20 Documents

| Publication numbers | Title | Current assignees |
|---|---|---|
| US5512743 A | Space-based asteroid detection and monitoring system | US NAVY |
| US7105791 B1 | Orbital debris detection and tracking system utilizing sun or moon occlusion | POLLER BRIAN |
| US20030202682 A1 | Moving object detection method | NACHI FUJIKOSHI |
| US20120229626 A1 | Method of predicting a trajectory of an asteroid | KING ABDULAZIZ CITY FOR SCIENCE & TECHNOLOGY |
| US6133997 A | System for spotting moving objects based on a plurality of artificial satellites | NASDA - NATIONAL SPACE DEVELOPMENT AGENCY OF JAPAN |
| EP2593366 A1 | Optical watch system for a space watch system for near space monitoring | AIRBUS SAFRAN LAUNCHERS, ... |
| US20180017394 A1 | Planetary surveillance system | DOUGLAS DAVID BYRON, ... |
| EP2593367 A1 | Space surveillance system for surveying the near space | ARIANEGROUP |
| WO200149565 A1 | Method and apparatus for autonomous solar navigation | JOHNS HOPKINS UNIVERSITY |
| WO9711882 A2 | Techniques for optimizing an autonomous star tracker | LOCKHEED MARTIN |
| US20090321578 A1 | Planetary impact defense system | PICCIONELLI GREGORY A |
| EP3443298 A2 | Position determination by observing a celestial object transit the sun or moon | CHARLES STARK DRAPER LABORATORY |
| EP2121444 A1 | Method, satellite, and a system or an arrangement with at least one satellite for detecting natural or artificial objects, and the use thereof in the execution of said method | OHB ORBITALE HOCHTECHNOLOGIE BREMEN SYSTEM |
| US7982951 B1 | Digital tracking platform for telescopes | BURSCH STEPHEN LEROY, ... |
| US6757612 B1 | Phenomenological orbital debris impact risk assessment model and software | OCEANIT LABORATORIES |
| US20140039855 A1 | Method and system for evaluating stare-time by a pointing system | HONEYWELL INTERNATIONAL |
| US9266627 B1 | Method, apparatus, and system for asteroid prospecting and mining | CONSENSYS SPACE |
| US4453224 A | Orbiting objective lens telescope system and method | BANKERS TRUST |
| US4330705 A | Optical tracking device using interlaced images | BALL AEROSPACE & TECHNOLOGIES |
| US6452538 B1 | Satellite system for monitoring space | ROBILL PRODUCTS RIDGEWOOD NJ |

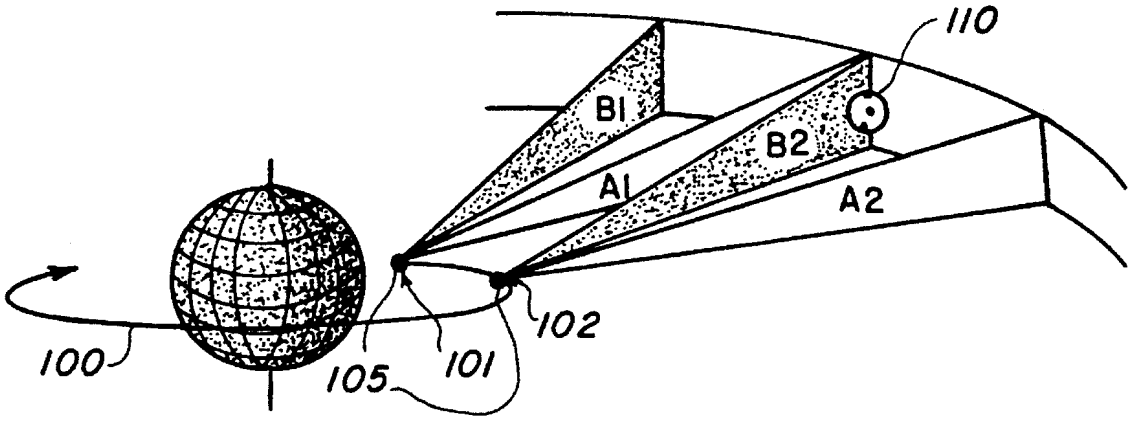
Family 1/20 - FAMPAT - ©Questel

**Title**

(US5512743)

Space-based asteroid detection and monitoring system

**Images**




**Publication numbers with kind code & date**

US5512743 A 1996-04-30 US5512743

**Abstract**

(US5512743)

A satellite-borne system for the detection of near earth objects. The system periodically captures two images of the celestial sphere about the earth using a pair of linear arrays of optical detectors oriented so that the detectors image lines on the celestial sphere that are separated at each pixel in azimuth by the same angle. The position of the linear detectors is varied for each orbit of the earth by the satellite such that the entire celestial sphere can be imaged. The images produced by the two detector arrays are temporarily stored in memory until they can be processed using frame difference signal processing techniques. The results from the frame difference signal processing are transmitted to a ground station for further processing. The processing on the ground can include object classification, orbit tracking (using a time sequence of differenced frames), and earth collision determination and warning.

**Inventors**

SHAFFER WILLIAM A

MCHUGH MARTIN J

WANG DEXTER

**Latest standardized assignees - inventors removed**

US NAVY

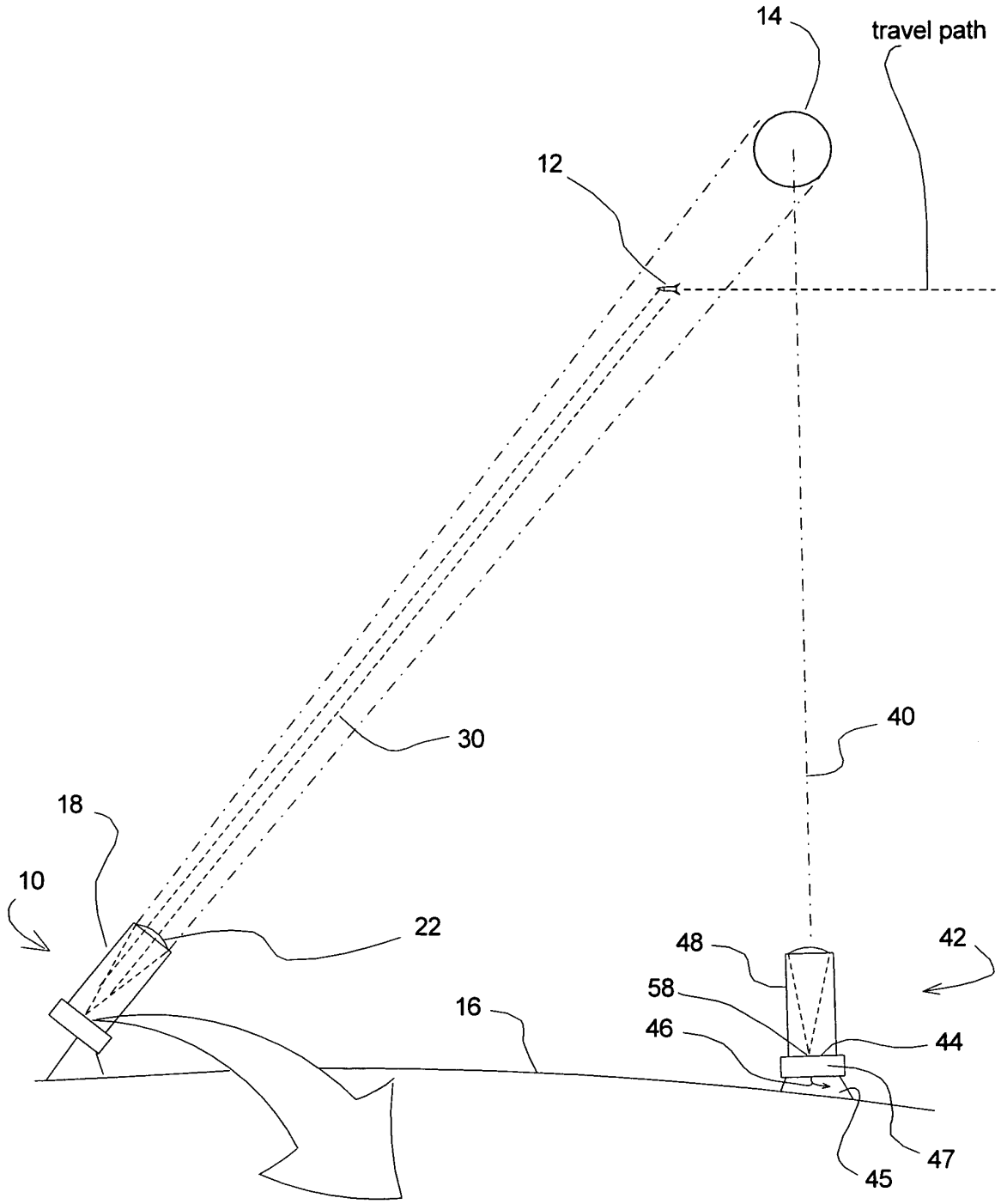
Family 2/20 - FAMPAT - ©Questel

**Title**

(US7105791)

Orbital debris detection and tracking system utilizing sun or moon occlusion

**Images**




**Publication numbers with kind code & date**

US7105791 B1 2006-09-12 US7105791

**Abstract**

(US7105791)

A system for using an image of the Sun for detecting objects traveling through Earth's atmosphere is disclosed. The system includes a receiver for collecting incident sunlight (solar energy) and a light sensitive device that produces a signal in response to exposure to light. A signal processor that is coupled to the light sensitive device, the signal processor sensing the collected incident sunlight and is programmed for providing an output signal corresponding to provide a detection signal in response to a shadow that moves across the light sensitive device.

