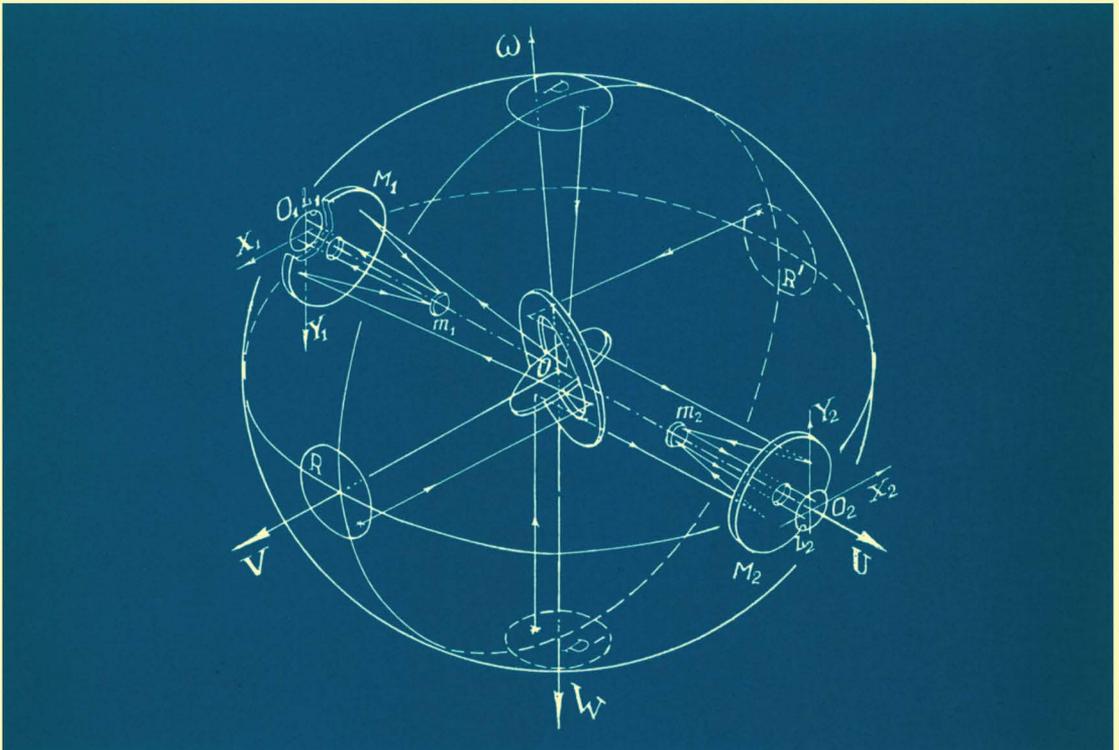


INTERNATIONAL ASTRONOMICAL UNION

SYMPOSIUM No. 141

INERTIAL COORDINATE SYSTEM ON THE SKY

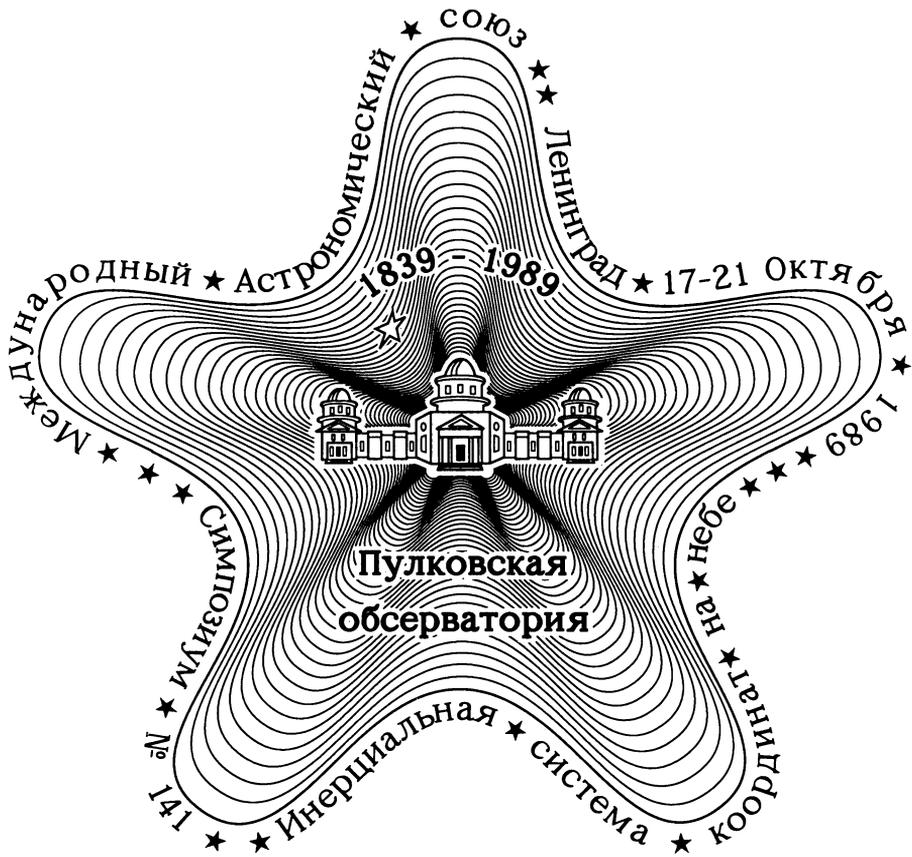
Edited by JAY H. LIESKE and VICTOR K. ABALAKIN



INTERNATIONAL ASTRONOMICAL UNION

KLUWER ACADEMIC PUBLISHERS

INERTIAL COORDINATE SYSTEM ON THE SKY



INTERNATIONAL ASTRONOMICAL UNION
UNION ASTRONOMIQUE INTERNATIONALE

INERTIAL COORDINATE SYSTEM ON THE SKY

PROCEEDINGS OF THE 141ST SYMPOSIUM OF THE
INTERNATIONAL ASTRONOMICAL UNION
HELD IN LENINGRAD, U.S.S.R., OCTOBER 17–21, 1989

EDITED BY

JAY H. LIESKE

*Jet Propulsion Laboratory, California Institute of Technology,
Pasadena, California, U.S.A.*

and

VICTOR K. ABALAKIN

*Central Astronomical Observatory Pulkovo, USSR Academy of Sciences,
Leningrad, U.S.S.R.*



KLUWER ACADEMIC PUBLISHERS

DORDRECHT / BOSTON / LONDON



Library of Congress Cataloging in Publication Data

International Astronomical Union. Symposium (141st : 1989 : Leningrad, R.S.F.S.R.)

Inertial coordinate system on the sky : proceedings of the 141st Symposium of the International Astronomical Union, held in Leningrad, USSR, 17-21 October 1989 / edited by Jay H. Lieske and Viktor K. Abalakin.

p. cm.

At head of title: International Astronomical Union=Union astronomique internationale.

Includes bibliographical references.

ISBN 0-7923-0786-0 (U.S. : alk. paper). -- ISBN 0-7923-0787-9 (U.S. : pbk. : alk. paper)

I. Celestial reference systems--Congresses. I. Lieske, Jay H. II. Abalakin, Viktor Kuz'mich. III. Title.

QB633.I58 1989

525--dc20

90-4538

ISBN 0-7923-0786-0 (HB)

ISBN 0-7923-0787-9 (PB)

*Published on behalf of
the International Astronomical Union
by*

Kluwer Academic Publishers, P.O. Box 17, 3300 AA Dordrecht, The Netherlands.

