only One Other Chance

Since the Military Collegium has denied Mr. Powers the right to have the case reviewed, his only other possibility of a re-



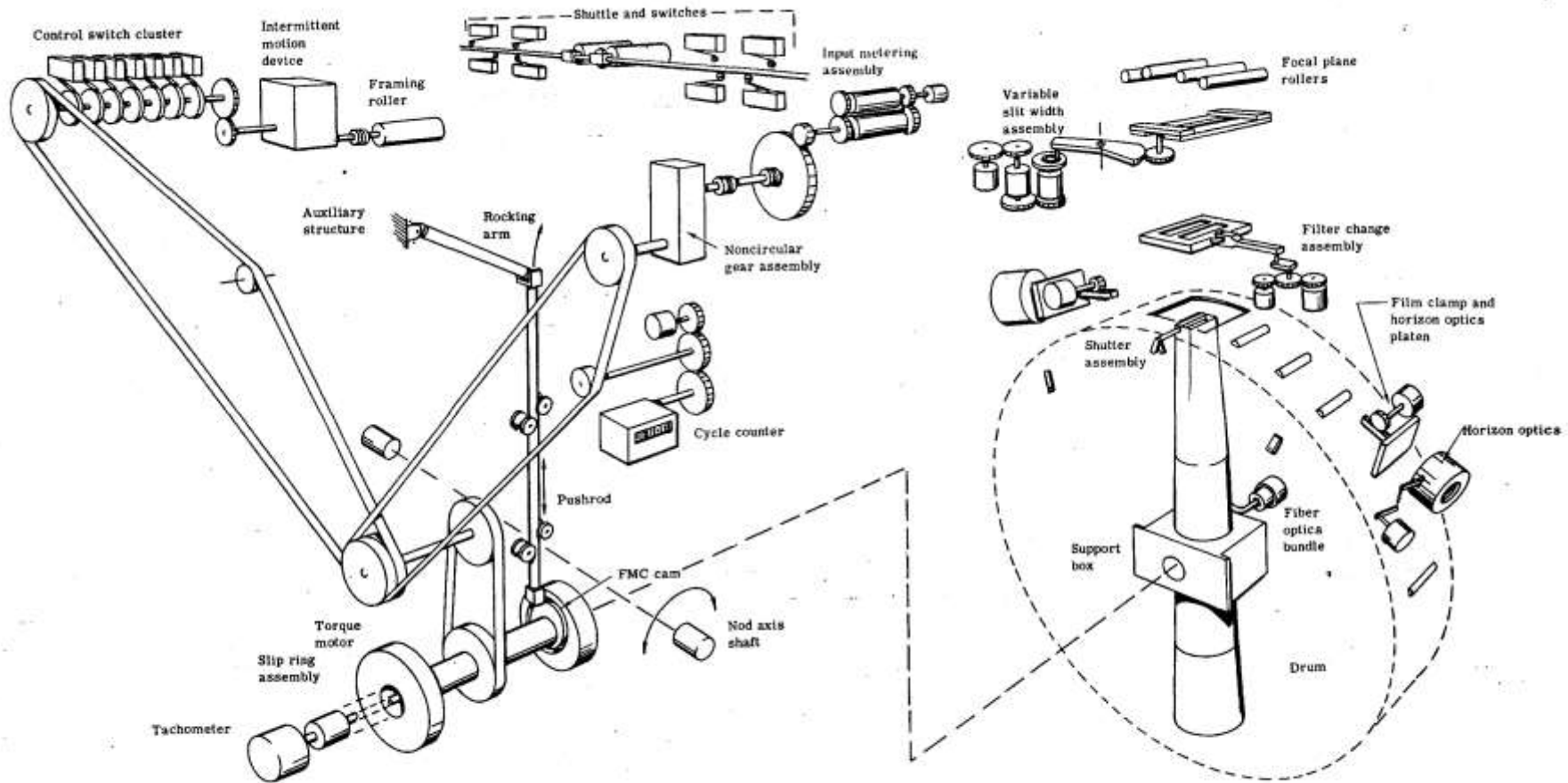