**Inventors**

POLLER BRIAN

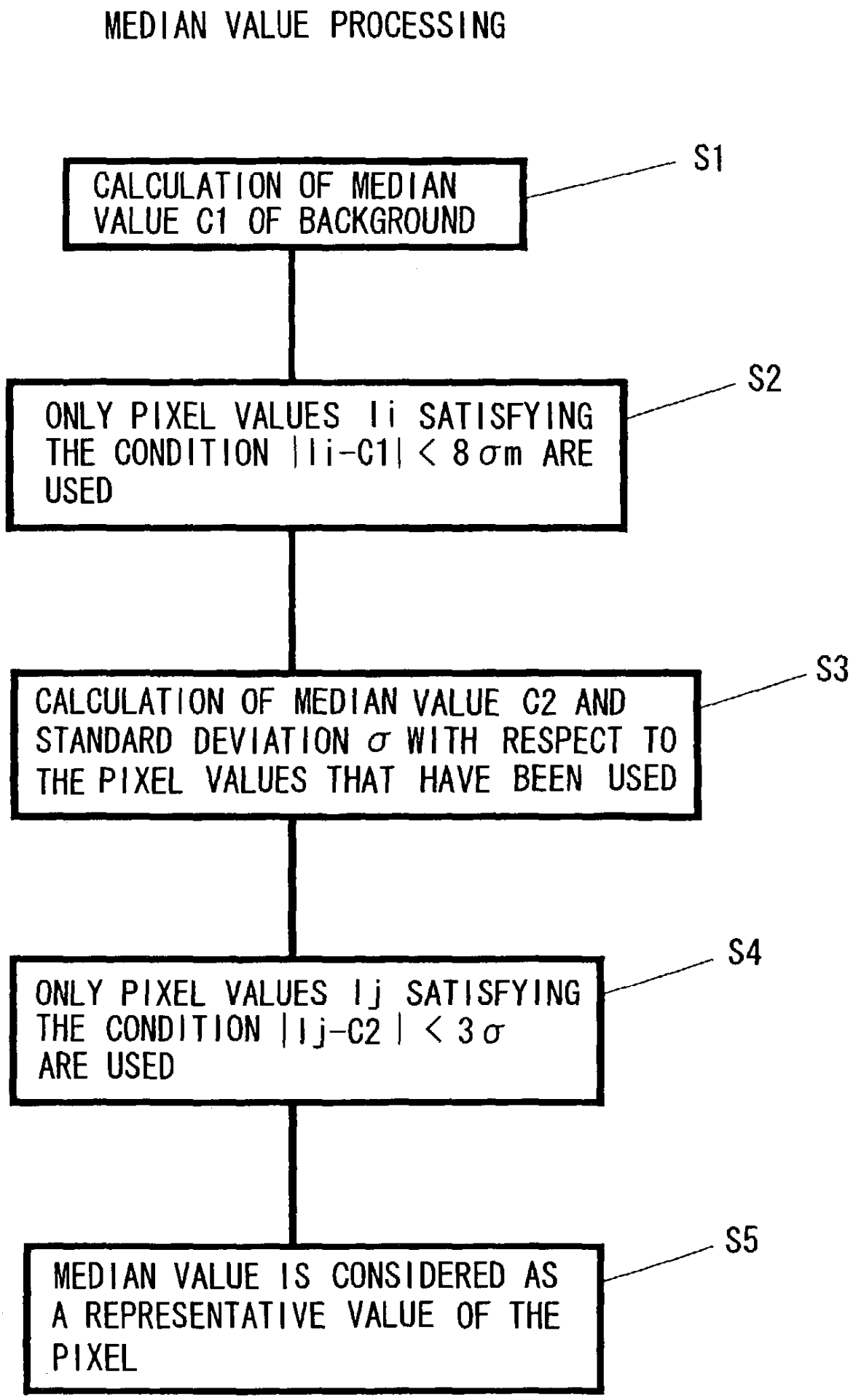
Family 3/20 - FAMPAT - ©Questel

**Title**

(US7155031)

Moving object detection method

**Images**




**Publication numbers with kind code & date**

FR2839175 B1 2010-02-26 FR2839175

| | | | |
|---|---|---|---|
| US7155031 | B2 | 2006-12-26 | US7155031 |
| JP3671220 | B2 | 2005-04-28 | JP3671220 |
| DE10319491 | A1 | 2004-02-26 | DE10319491 |
| JP2003323625 | A | 2003-11-14 | JP2003323625 |
| FR2839175 | A1 | 2003-10-31 | FR2839175 |
| US20030202682 | A1 | 2003-10-30 | US20030202682 |

**Abstract**

(US20030202682)

From a plurality of pictures 1 - 1 through 1 - 3 captured at successive time intervals, pictures 2 - 1 through 2 - 3 of regions determined in accordance with the movement of the celestial object are cut out. By deriving median values in regard to the same pixels in each of the cut-out pictures 2 - 1 through 2 - 3 , a median value picture 3 - 1 is created. By deriving median values, the influence of large numbers of fixed starts that hinder the detection of the moving celestial object that moves in the cut-out pictures is eliminated, and only the moving celestial object is permitted to remain. When deriving median value, pixel values indicating singular values are eliminated in advance, so that the effects of the images of large bright light sources and the lost pixels that output no pixel values are effectively reduced. Further, when an average value picture is created using a plurality of median value pictures previously obtained, the detection limit increases and a dark moving celestial object that cannot be detected using a single observation picture can be extracted.

**Inventors**

YANAGISAWA TOSHIFUMI

NAKAJIMA ATSUSHI

KIMURA TAKEO

**Latest standardized assignees - inventors removed**

NACHI FUJIKOSHI

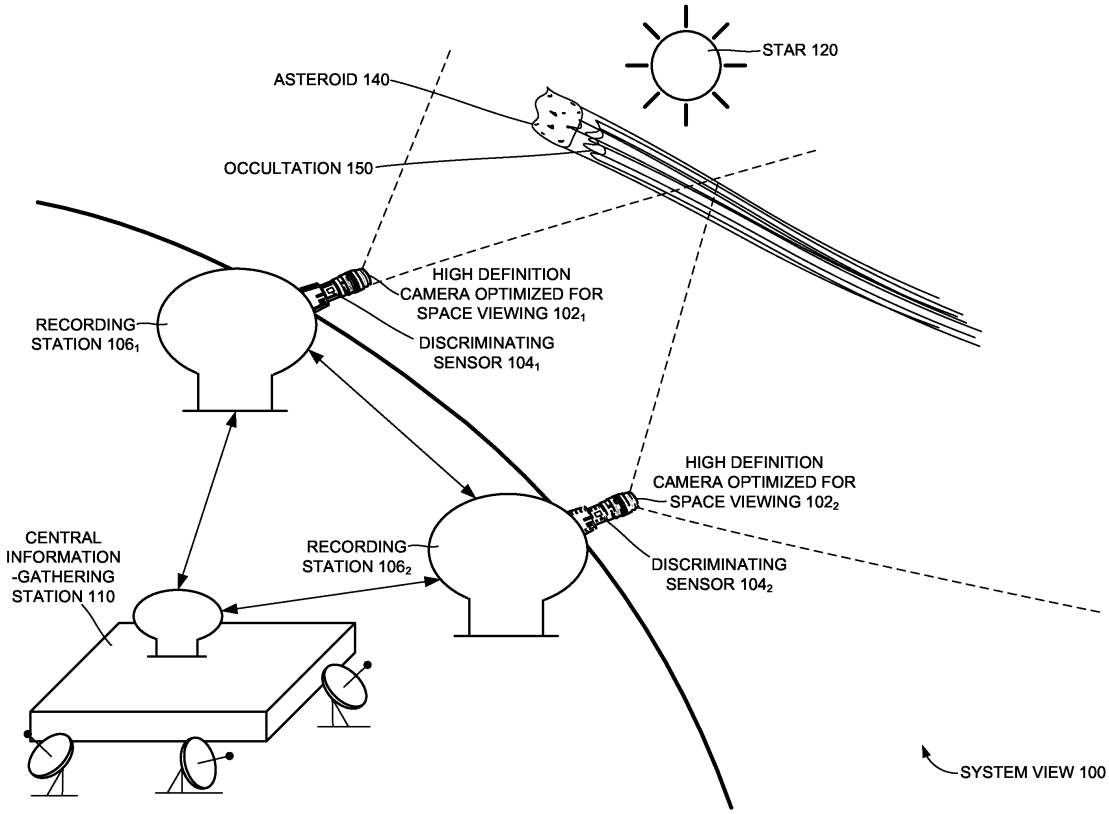
Family 4/20 - FAMPAT - ©Questel

**Title**

(US8947524)

Method of predicting a trajectory of an asteroid

**Images**




**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| US8947524 | B2 | 2015-02-03 | US8947524 |
| US20120229626 | A1 | 2012-09-13 | US20120229626 |

**Abstract**

(US20120229626)

Disclosed are a system, a method and an apparatus of predicting a trajectory of an asteroid. In one embodiment, a method of predicting a trajectory of an asteroid near a celestial object, includes continuously monitoring, through a high-definition camera optimized for space viewing, an unlimited expanse of space as visible from a location of the high-definition camera optimized for space viewing. The method also includes detecting a change in a light intensity of one of a plurality of stars. In addition, the method includes determining that the light intensity of a star has changed beyond a threshold parameter. The method further includes detecting an occultation, through a discriminating sensor, when the change in the light intensity of the star is determined. On detecting occultation, the method includes recording a set of properties associated with the occultation.