*Kluwer Academic Publishers incorporates
the publishing programmes of
D. Reidel, Martinus Nijhoff, Dr W. Junk and MTP Press.*

*Sold and distributed in the U.S.A. and Canada
by Kluwer Academic Publishers,
101 Philip Drive, Norwell, MA 02061, U.S.A.*

*In all other countries, sold and distributed
by Kluwer Academic Publishers Group,
P.O. Box 322, 3300 AH Dordrecht, The Netherlands.*

Printed on acid-free paper

All Rights Reserved

© 1990 by the International Astronomical Union

No part of the material protected by this copyright notice may be reproduced or utilized in any form or by any means, electronic or mechanical including photocopying, recording or by any information storage and retrieval system, without written permission from the publisher.

Printed in The Netherlands

TABLE OF CONTENTS

PREFACE	xv
SCIENTIFIC AND LOCAL ORGANIZING COMMITTEES	xvi
LIST OF PARTICIPANTS	xvii
RESOLUTIONS ADOPTED	xxxiii

Part 1

The legacy of Pulkovo for inertial systems and reference frames

INTRODUCTORY REMARKS	
J.H. Lieske	3
CONCLUDING REMARKS	
G. Westerhout	5
THE LEGACY OF THE STRUVES FOR THE ESTABLISHMENT OF AN INERTIAL COORDINATE SYSTEM ON THE SKY	
A.H. Batten	7
PULKOVO OBSERVATORY'S STATUS IN 19TH CENTURY POSITIONAL ASTRONOMY	
K. Krisciunas	15
THE LONGEST GEODETIC ARC: DELISLE, THE STRUVES AND PULKOVO OBSERVATORY	
S. Débarbat	25
PULKOVO OBSERVATORY AND THE NATIONAL OBSERVATORY MOVEMENT: AN HISTORICAL OVERVIEW	
S.J. Dick	29
THE PAST, PRESENT AND FUTURE OF REFERENCE SYSTEMS FOR ASTRONOMY AND GEODESY	
G.A. Wilkins	39
THE IAU WORKING GROUP ON REFERENCE SYSTEMS	
J.A. Hughes	47
THE ORIGIN OF CELESTIAL COORDINATES	
C.A. Murray	51

Part 2

Pulkovo today

THE PULKOVO PROGRAMME FOR THE STUDY OF VISUAL DOUBLE STARS	
A.A. Kisselev, O.P. Bykov, O.A. Kalinichenko, O.V. Kiyayeva, L.G. Romanenko, N.A. Shakht	63