Fig. 2-3 — Camera functional schematic

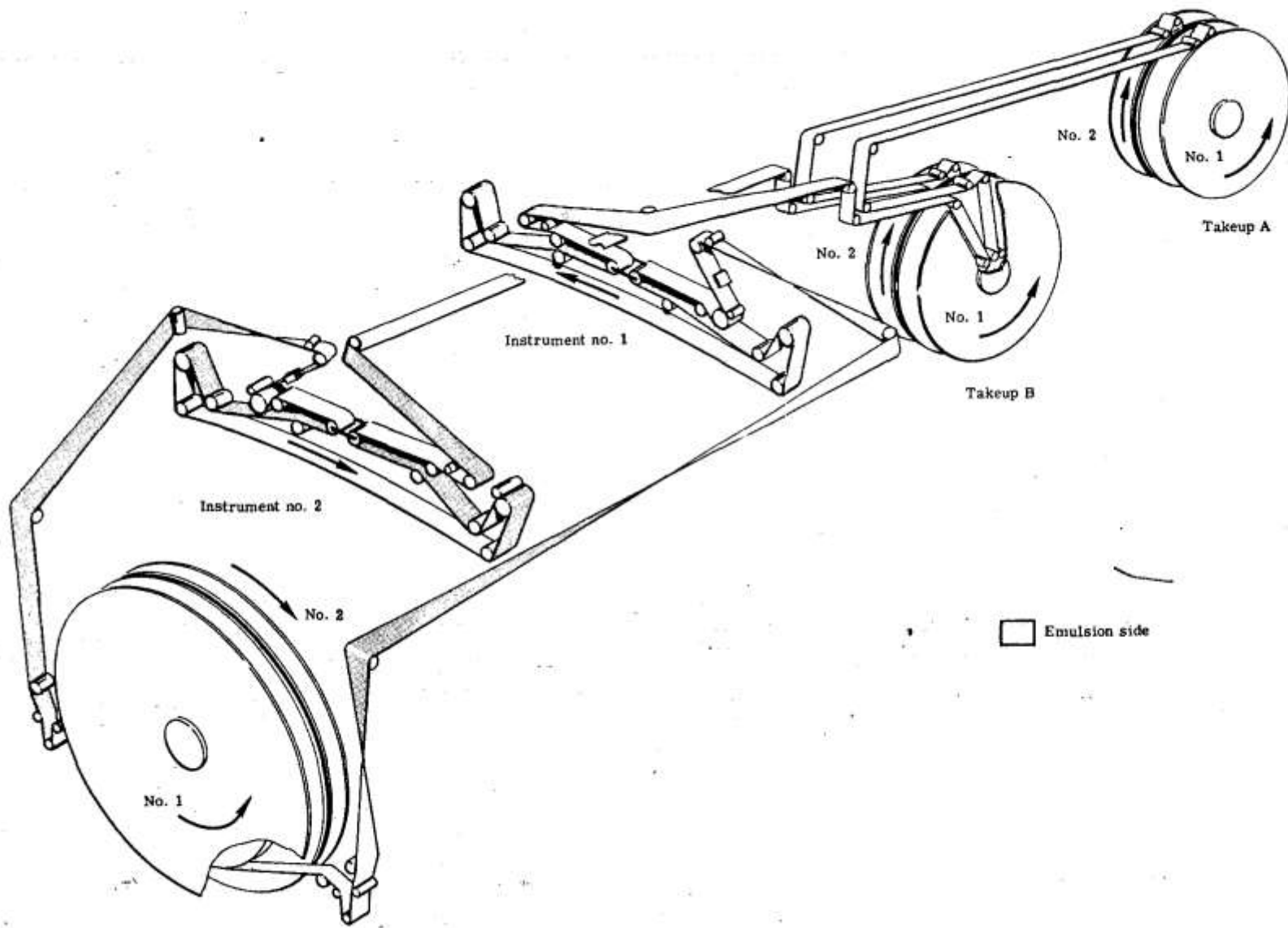


Fig. 5-1 — Film threading diagram

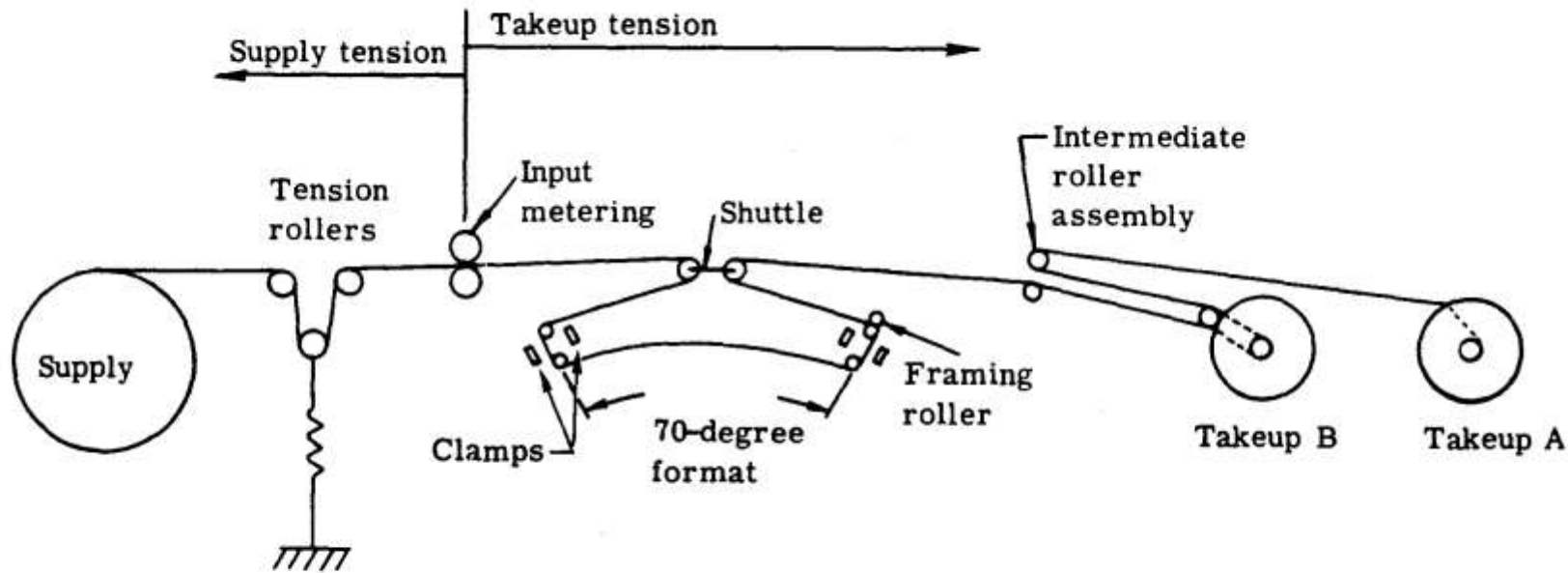
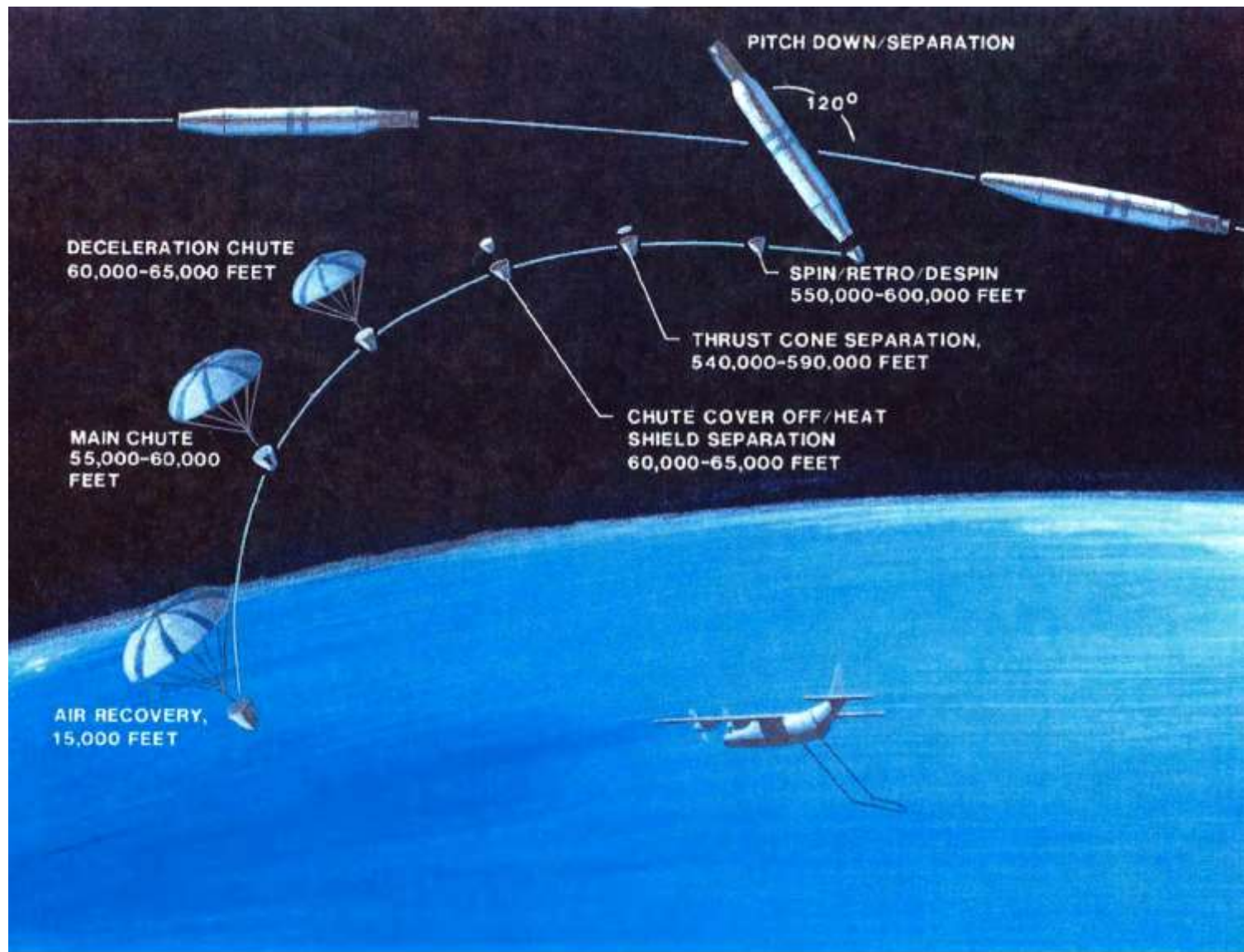