**Inventors**

ALTWAIJRY HAITHEM

ALFOZAN KHALED

ALGHALAIQAH ABDULLAH

**Latest standardized assignees - inventors removed**

KING ABDULAZIZ CITY FOR SCIENCE & TECHNOLOGY

Family 5/20 - FAMPAT - ©Questel

**Title**

(US6133997)

System for spotting moving objects based on a plurality of artificial satellites

**Images**

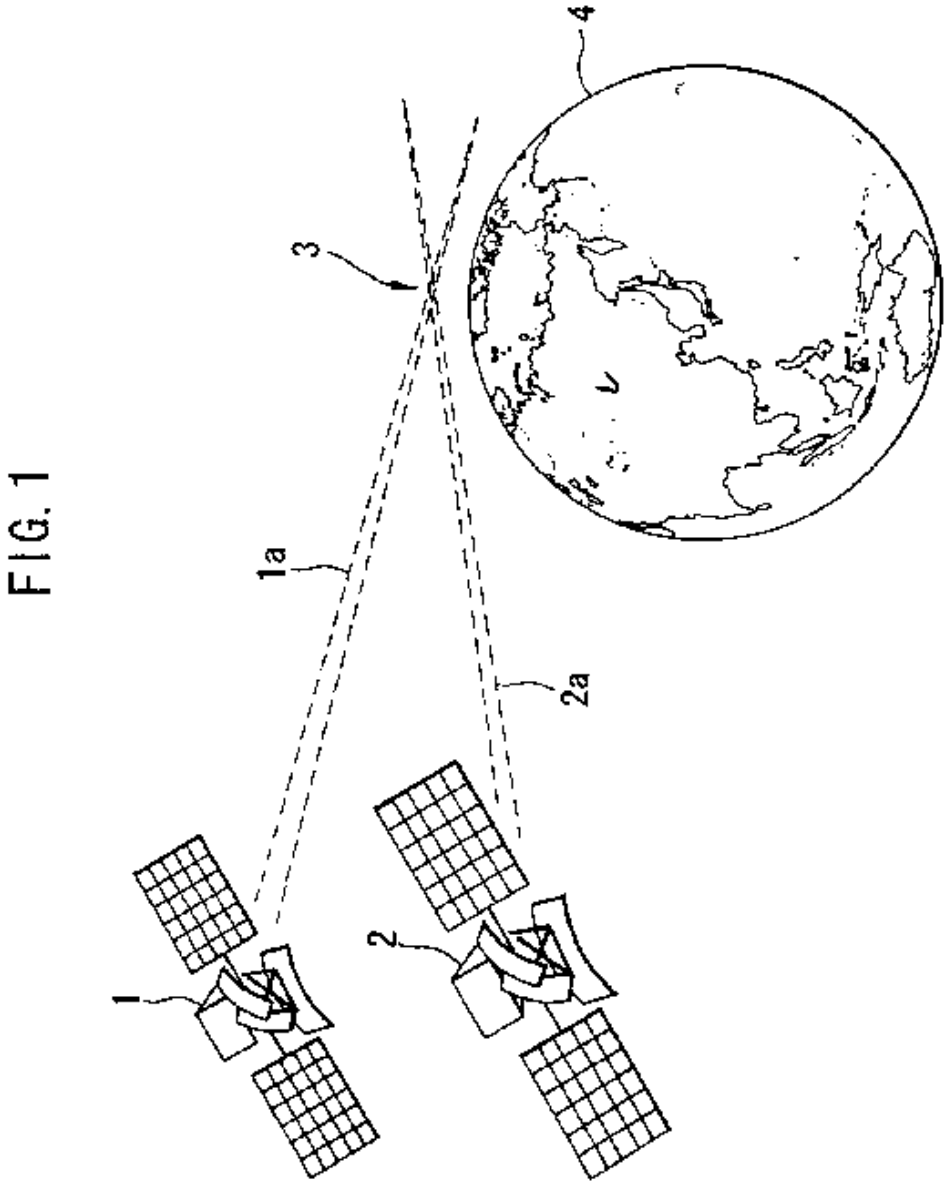



FIG. 1

**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| US6133997 | A | 2000-10-17 | US6133997 |
| JP11271056 | A | 1999-10-05 | JP11271056 |
| JP2879146 | B2 | 1999-04-05 | JP2879146 |

**Abstract**

(US6133997)

A system for spotting moving objects based on a plurality of artificial satellites including: a step of taking images at the same point in time by using imaging devices respectively mounted on at least two units of artificial satellites located separately from one another of which the positions can be defined at every moment in time; a step of discriminating a large number of stars at infinity and a small number of moving objects located near the earth through a synthetic processing by superimposing upon one another at least two images of spots obtained from the image taking at the respective satellites;

and a step of specifying the positions of the discriminated moving objects from data of images forming positions of the moving objects on the basis of the large number of stars at infinity.

**Inventors**

YAMAWAKI KOJI
TAKAMI YASUHIRO
NISHIO YOKO
KANEKO YUTAKA
KINOSHITA TAKAHIRO

**Latest standardized assignees - inventors removed**

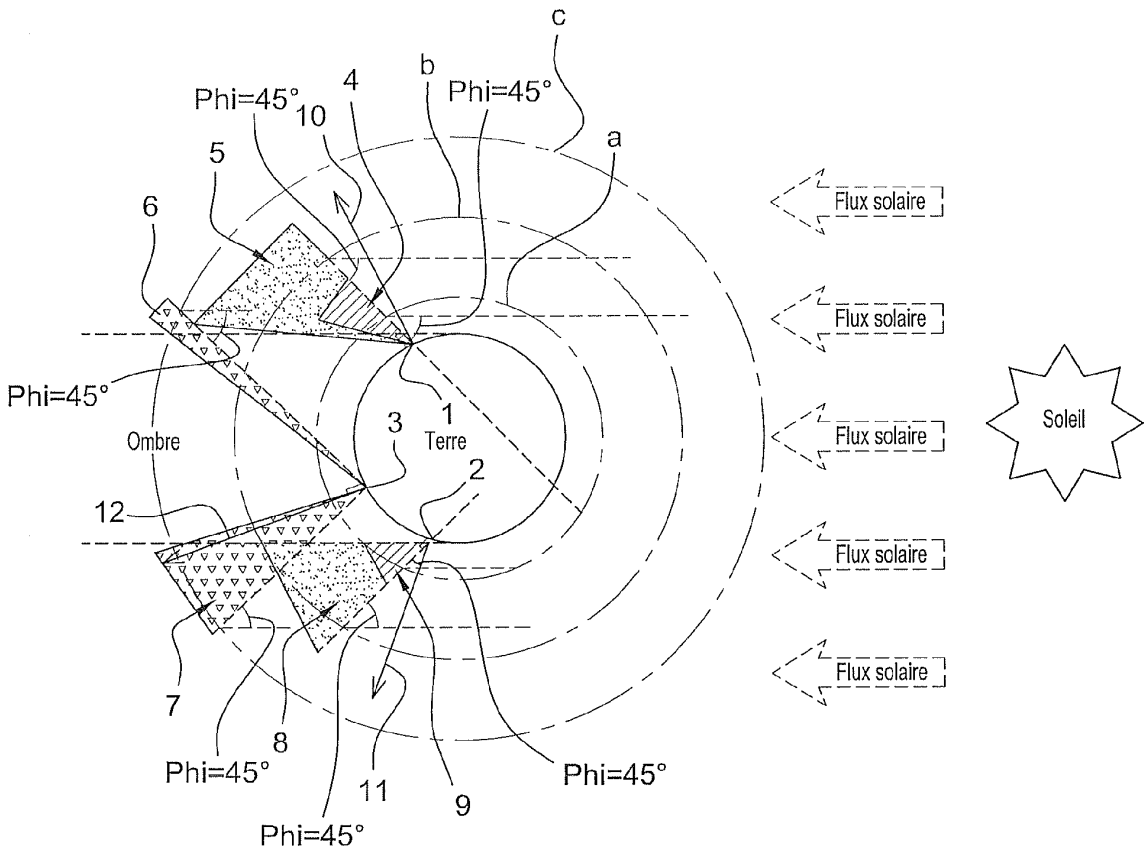
NASDA - NATIONAL SPACE DEVELOPMENT AGENCY OF JAPAN

Family 6/20 - FAMPAT - ©Questel

**Title**

(EP2593366)
Optical watch system for a space watch system for near space monitoring

**Images**




**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| CA2804991 | C | 2018-06-05 | CA2804991 |
| US9121704 | B2 | 2015-09-01 | US9121704 |
| US20130264463 | A1 | 2013-10-10 | US20130264463 |
| FR2962556 | B1 | 2013-05-24 | FR2962556 |
| EP2593366 | A1 | 2013-05-22 | EP2593366 |
| CA2804991 | A1 | 2012-01-19 | CA2804991 |
| WO2012/007361 | A1 | 2012-01-19 | WO201207361 |
| FR2962556 | A1 | 2012-01-13 | FR2962556 |

**Abstract**

(EP2593366)

The invention relates to an optical system for a watch system for a space watch system, characterized in that said optical system comprises at least one telescope having a field no lower than 5°, and preferably no lower than 10°, which is mounted on a mount that is movable along two axes, wherein said telescope is coupled to an image sensor having a sensitivity suitable for an integration time having an order of magnitude of a hundred milliseconds.

**Inventors**

MARTIN BERNARD
LE BERRE FRANCOIS
CAILLAU DAMIEN
LEVEQUE LOUIS

**Latest standardized assignees - inventors removed**

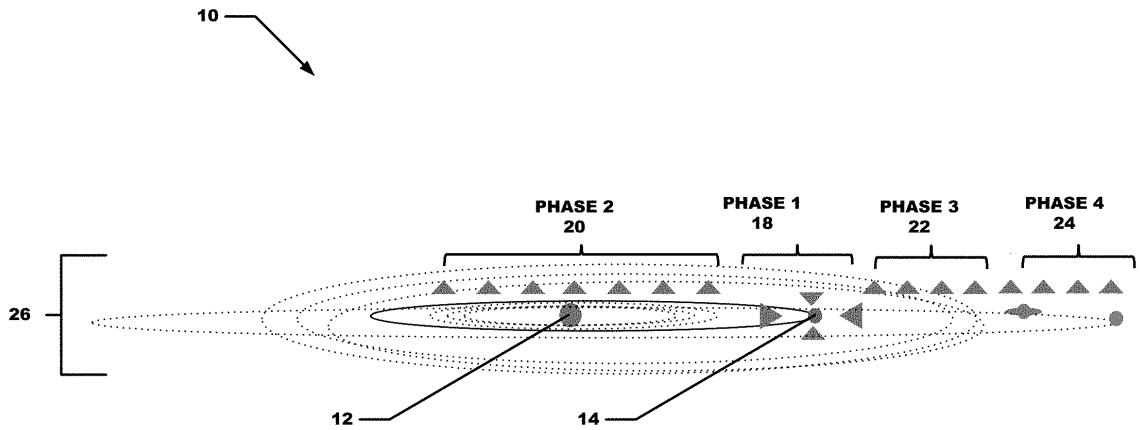
AIRBUS SAFRAN LAUNCHERS
ARIANEGROUP

Family 7/20 - FAMPAT - ©Questel

**Title**

(US10317218)
Planetary surveillance system

**Images**




**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| US10317218 | B2 | 2019-06-11 | US10317218 |
| US20180017394 | A1 | 2018-01-18 | US20180017394 |

**Abstract**

(US20180017394)
A computer-implemented planetary surveillance system method and apparatus is presented. A first space object detection system is disposed proximate Earth, wherein the first space object detection systems include a first constellation of Planetary Surveillance System Platforms (PSSPs) that provide warning of asteroids approaching Earth and on a path which has a likelihood of impacting Earth. At least one additional space object detection system is also used.