ON THE USE OF STATISTICAL PARALLAXES FOR THE PROPER MOTION REDUCTION N.M. Bronnikova, N.A. Shakht	65
ABSOLUTE DETERMINATIONS OF STAR DECLINATIONS FROM POLE TO POLE V.A. Naumov	67
ON THE PHOTOGRAPHIC VERTICAL CATALOG V.A. Naumov	68
ON THE PROGRAMME OF GROUND-BASED OBSERVATIONS OF BRIGHT SELECTED MINOR PLANETS FOR 1991–2000 Yu.V. Batrakov, V.A. Shor	69
COMPLEX GEODYNAMICAL INVESTIGATIONS IN THE AREA OF THE USSR ACADEMY OF SCIENCES CENTRAL ASTRONOMICAL OBSERVATORY AT PULKOVO V.K. Abalakin, V.I. Bogdanov, Yu.D. Boulanger, V.A. Naumov	72
PULKOVO PROGRAMME FOR THE PHOTOGRAPHIC OBSERVATIONS OF SATELLITES OF PLANETS T.P. Kisseleva, V.V. Bobylev, N.M. Bronnikova, A.A. Dementjeva, O.A. Kalinichenko, A.A. Kisselev, H.I. Potter, S.V. Tolbin, N.A. Shakht	73
CONFOR: A NEW PROGRAM FOR DETERMINING THE CONNECTION BETWEEN RADIO AND OPTICAL REFERENCE FRAMES V.S. Gubanov, I.I. Kumkova, V.V. Tel'nyuk-Adamchuk	75
A PROPOSAL FOR ASTROMETRIC OBSERVATIONS FROM SPACE M.S. Chubey, V.V. Makarov, V.N. Yershov, I.I. Kanayev, V.A. Fomin, Yu.S. Streletsky, A.V. Schumacher	77
ON THE CREATION OF A NEW CATALOGUE FOR USSR TIME SERVICE V.L. Gorshkov, D.D. Polozhentsev, A.A. Popov, N.V. Shcherbakova, A.D. Polozhentsev	81
ON $\Delta\delta_\alpha$ SYSTEMATIC ERRORS OF THE FK5 G.S. Kosin	83
ON THE ORGANIZATION OF ABSOLUTE COORDINATE DETERMINATION OF THE FK5 STARS B.K. Bagildinsky, V.A. Fomin, I.S. Guseva, T.R. Kirian, A.A. Nemiro, G.M. Petrov, G.I. Pinigin, V.D. Shkutov	84
THE FK4 ORIENTATION PARAMETERS DERIVED FROM PHOTOGRAPHIC AND VLBI OBSERVATIONS OF RADIO / OPTICAL OBJECTS V.S. Gubanov, I.I. Kumkova, N.I. Solina	85
EQUATOR AND ECLIPTIC FK5 POSITIONS ON THE BASIS OF SUN AND PLANETS OBSERVATIONS BY THE ERTEL-STRUVE VERTICAL CIRCLE AT THE KISLOVODSK MOUNT STATION A.V. Devyatkin, K.G. Gnevysheva	87
THE NIKOLAEV AXIAL MERIDIAN CIRCLE: THE PRESENT AND FUTURE STATUS O.E. Shornikov, A.V. Shulga, N.S. Liadovoi, S.L. Kashtalian, P.V. Meigurov	88

ON THE PROGRESS OF THE CONSTRUCTION OF THE SUKHAREV MERIDIAN AUTOMATIC HORIZONTAL INSTRUMENT (SMAHI) R.I. Gumerov, V.B. Karpov, T.R. Kirian, N.S. Liadovoi, G.I. Pinigin, A.A. Pozhalov, V.P. Sibilev, A.W. Schumacher, N.A. Shkutova, O.E. Shornikov	89
CONSTRUCTIONS OF ASTROMETRIC INSTRUMENTATION AT PULKOVO OBSERVATORY V.N. Yershov, Yu.S. Streletsky, N.V. Lebedev	91
POSITIONAL OBSERVATIONS OF COMPONENTS OF TRIPLE STARS FOR THE HIPPARCOS AND HST MISSIONS J.P. Anosova, V.V. Orlov	93
PROBLEM OF USING LUNAR POSITIONAL OBSERVATIONS FOR DETERMINATION OF ZERO-POINTS OF FUNDAMENTAL STAR CATALOGUES V.A. Fomin	93
DENSITY FUNCTION OF THE FK4 SYSTEMATIC ERRORS V.S. Gubanov, N.I. Solina	94
ON THE TIE OF ASTROMETRIC RADIO SOURCES TO THE FK4 SYSTEM WITH ZENITH TELESCOPE ZTL-180 OBSERVATIONS E.Ya. Prudnikova	94
CIRCLE READING DEVICE OF THE MERIDIAN INSTRUMENT WITH A SELF- INSTALLED ZERO-POINT G.I. Pinigin, Y.A. Bubnov, A.W. Shumacher	94
MODIFIED METHOD OF KREJNINA-MURRI FOR THE DETERMINATION OF ABSOLUTE DECLINATION S.A. Tolchelnikova-Murri	95
ON THE DEFINITION OF AN "INERTIAL COORDINATE SYSTEM" S.S. Peruansky	95
CONTRIBUTION OF SOVIET-BOLIVIAN ASTRONOMICAL OBSERVATORY IN THE CONSTRUCTION OF THE INERTIAL COORDINATE SYSTEM D.D. Polozhentsev, H.I. Potter, L.I. Yagudin, J.A. Zelaya, R.F. Zalles	96
THE PROBLEM OF THE LEVELING OF THE RESERVED NET OF ARCS AT THE CELESTIAL SPHERE BY THE CONSTRUCTION OF THE REFERENCE COORDINATE SYSTEM E.I. Yagudina	96