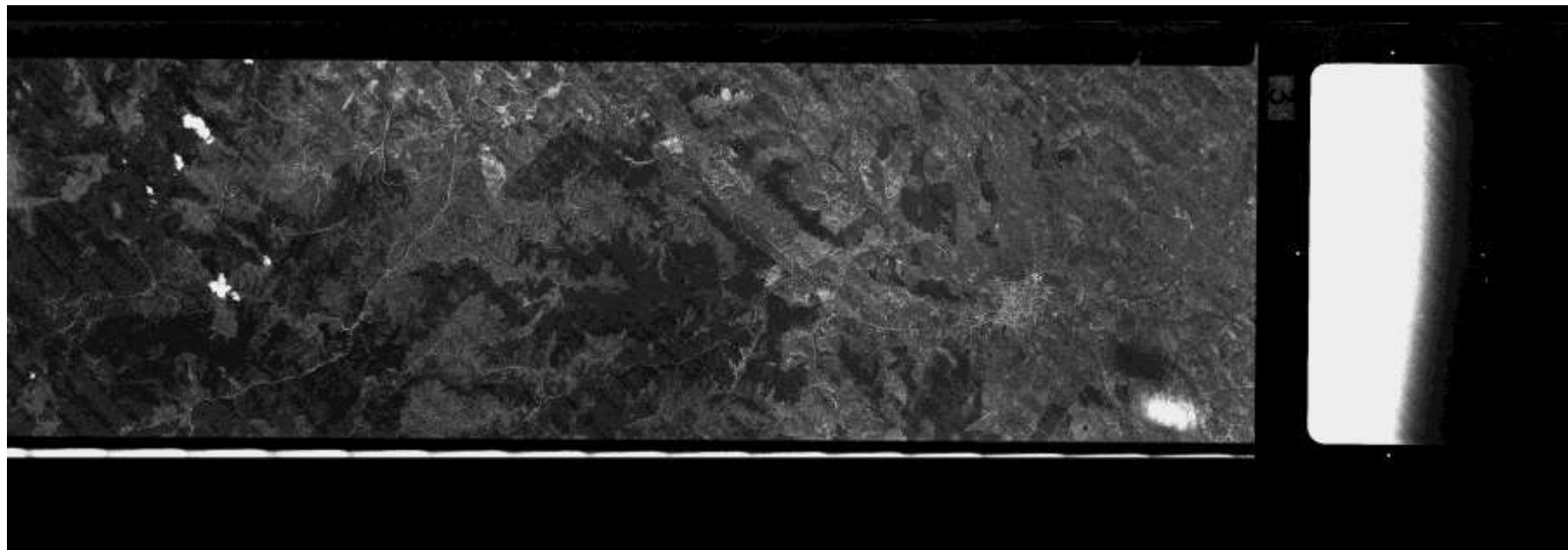
Fig. 3-16 — Film transport system schematic



Corona Recovery Sequence



CORONA felvételek...



[Search Criteria](#) [Data Sets](#) [Additional Criteria](#) [Results](#)

[Search Criteria Summary \(Show\)](#) [Clear Search Criteria](#)

1. Enter Search Criteria

To narrow your search area, type in an address or place name, enter coordinates or click the map to define your search area (for ge-coord map tools, view the [help document](#)), and/or choose a date range.

[Demander](#) [KML/Shapefile Upload](#)

Select a Geocoding Method

Search Limits: The search result limit is 100 records; select a Country, Feature Class, and/or Feature Type to reduce your chances of exceeding this limit.

[US Features](#) [World Features](#)

Feature Name

State

Feature Type

[Show](#) [Clear](#)



[Polygon](#) [Circle](#) [Predefined Area](#)

[Degree Minutes/Seconds](#) [Decimal](#)

No coordinates selected.

[Use Map](#) [Add Coordinates](#) [Clear Coordinates](#)

[Link Search](#) [Cloud Cover](#) [Result Options](#)

Search from to

Search months:

[Data Sets](#) [Advanced Criteria](#) [Results](#)

The provided maps are not for purchase or for download; they are to be used as a guide for reference and search purposes only.



Search Criteria Data Sets Additional Criteria Results

1 Enter Search Criteria

To narrow your search area, type in an address or place name, enter coordinates or click the map to define your search area (for advanced map tools, view the help documentation), and/or choose a date range.

Geocoder: F9LShapefile Upload

Select a Geocoding Method

Feature (GMS)

Search Limits: The search result limit is 100 records; select a Country, Feature Class, and/or Feature Type to reduce your chances of exceeding this limit.

US Features View Features

Feature Name

State

Feature Type

Show Create

Pages: Grid Predefined Area

Degrees Minutes/Seconds External

- 1. Lat 47° 13' 06" N, Lon 018° 30' 59" E
- 2. Lat 47° 13' 09" N, Lon 018° 21' 34" E
- 3. Lat 47° 10' 34" N, Lon 018° 21' 34" E
- 4. Lat 47° 10' 34" N, Lon 018° 30' 59" E