**Inventors**

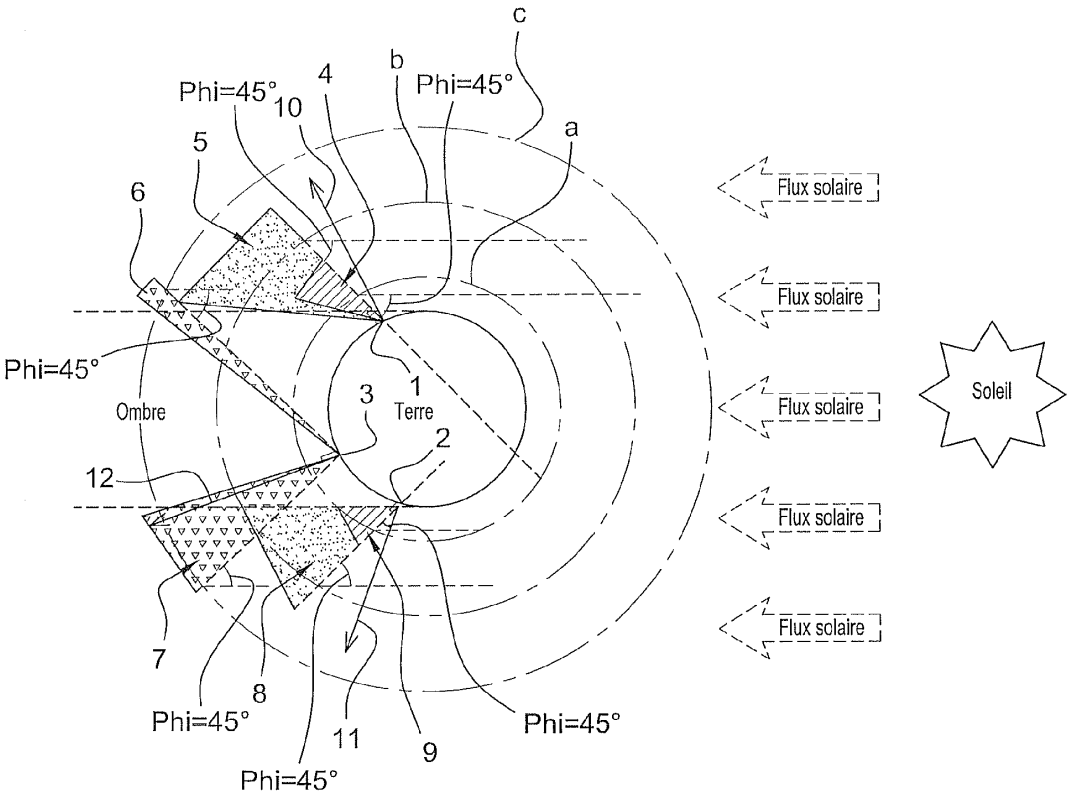
DOUGLAS DAVID BYRON
DOUGLAS ROBERT E

Family 8/20 - FAMPAT - ©Questel

**Title**

(EP2593367)
Space surveillance system for surveying the near space

**Images**




**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| PL2593367 | T3 | 2019-06-28 | PL2593367 |
| ES2716552 | T3 | 2019-06-13 | ES2716552 |
| PT2593367 | T | 2019-04-02 | PT2593367T |
| CA2805010 | C | 2019-02-26 | CA2805010 |
| EP2593367 | B1 | 2019-02-20 | EP2593367 |
| FR2962412 | B1 | 2014-03-21 | FR2962412 |
| US20130278757 | A1 | 2013-10-24 | US20130278757 |
| EP2593367 | A1 | 2013-05-22 | EP2593367 |
| CA2805010 | A1 | 2012-01-19 | CA2805010 |
| WO2012/007360 | A1 | 2012-01-19 | WO201207360 |
| FR2962412 | A1 | 2012-01-13 | FR2962412 |

**Abstract**

(EP2593367)
The invention relates to a space situational awareness system including optical watch systems which are arranged as a network and are suitable for scanning areas of the Earth orbit, in particular the LEO layer, and which are arranged in the form of a mesh at the surface of a planet, characterized in that said system comprises means suitable for acquiring images of objects passing through the areas that are scanned by the optical systems, and calculation means suitable for carrying out a measurement of the position time series of the objects passing through the scanned areas by short fixed-field integration.

**Inventors**

MARTIN BERNARD
LE BERRE FRANÇOIS
CAILLAU DAMIEN
LEVEQUE LOUIS

**Latest standardized assignees - inventors removed**

ARIANEGROUP

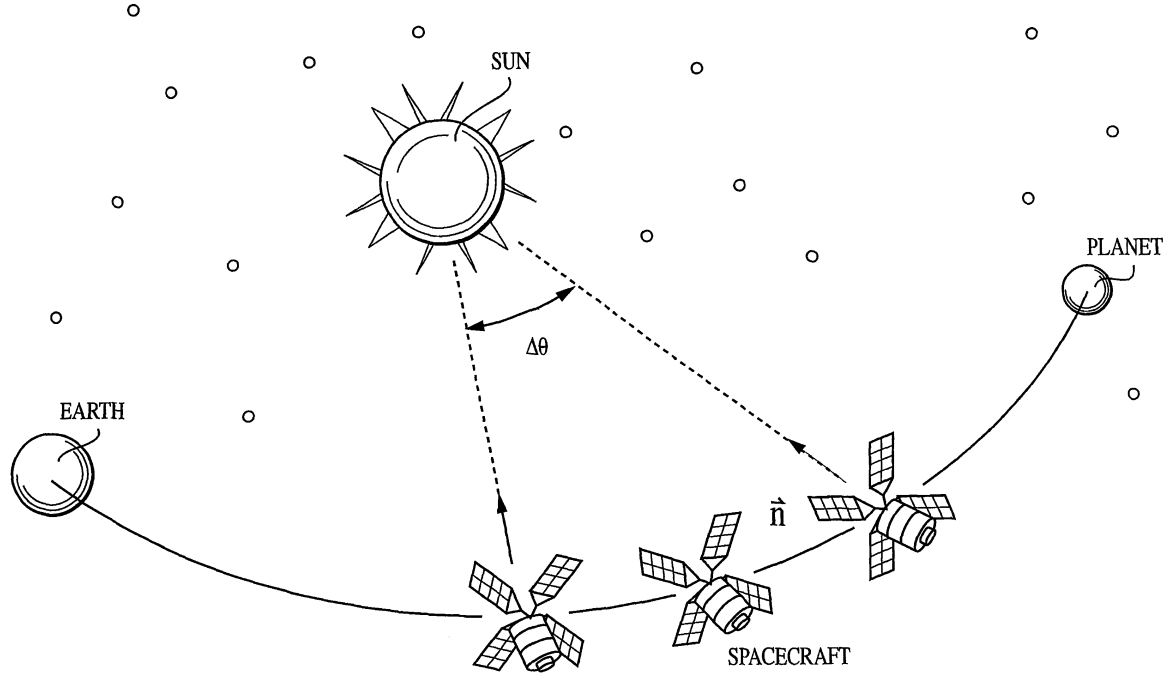
Family 9/20 - FAMPAT - ©Questel

**Title**

(WO200149565)

Method and apparatus for autonomous solar navigation

**Images**




**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| US6622970 | B2 | 2003-09-23 | US6622970 |
| US20030006345 | A1 | 2003-01-09 | US20030006345 |
| AU2927301 | A | 2001-07-16 | AU200129273 |
| WO01/49565 | A1 | 2001-07-12 | WO200149565 |

**Abstract**

(WO01/49565)

A method and apparatus for autonomous navigation for deep space missions using the sun as the reference body and determining the spacecraft orbit based on observations made on the sun using onboard instruments. Two types of observation data, the direction of the spacecraft relative to the sun as a function of time and the optical Doppler shift due to the motion of the spacecraft relative to the sun, can be used for the spacecraft orbit determination. A dual imaging system which functions as a sun imager taking images of the sun against star backgrounds during the cruise phase and as a regular optical imager taking pictures of the targeting planetary body during the approaching phase is also described.

**Inventors**

GUO YANPING

**Latest standardized assignees - inventors removed**

JOHNS HOPKINS UNIVERSITY

Family 10/20 - FAMPAT - ©Questel

**Title**

(WO9711882)

Techniques for optimizing an autonomous star tracker

**Images**

OTHER PUBLICATIONS

R.W.H. van Bezooijen. "Autonomous Star Tracker Development," *12th IFAC Symposium on Automatic Control in Aerospace—Aerospace Control '92*, Sep. 7–11, 1992, Ottobrunn, Germany, pp. 563–568.

R.W.H. van Bezooijen. "Star Sensors for Autonomous Attitude Control and Navigation." *SPIE OE/Technology '92 Symposium*, Nov. 17,1992, Boston, Massachusetts, U.S.A., pp. 1–25.

R.W.H. van Bezooijen, "True–sky demonstration of an autonomous star tracker," *SPIE International Symposium on Optical Engineering in Aerospace Sensing*, Apr. 5, 1994, Orlando Florida , pp. 1–13.


**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| US5745869 | A | 1998-04-28 | US5745869 |
| WO97/11882 | A3 | 1997-09-12 | WO9711882 |
| AU7118896 | A | 1997-04-17 | AU9671188 |
| WO97/11882 | A2 | 1997-04-03 | WO9711882 |

**Abstract**


(WO97/11882)

A method for determining the attitude of a spacecraft (1) by observing stars (2) within a starfield (3). A detector (13), camera electronics (14), and computer (15) located on board the spacecraft (1) are used to generate a set of star match groups by matching pairs of stars observed by the detector (13) with pairs of guide stars from a stored database (18) of guide stars. Match groups having small numbers of stars are eliminated. Non-eliminated match groups are validated.

Redundant match groups are eliminated. A match group having the largest number of stars is selected. Finally, the attitude of the spacecraft (1) is derived from positions of guide stars within the selected match group. The guide star database (18) can be broken into an acquisition guide star database (8) and a supplementary guide star database (9). The field of view (20) of detector (13) can be broken into a grid of pixels overlaid by a grid of superpixels (21). The guide star pairs are preferably presorted in order of increasing angular separation. An identification matrix (IDGRP) can be used to speed the star identification process.