Show Map Add Coordinate Clear Coordinate

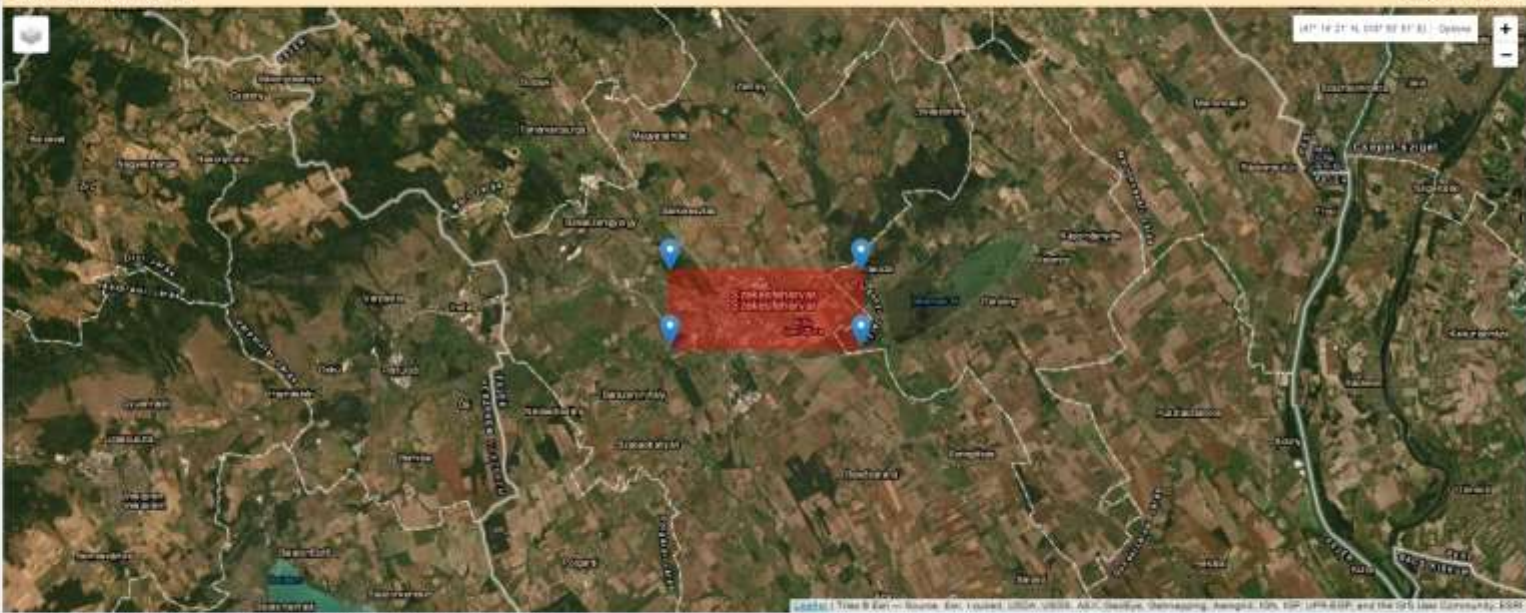
Date Range Cloud Cover Result Options

Search from: mm/dd/yyyy to: mm/dd/yyyy

Search months: all

Search Criteria Summary (show)

Clear Search Criteria



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Search Criteria: [Data Sets](#) [Additional Criteria](#) [Results](#)

Search Criteria Summary (0/0) [Clear Search Criteria](#)

2. Select Your Data Set(s)

Check the boxes for the data set(s) you want to search. When done selecting data set(s), click the [Additional Criteria](#) or [Results](#) buttons below. Click the plus sign next to the category name to show a list of data sets.

Use Data Set PreFilter (your's track)

Data Set Search:

This data set list is cached for performance. If your user preferences have changed or you are not seeing an expected dataset, [click here to refresh your list](#).

- Aerial Imagery
- AVHRR
- CBRS Legacy
- Commercial Satellites
- Declassified Data
 - Declass 1 (1990)
 - Declass 2 (2002)
 - Declass 3 (2013)
- Digital Elevation
- Digital Line Graphs
- Digital Maps
- ED-1
- Global Fisheries
- HCMS
- ISROV
- Land Cover
- Landcut
- LCMAP

[Clear All Selected](#) [Additional Criteria](#) [Results](#)



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Search Criteria Data Sets Additional Criteria Results

4 Search Results

If you selected more than one data set to search, use the dropdown to see the search results for each specific data set.

Show Result Controls

Data Set Click here to expand your results

Declass 1 (1996)

First Previous 1 of 1 Next Last

Displaying 1 - 14 of 14

Entity ID: 081117-101004100
 Coordinates: 47.95, -10.733
 Camera Resolution: Stereo High
 Acquisition Date: 1872-05-28

Entity ID: 081117-101004100
 Coordinates: 46.93, -10.97
 Camera Resolution: Stereo High
 Acquisition Date: 1872-05-28

Entity ID: 081117-101004100
 Coordinates: 47.71, -10.712
 Camera Resolution: Stereo High
 Acquisition Date: 1872-05-28

Entity ID: 081117-101004100
 Coordinates: 46.93, -10.672
 Camera Resolution: Stereo High
 Acquisition Date: 1872-05-28

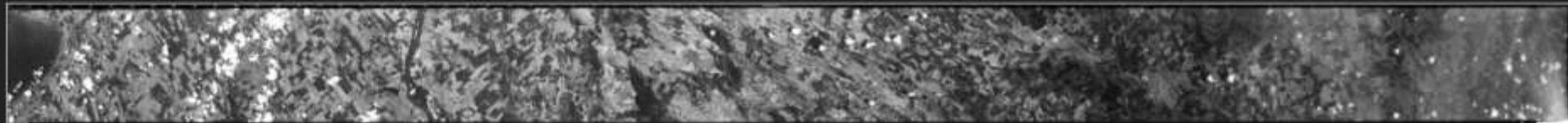
Entity ID: 081117-101004100
 Coordinates: 46.93, -10.672
 Camera Resolution: Stereo High
 Acquisition Date: 1872-05-28

View Item Basket Submit Standing Request

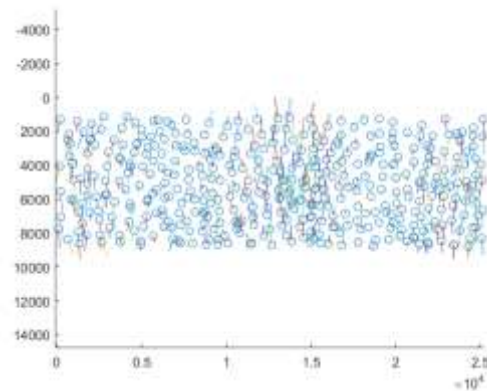
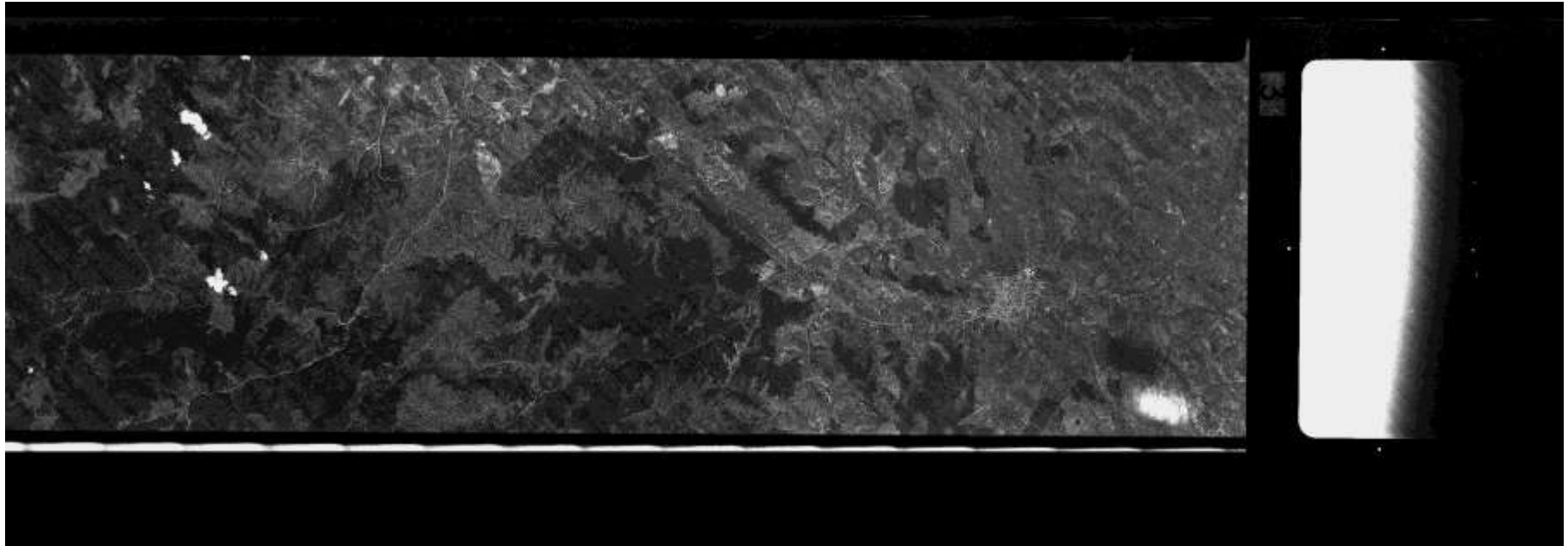
Search Criteria Summary Show Clear Search Criteria