**Inventors**

VAN BEZOOIJEN ROELOF W H

**Latest standardized assignees - inventors removed**

LOCKHEED MARTIN

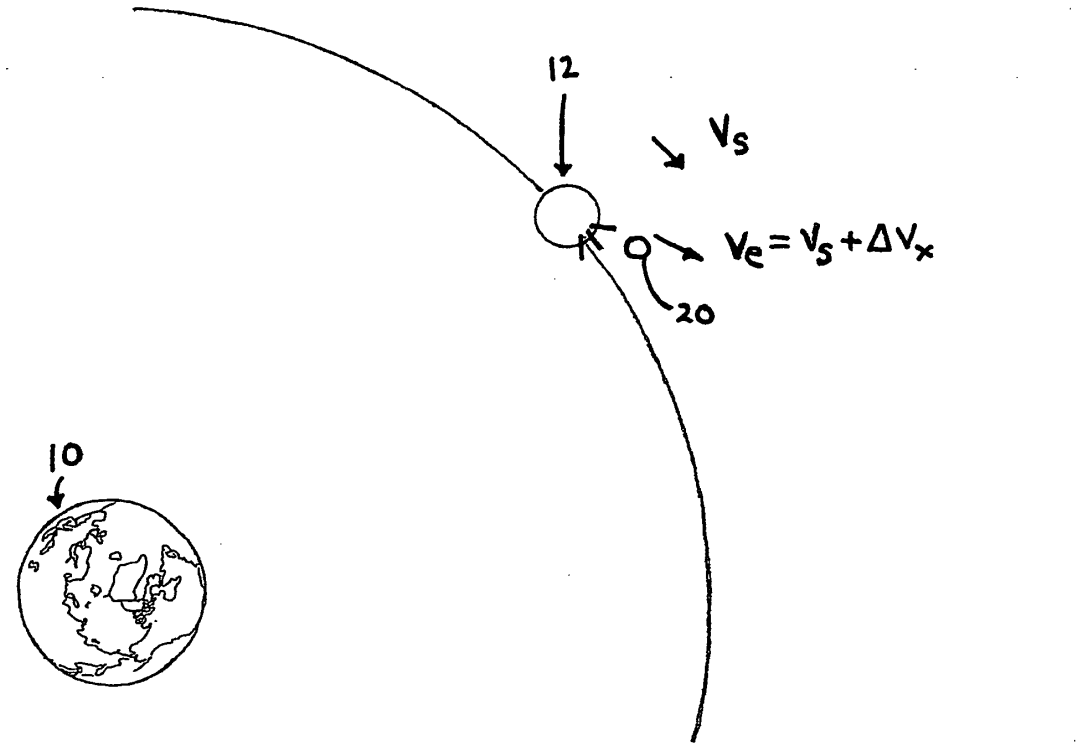
Family 11/20 - FAMPAT - ©Questel

**Title**

(US8025002)

Planetary impact defense system

**Images**




**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| US8025002 | B2 | 2011-09-27 | US8025002 |
| US20090321578 | A1 | 2009-12-31 | US20090321578 |

**Abstract**

(US20090321578)

A system for defending a planet having a satellite against impact from an incoming body includes an explosive system and a propulsion system. The explosive system is adapted for deployment on the satellite and detonation thereon with sufficient explosive force to produce at least one ejectum to which is imparted a velocity increment sufficient for the ejectum to exceed the satellite's escape velocity and enter orbit about the planet. The propulsion system is adapted to be secured to at least one ejectum and impart a velocity increment to the ejectum sufficient to leave orbit about the planet and enter an orbit intercepting the incoming body. The system is used in a planetary defense method in which the explosive system is deployed at a deployment site on the satellite and detonated to produce at least one ejectum having a velocity that exceeds

the escape velocity of the satellite. The ejectum enters into orbit around the planet, at which time the propulsion system is secured to the ejectum to produce a projectile. The propulsion system is then activated to increase the velocity of the projectile, causing the projectile to enter into an intercept orbit targeting the incoming body and subsequently intercept and impact the incoming body. The impact prevents the incoming body from impacting the planet.

**Inventors**

PICCIONELLI GREGORY A

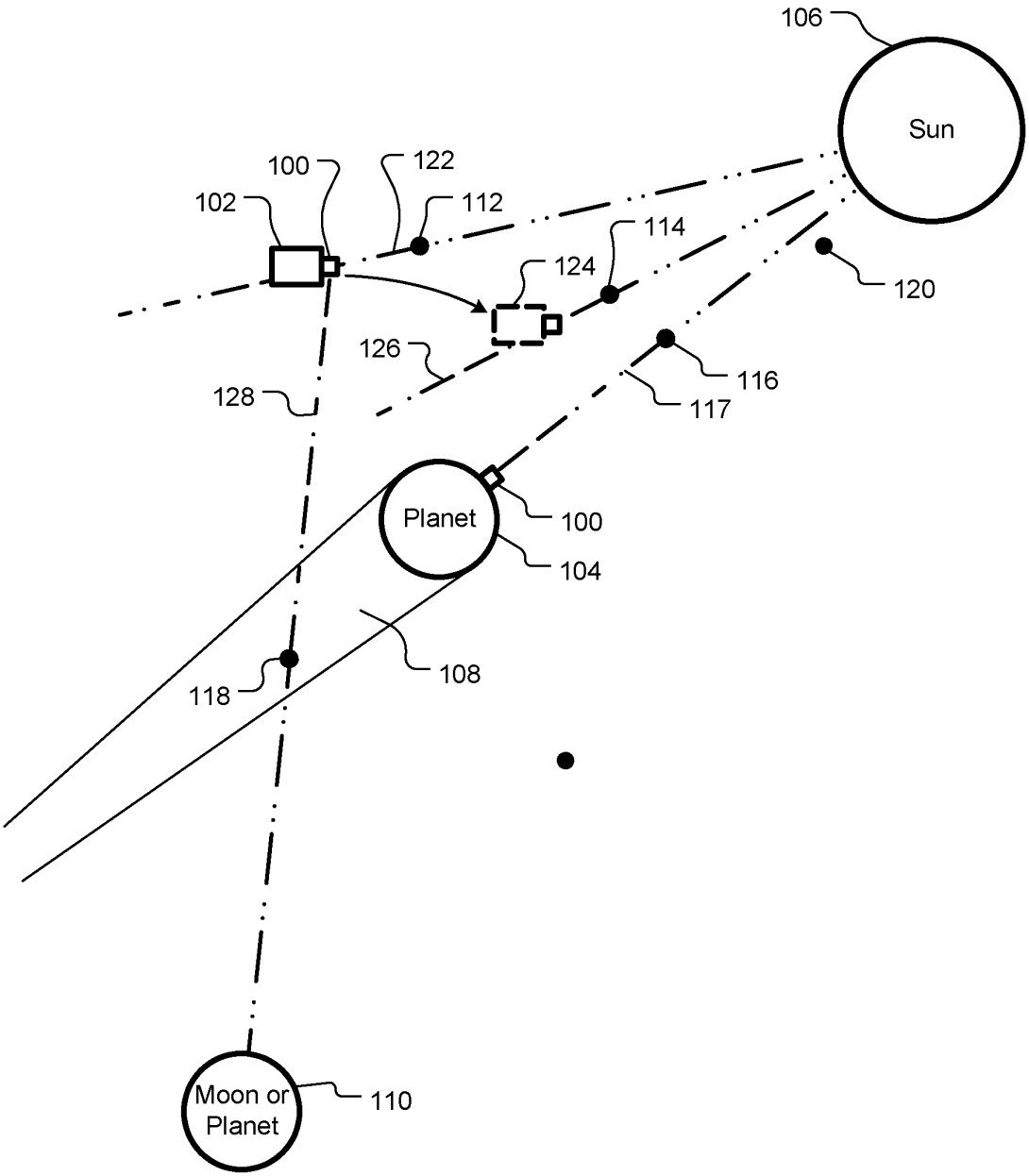
Family 12/20 - FAMPAT - ©Questel

**Title**

(EP3443298)

Position determination by observing a celestial object transit the sun or moon

**Images**




**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| US10234533 | B2 | 2019-03-19 | US10234533 |
| EP3443298 | A2 | 2019-02-20 | EP3443298 |
| WO2018/125311 | A3 | 2018-08-09 | WO2018125311 |
| WO2018/125311 | A2 | 2018-07-05 | WO2018125311 |

| | | | |
|---|---|---|---|
| US20180074154 | A1 | 2018-03-15 | US20180074154 |

**Abstract**

(EP3443298)

A navigation system determines a position by referring to artificial or natural satellites or other space objects during daylight or when the objects are in a planet's shadow. A telescope and image sensor observe and image shadows of the objects as the objects transit the sun or a sunlit surface of a planet or moon, thereby solving problems related to the two key times during which traditional SkyMark navigation is difficult or impossible.

**Inventors**

LANE BENJAMIN F

WHITACRE WILLIAM W

**Latest standardized assignees - inventors removed**

CHARLES STARK DRAPER LABORATORY

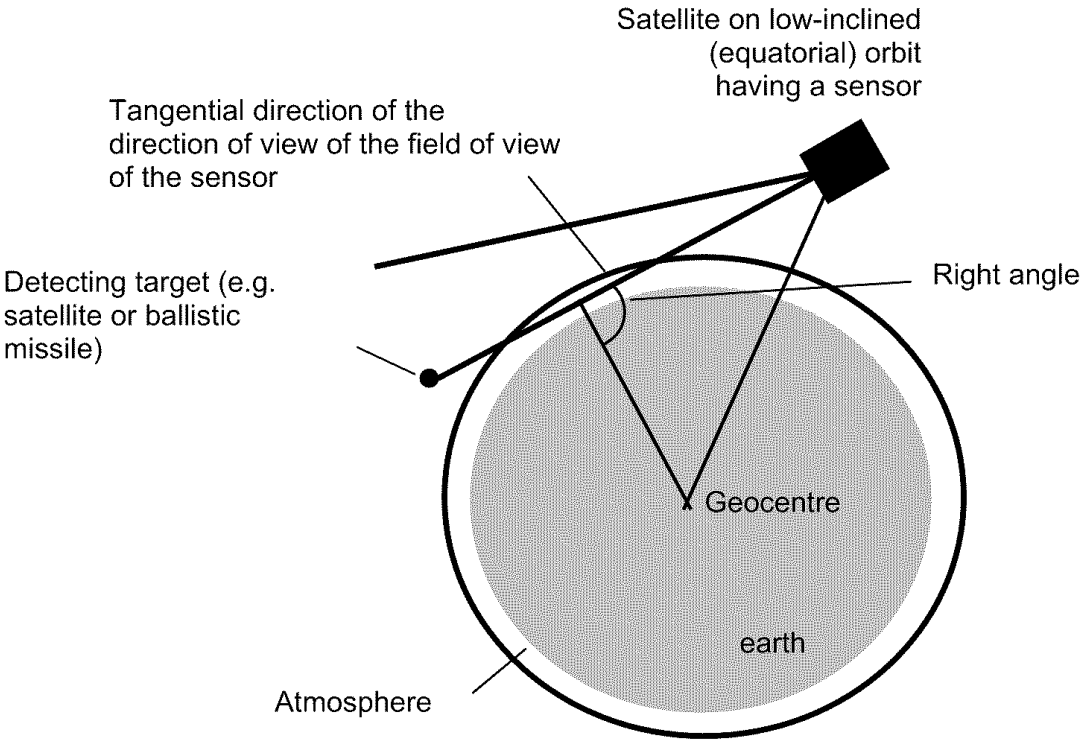
Family 13/20 - FAMPAT - ©Questel

**Title**

(EP2121444)