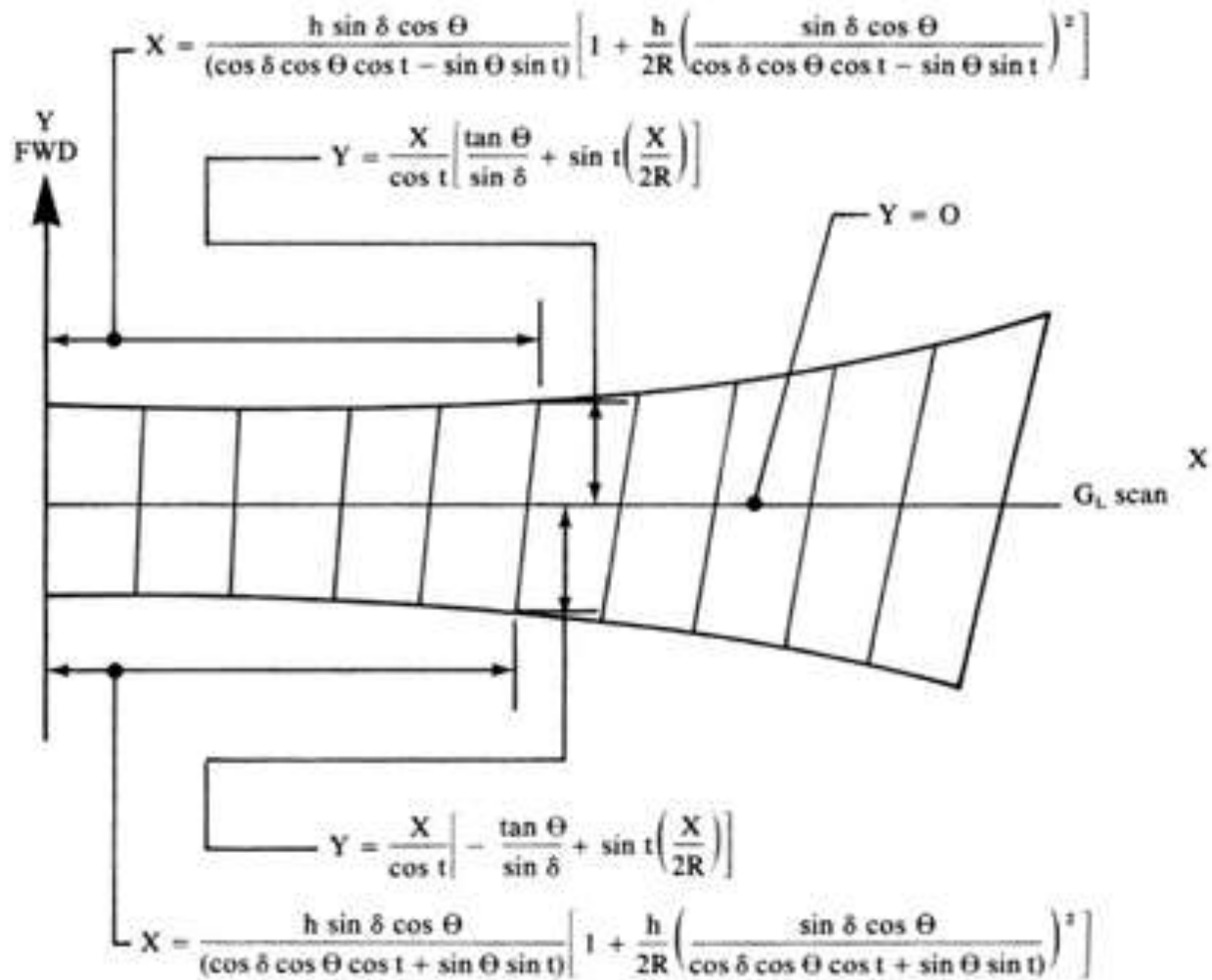


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CORONA felvételek geometria illesztése





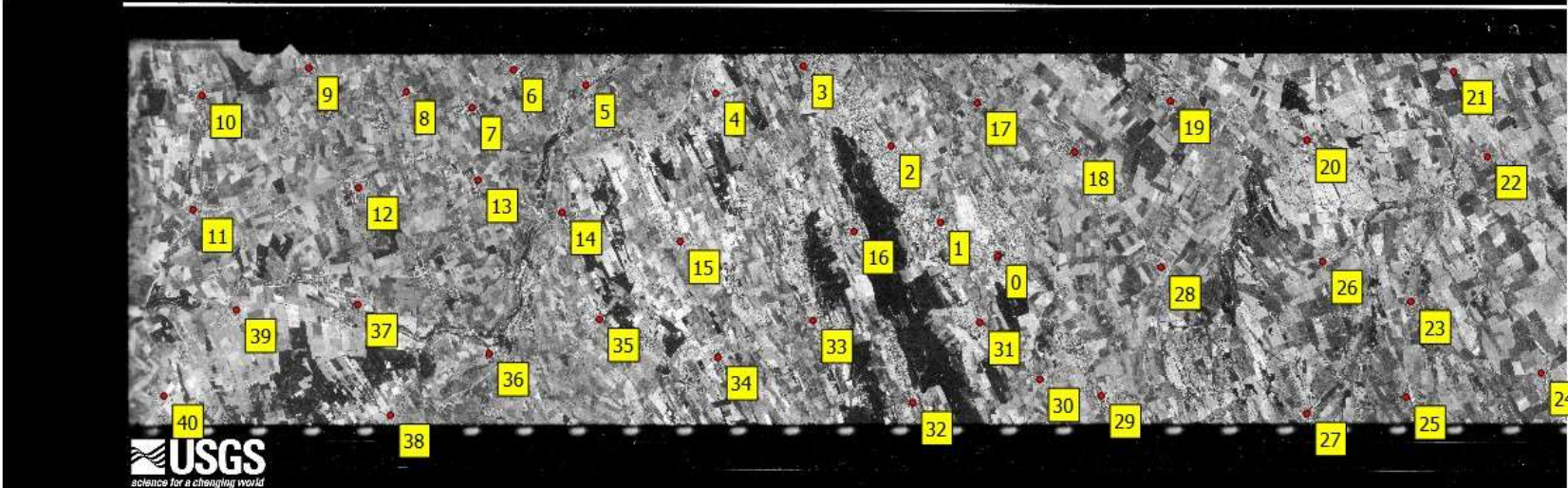
NOTE: R = Earth Radius (3440 n.m.)
for $\delta = 0$

$$Y = \begin{cases} \frac{h \sin \Theta}{\cos t \cos (t + \Theta)} \\ -\frac{h \sin \Theta}{\cos t \cos (t - \Theta)} \end{cases}$$

CORONA (Dunántúl)

Georeferáló

Fájl Szerkesztés Nézet Beállítások



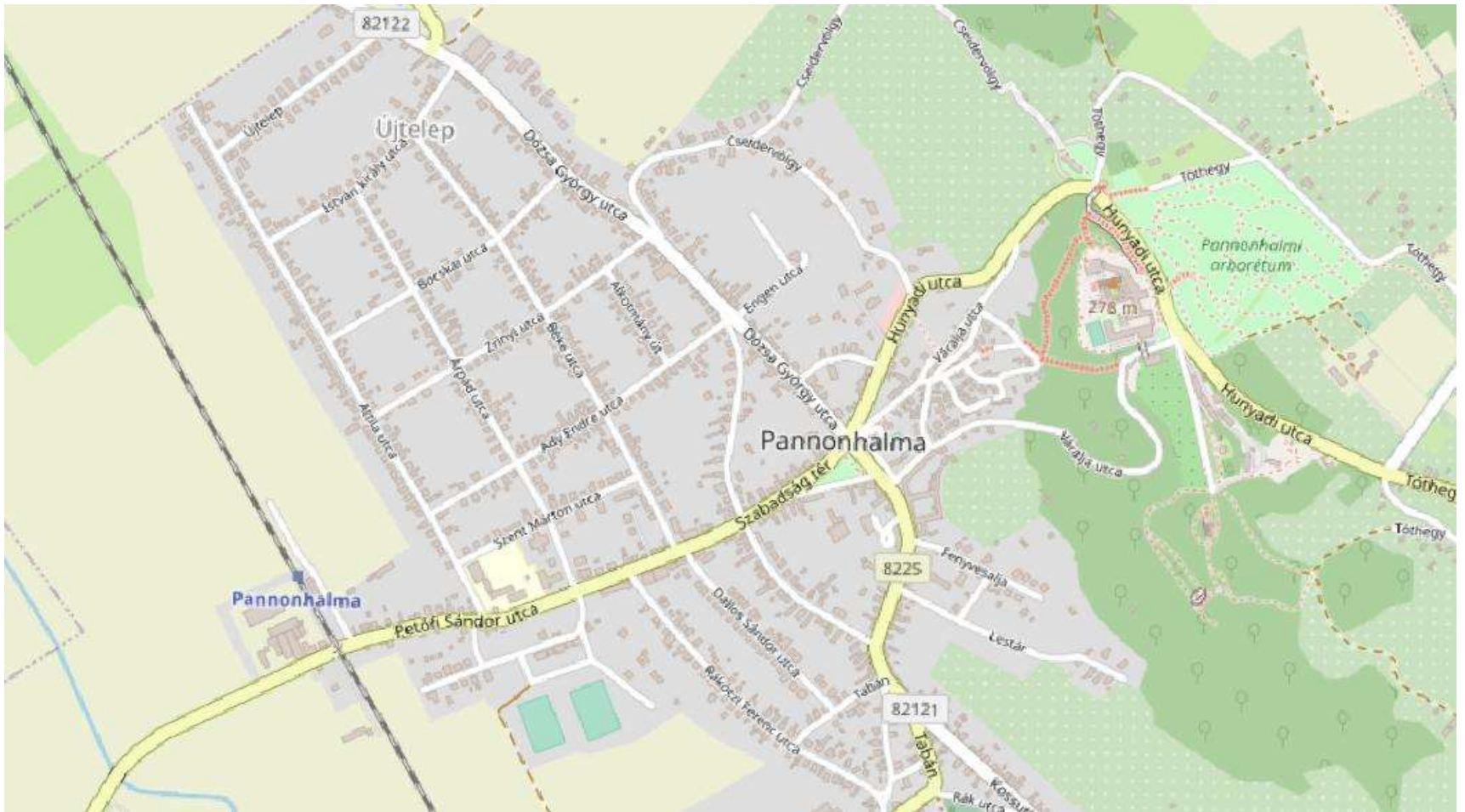
USGS
science for a changing world

GCP tábla

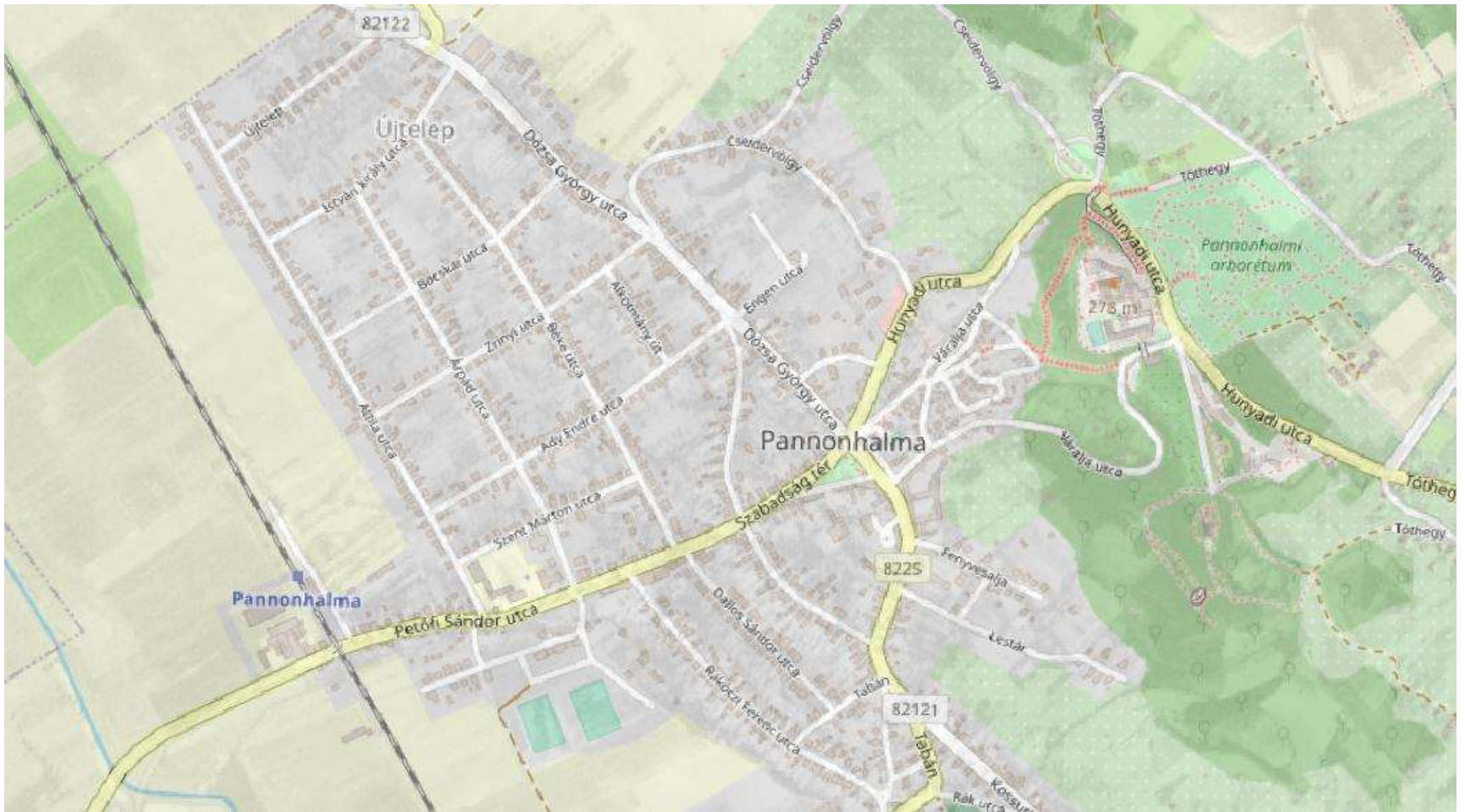
Látható	ID	Forrás X	Forrás Y	Cél X	Cél Y	dX (pixel)	dY (pixel)	Javítás (pixel)
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<input checked="" type="checkbox"/>	1	20053	-4748,64	549749	247247	0	0	0