Method, satellite, and a system or an arrangement with at least one satellite for detecting natural or artificial objects, and the use thereof in the execution of said method

**Images**




**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| US9284074 | B2 | 2016-03-15 | US9284074 |
| PL2121444 | T3 | 2015-01-30 | PL2121444 |
| EP2121444 | B1 | 2014-04-23 | EP2121444 |
| AU2007334958 | B2 | 2013-08-01 | AU2007334958 |
| US20100038490 | A1 | 2010-02-18 | US20100038490 |
| EP2121444 | A1 | 2009-11-25 | EP2121444 |
| AU2007334958 | A1 | 2008-06-26 | AU2007334958 |
| DE102006060091 | A1 | 2008-06-26 | DE102006060091 |

WO2008/074449 A1 2008-06-26 WO200874449

**Abstract**

(EP2121444)

The invention relates to a method, a satellite, and a system or an arrangement with at least one satellite for detecting flying objects that are located in the vicinity of a planet, planetoid or similar celestial bodies. The invention further relates to the use thereof for carrying out said method and particularly to a constellation of LEO satellites (LEO = Low Earth Orbit) as an early warning of ballistic missiles, wherein said constellation comprises only satellites on equatorial orbits or orbits with low inclination. Satellite constellations in the low earth orbit (LEO) for missile detection are used for early warning of ballistic missiles, either by detecting the combustion phase of the flying object or by detection during the free-flight phase. The viewing direction of the sensors can be directed directly toward the earth or at an angle past the atmosphere.

**Inventors**

HOFSCHUSTER GERD DR

MAHAL SASCHA

KASSEBOM MARTIN

**Latest standardized assignees - inventors removed**

OHB ORBITALE HOCHTECHNOLOGIE BREMEN SYSTEM

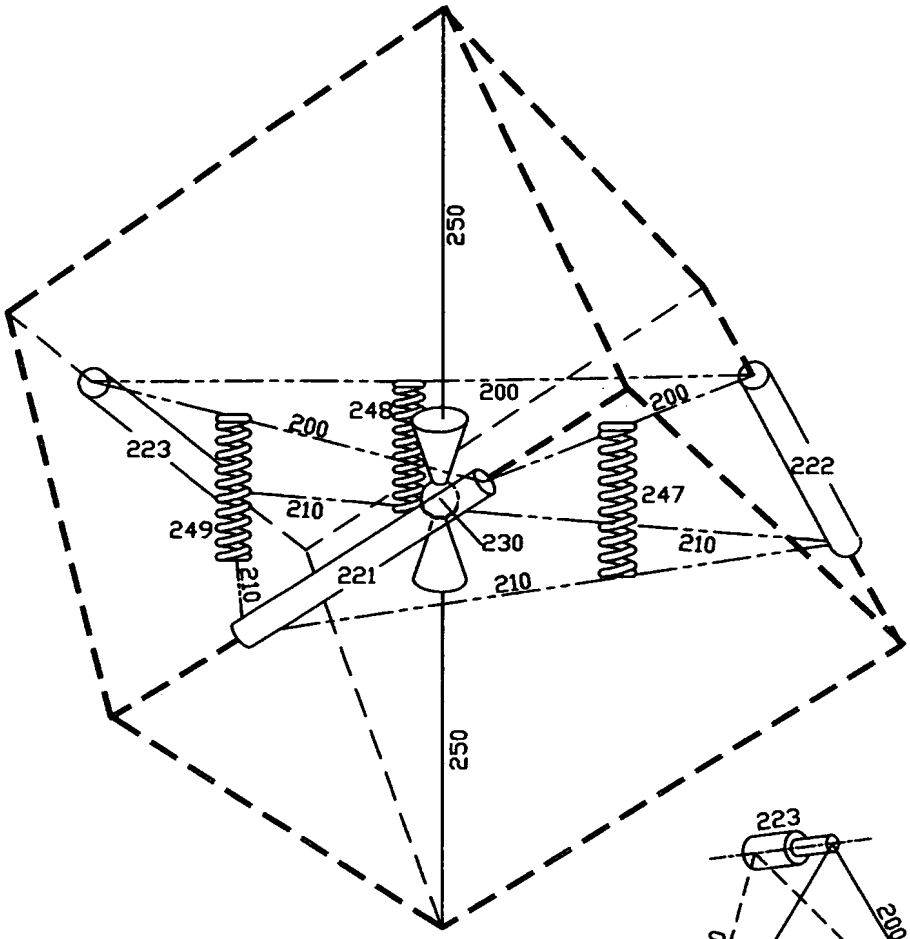
Family 14/20 - FAMPAT - ©Questel

**Title**

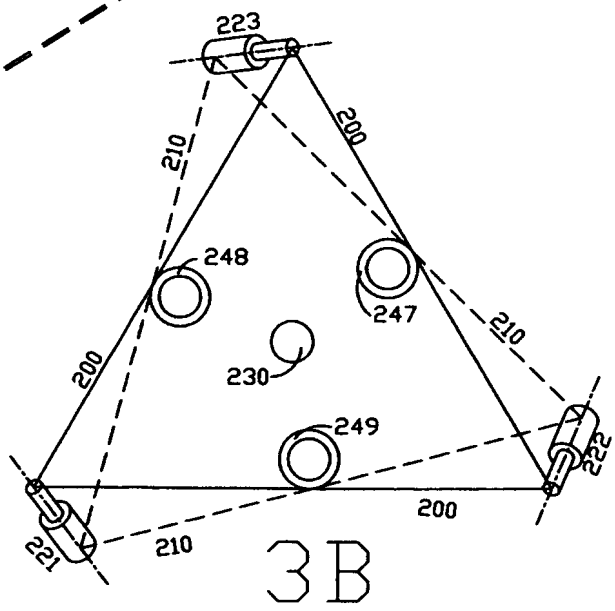
(US7982951)

Digital tracking platform for telescopes

**Images**




3A




3B

**Publication numbers with kind code & date**

US7982951 B1 2011-07-19 US7982951

**Abstract**

(US7982951)

A digitally controlled platform for precise celestial tracking of astronomical telescopes, generally those having an independent pointing mechanism. A movable stage carrying the telescope is moved relative to a base by three digitally controlled actuators each of which determines the distance between a point fixed in the base and a point fixed stage. The base and stage otherwise are connected by a mechanism that holds a single point fixed in the base in coincidence with a single point fixed in the stage. It functions without approximation at any digitally specified latitude and longitude, enabling astrophotography with alt/azimuth mounted telescopes and diurnal tracking through the zenith. The digital controller may be a personal computer laptop running a multitasking operating system linked to the platform electronics by a Universal Serial Bus cable. Novel software design allows precise tracking, control, and calibration in spite of operating system and Universal Serial Bus latency.

**Inventors**

INNES ROBERT
BURSCH STEPHEN LEROY

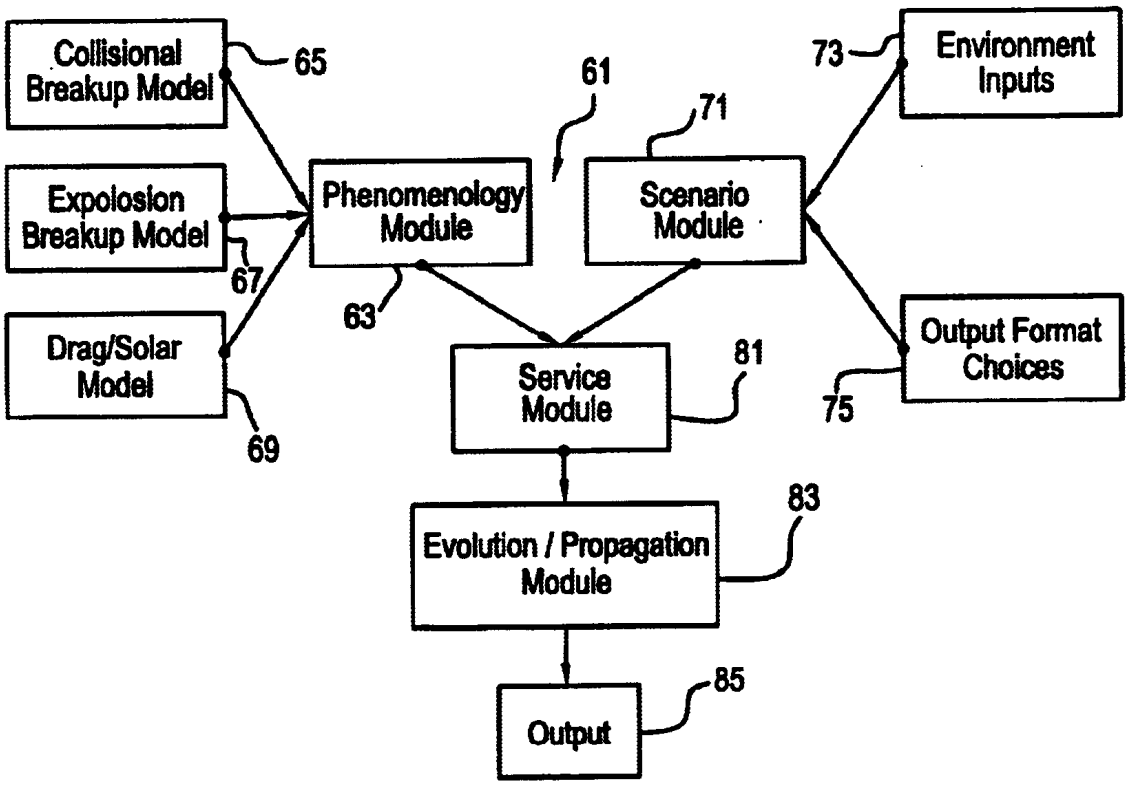
Family 15/20 - FAMPAT - ©Questel

**Title**

(US6757612)

Phenomenological orbital debris impact risk assessment model and software

**Images**




**Publication numbers with kind code & date**

US6757612 B1 2004-06-29 US6757612

**Abstract**

(US6757612)

An orbital debris impact risk assessment and management model is provided for low-Earth orbit (LEO). The model is phenomenologically based, meaning real, theoretical and historical data of the LEO environment is used in conjunction with thermodynamic based code architecture to perform impact risk assessments. The format of the model is developed such that user friendliness and user adaptability are maximized. The model can be used as a stand-alone program (software) or run over the World-Wide Web as an application service provider (ASP). The model may be used to examine trends in the evolution of the LEO environment or to calculate likelihood of impacts for specific on-orbit assets or groups of assets.