Transzformáció: Nincs beállítva 31491,-112 Semmi

CORONA



CORONA



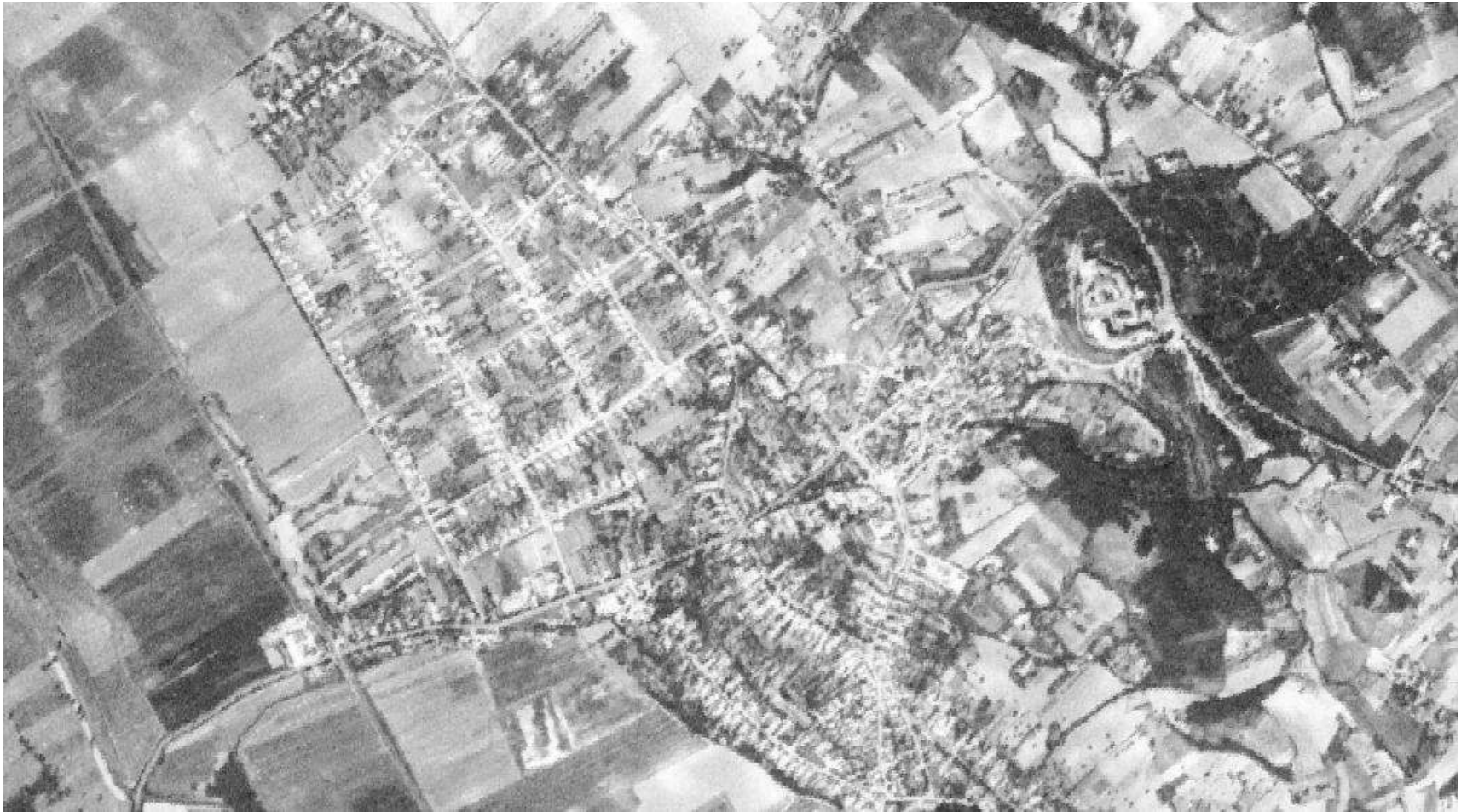
CORONA



CORONA



CORONA



GAMBIT



GAMBIT



GAMBIT



GAMBIT



GAMBIT





Átlátszóság:

100%

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Átlátszóság:

80%

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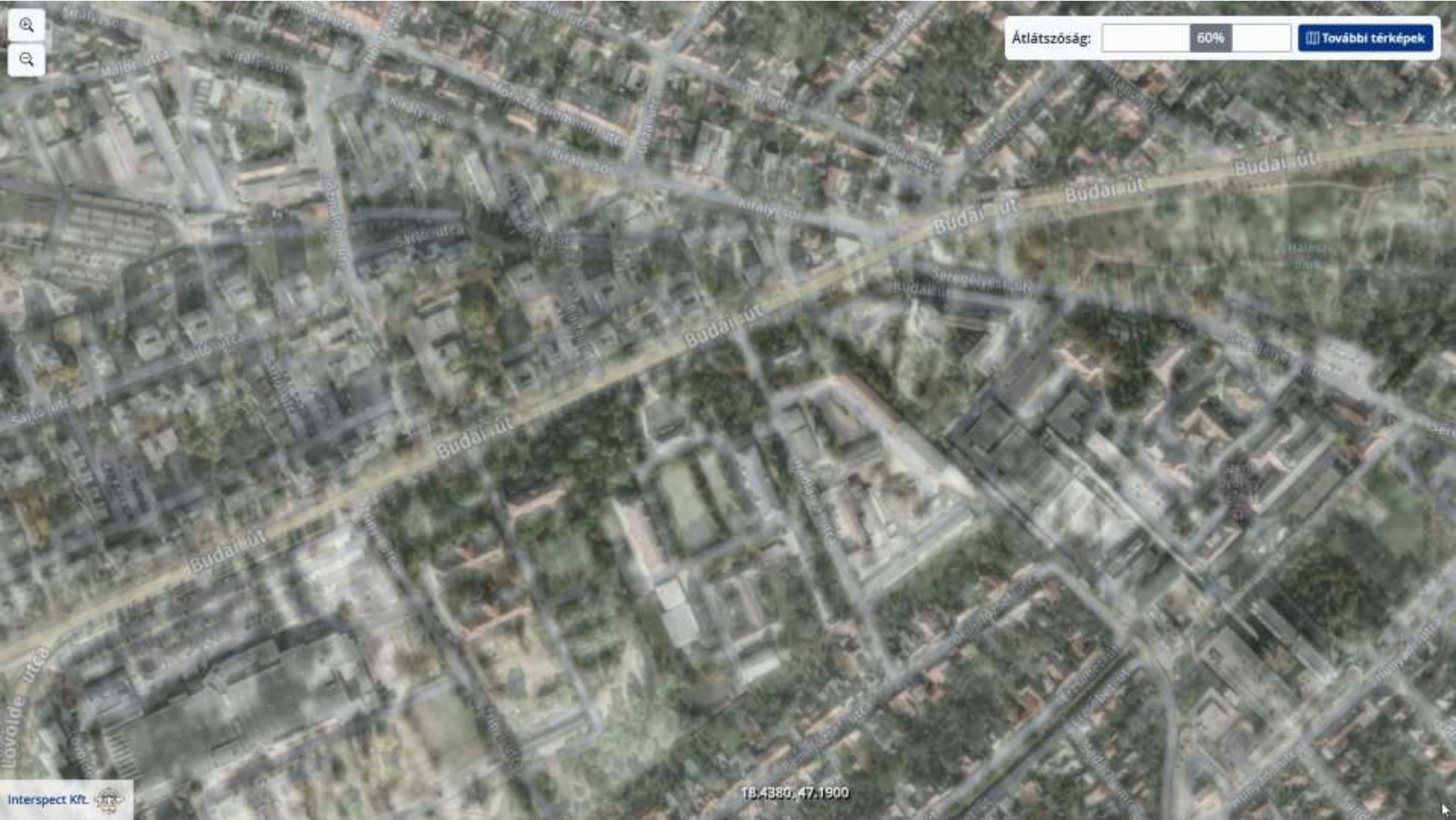




Átlátszóság:

60%

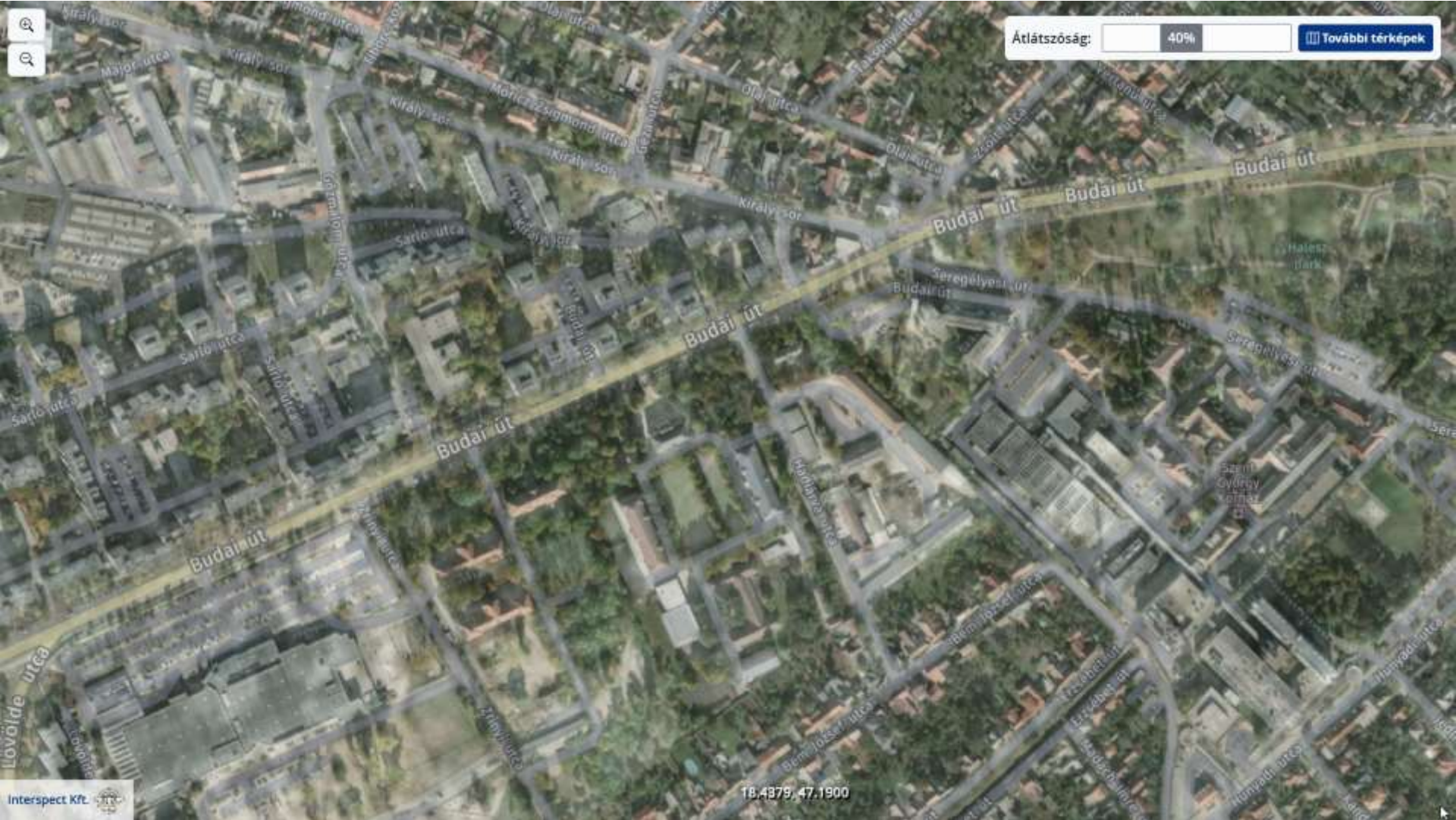
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Átlátszóság:

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Átlátszóság:

20%

További térképek



Átlátszóság:

0%

További térképek

18.4879, 47.1900

Interspect Kft.



Átlátszóság:

100%

[További térképek](#)

















Köszönöm a figyelmet!