**Inventors**

TALENT DAVID L
CHEUNG KEN C K
NISHIMOTO DARON L

**Latest standardized assignees - inventors removed**

OCEANIT LABORATORIES

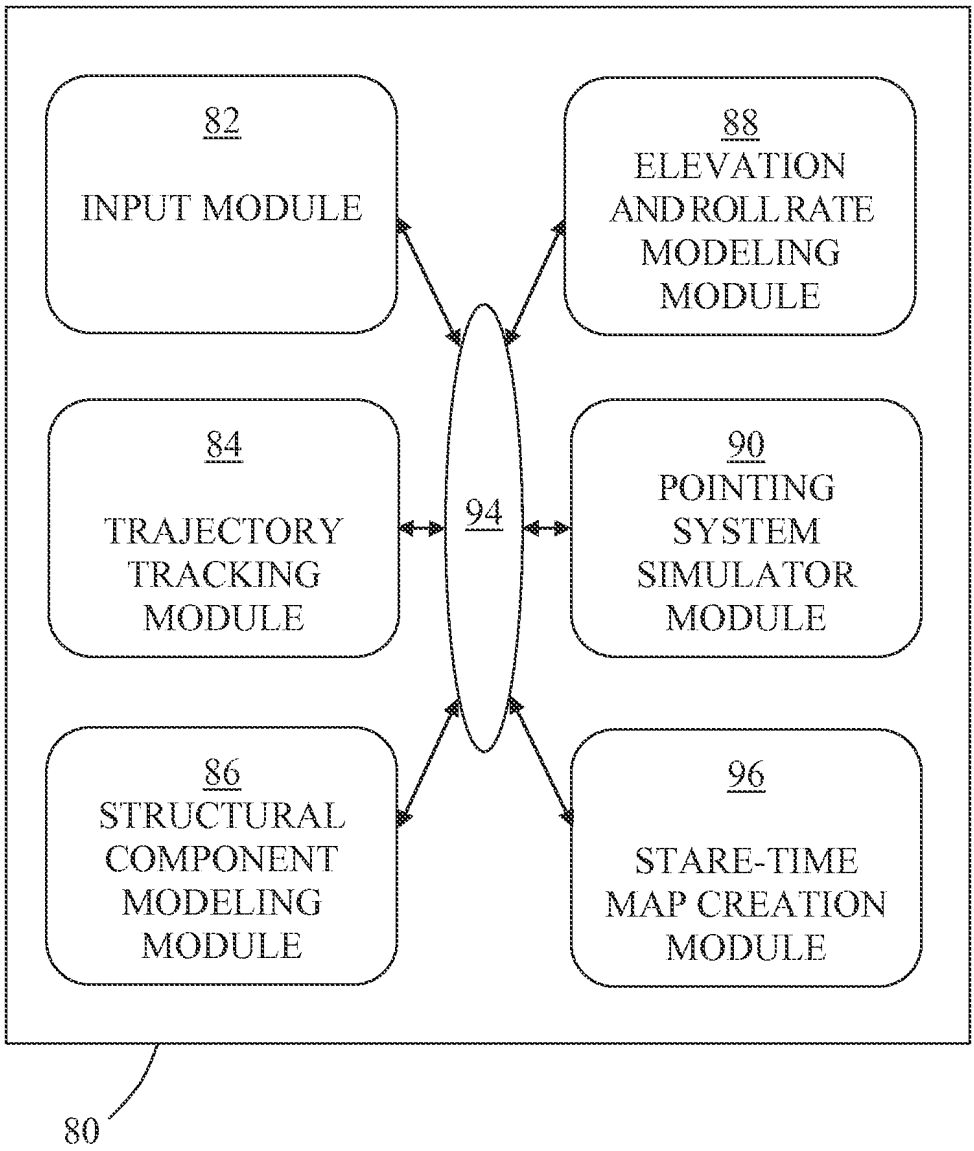
Family 16/20 - FAMPAT - ©Questel

**Title**

(US9182584)

Method and system for evaluating stare-time by a pointing system

**Images**




**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| US9182584 | B2 | 2015-11-10 | US9182584 |
| US20140039855 | A1 | 2014-02-06 | US20140039855 |

**Abstract**

(US20140039855)

A method and system to evaluate stare-time of a selected target by a pointing system is provided. In an embodiment, the method includes specifying a time period for evaluation. A processor simulates movement of selected celestial bodies during the time period and movement of the platform during the time period. The processor further simulates pointing the pointing system in each celestial direction during the time period. The method calculates stare-time in each celestial direction uninterrupted by the selected celestial bodies and the platform during the time period.

**Inventors**

RACHLIN ELLIOTT

DOPILKA DAVID J

**Latest standardized assignees - inventors removed**

HONEYWELL INTERNATIONAL

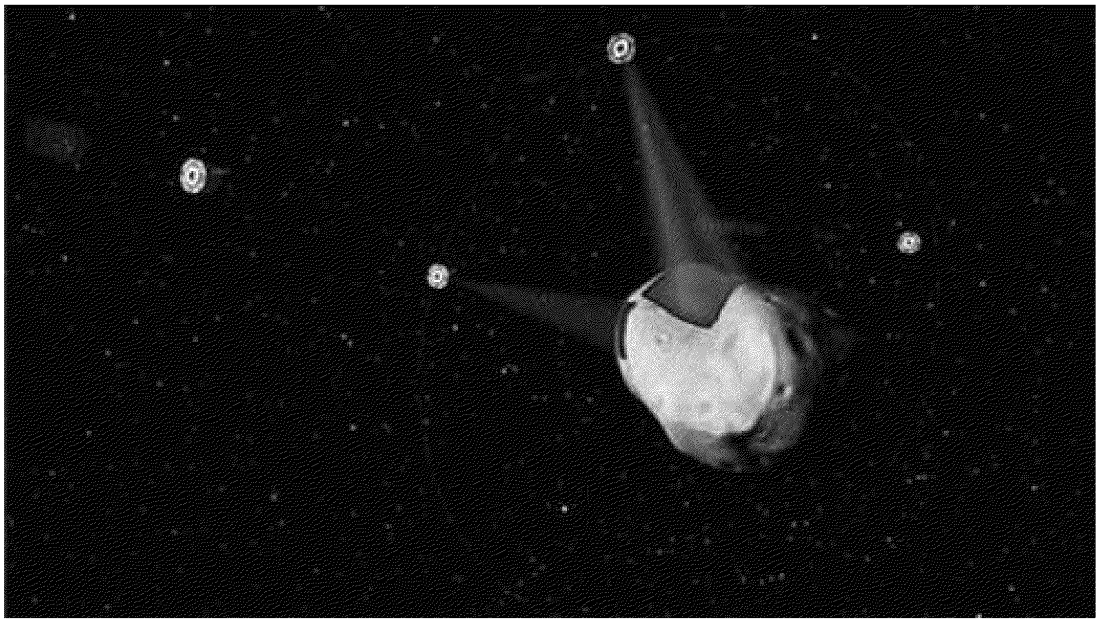
Family 17/20 - FAMPAT - ©Questel

**Title**

(US9266627)

Method, apparatus, and system for asteroid prospecting and mining

**Images**



**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| US9499284 | B1 | 2016-11-22 | US9499284 |
| US9409658 | B1 | 2016-08-09 | US9409658 |
| US9266627 | B1 | 2016-02-23 | US9266627 |

**Abstract**

(US9266627)

A method of prospecting asteroids for mining includes (a) launching at least one spacecraft, the spacecraft including a space telescope; (b) examining a plurality of asteroids using the space telescope to gather scientific data on the asteroids for characterization and cataloging; and (c) selecting one or more asteroids to mine from the plurality of asteroids examined by the space telescope and contained within the catalog. A system for prospecting asteroids for mining is also described.

**Inventors**

ANDERSON ERIC

DIAMANDIS PETER H

LEWICKI CHRIS

VOORHEES CHRIS

**Latest standardized assignees - inventors removed**

CONSENSYS SPACE

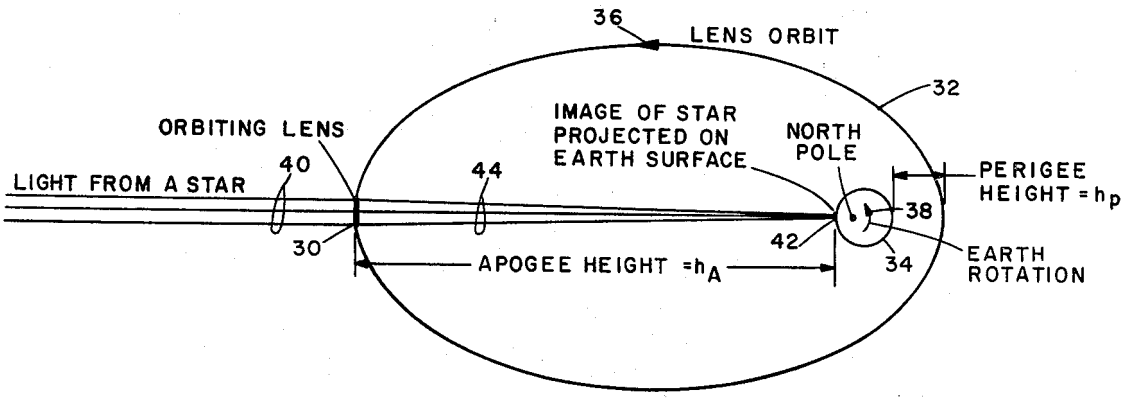
Family 18/20 - FAMPAT - ©Questel

**Title**

(US4453224)

Orbiting objective lens telescope system and method

**Images**




**Publication numbers with kind code & date**

US4453224 A 1984-06-05 US4453224

**Abstract**

(US4453224)

A large objective lens is placed in a highly eccentric orbit about the earth. The orbit and orientation of the lens are carefully chosen so that it focuses light or other radiation from a preselected astronomical object into an image which slowly moves across the surface of the earth. A row of optical sensing units is located on the surface of the earth so that the image focused by the orbiting objective lens will travel substantially perpendicularly across the row during an observation. Output data generated from the sensing units may be multiplexed and fed to a real time processor which produces display signals. Each of the sensing units provides one scan line of the image being observed. The display signals are fed to a suitable display device which produces a picture of the preselected astronomical object. The objective lens may comprise a large flexible Fresnel zone plate or a flexible convex lens carried by a bicycle wheel-type supporting structure. The lens and supporting structure may be unfolded from compact cargo configurations and rotated after being placed into orbit.

**Inventors**

CROOKS JR JAMES W

**Latest standardized assignees - inventors removed**

BANKERS TRUST

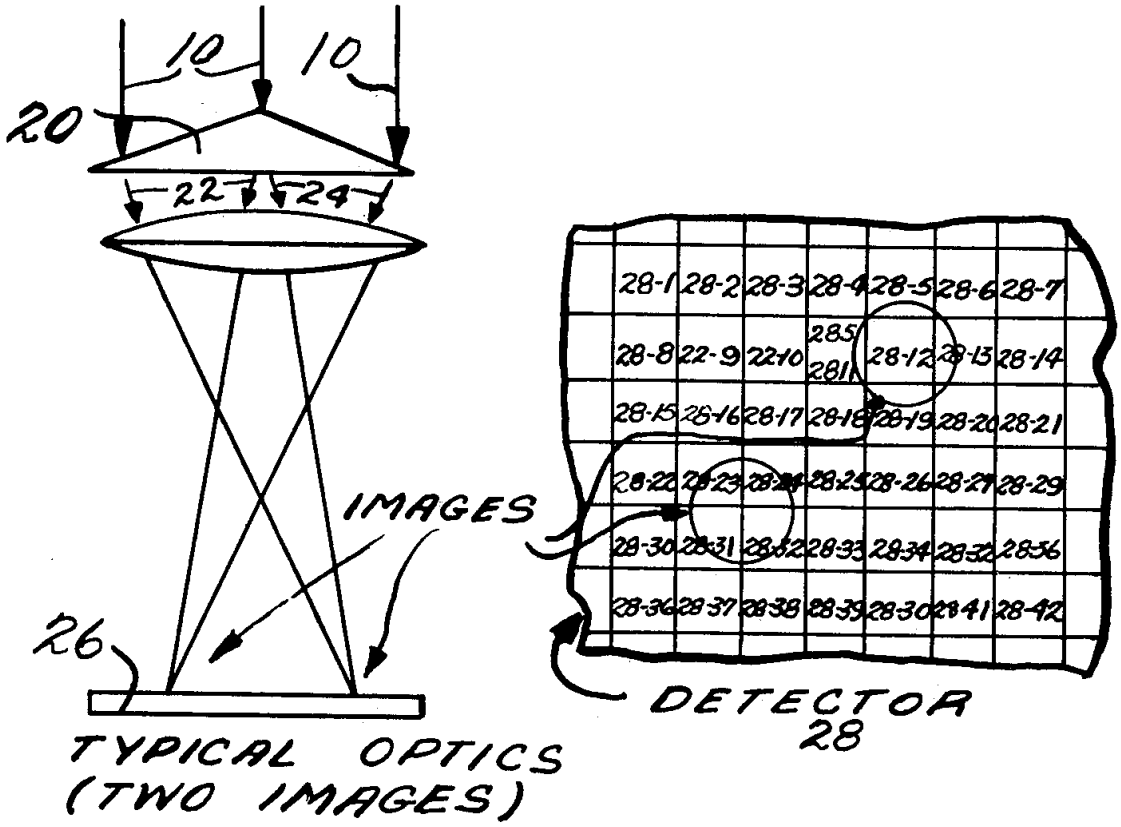
Family 19/20 - FAMPAT - ©Questel

**Title**

(US4330705)

Optical tracking device using interlaced images

**Images**




**Publication numbers with kind code & date**

| | | | |
|---|---|---|---|
| US4330705 | A | 1982-05-18 | US4330705 |

**Abstract**

(US4330705)

A stellar tracking device for providing increased interpolation accuracy for locating the centroid of a stellar image on a charge transfer device (CTD) array. A beam splitter splits the beam from a star being tracked into two separate and distinct beams which are focused by a lens as separate images on the surface of the CTD array. The beam splitter and lens are configured so that the two beams are spatially phase shifted (interlaced) in each axis of the array by one half of a cycle of the transfer function of a group of pixels made up of individual CTD elements. By combining the signals derived from separate subsets of pixels associated with the two separate images, a more linear transfer function for interpolation of the centroid of the beam is achieved than can be obtained by using only a single image.

**Inventors**

KOLLODGE JEROME C

**Latest standardized assignees - inventors removed**

BALL AEROSPACE & TECHNOLOGIES

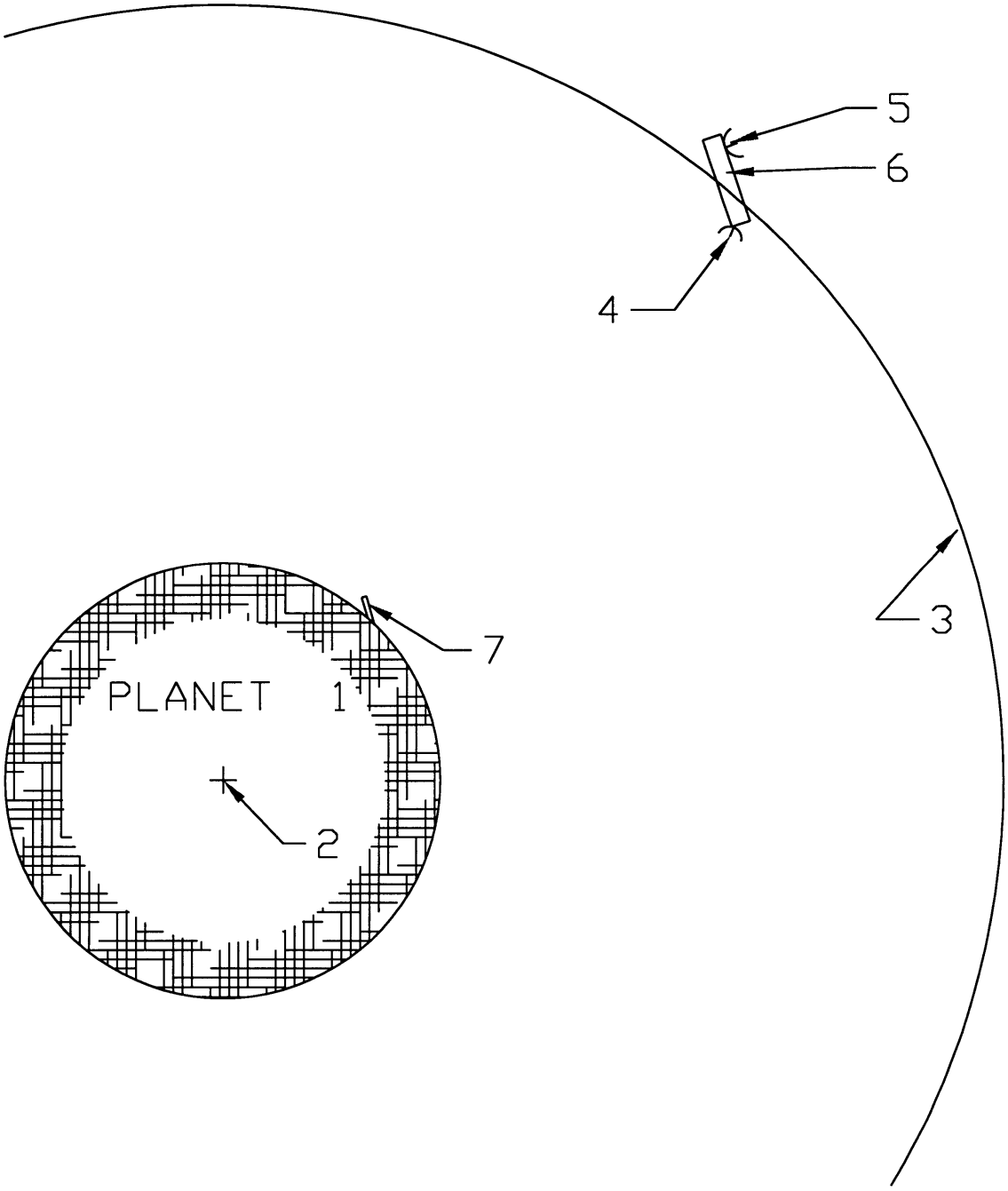
Family 20/20 - FAMPAT - ©Questel

**Title**

(US6452538)

Satellite system for monitoring space

**Images**




**Publication numbers with kind code & date**

US6452538 B1 2002-09-17 US6452538

**Abstract**

(US6452538)

A low-cost satellite system and method for using it for continuously monitoring near space and providing real-time data, both astronomical and space-environmental, is described and claimed. Low cost is achieved by disposing outwardly facing active and passive detection means aboard telecommunications and other satellites, and providing data from such means to subscribers. The system and method enable practical means to monitor space for approaching foreign bodies, providing high quality information for e.g., underfunded educational institutions while making enhanced use of geostationary orbits, a scarce resource, among other benefits.

**Inventors**

HOFFMAN III WILLIAM A

**Latest standardized assignees - inventors removed**

ROBILL PRODUCTS RIDGEWOOD NJ