Part 3

Concepts, Definitions, Models

THE CELESTIAL REFERENCE SYSTEM IN RELATIVISTIC FRAMEWORK Han Chun-Hao, Huang Tian-Yi, Xu Bang-xin	99
GENERAL RELATIVISTIC DESCRIPTION OF CELESTIAL REFERENCE SYSTEMS A.V. Voinov	111
RELATIVISTIC REFERENCE FRAMES OF LOCAL OBSERVER AND SPACE RADIOINTERFEROMETER A.N. Alexandrov, S.L. Parnovsky, V.I. Zhdanov	115

THE OPTIMUM CONVENTIONAL TERRESTRIAL SYSTEM DETERMINED BY VLBI AND SLR STATIONS W. Kosek, B. Kolaczek	118
THE CELESTIAL SYSTEM OF THE INTERNATIONAL EARTH ROTATION SERVICE E.F. Arias, M. Feissel	119
A NEW CONCEPT OF CONSTRUCTING AN ACCURATE COORDINATE SYSTEM FROM GROUND-BASED OPTICAL OBSERVATIONS Mao Wei, Hu Xiaochun, Guo Xinjian, Fan Yu	129
TRANSFORMATION OF THE MEAN PLACE FROM FK4 TO FK5 M. Sôma, S. Aoki	131
THE COMPUTATION OF MEAN POSITIONS AND PROPER MOTIONS C.S. Cole	137
CAN WE DEFINE AN INERTIAL REFERENCE SYSTEM? Li Linghuai, Tong Fu	141
THE ROLE OF OBSERVATION WITH HORIZONTAL MERIDIAN CIRCLE IN CHINA FOR ESTABLISHING AN INERTIAL FRAME Li Zhi-gang, Qi Guan-Rong	142
ON THE PROBLEM OF THE DEVELOPMENT OF ASTRONOMICAL REFRACTION METHODOLOGY ON THE BASIS OF NEW TECHNOLOGY V.I. Sergienko	142
DETERMINATION OF REFRACTION AND PROGRESS OF FUNDAMENTAL ASTROMETRY A.Yu. Yatsenko	143
PRECISION OF STUDIES FROM ASTROMETRIC OBSERVATIONS: RECENT PROGRESS AND FUTURE PROSPECTS Li Zheng-xin	145
NUTATION THEORY FOR A NON-RIGID EARTH: PRESENT STATUS AND FUTURE PROSPECTS J. Wahr	147
PROPOSALS FOR AN IMPROVED NUTATION FORMULA E. Groten, S.Y. Zhu	148
THE RESULTS OF THE RECONSTRUCTION OF THE COEFFICIENTS OF THE NUTATION FOR THE RIGID EARTH MODEL AND THEIR COMPARISON WITH NUMERICAL INTEGRATION J. Souchay, H. Kinoshita	149
THE DETERMINATION OF THE PRINCIPAL NUTATION TERMS FROM THE OBSERVATIONS WITH ZTF-135 IN 1948.7-1989.0 L.A. Glebova, L.D. Kostina, Z.M. Malkin, N.R. Persiyaninova	153
CORRECTIONS TO THE IAU 1980 NUTATION SERIES FROM LAGEOS OBSERVATIONS V.K. Tarady	155
OCEANIC INFLUENCES ON THE ANGULAR VELOCITY OF THE EARTH P. Brosche	156

THE PROGRAM COMPLEX “KIEV—GEODYNAMIC R1” M.M. Medvedsky	156
CURRENT STATE OF THE THEORY OF NUTATION S.M. Molodenskij	156
THE STUDY OF THE STRUCTURE OF 142-YEAR SERIES OF POLE COORDINATES L.V. Rykhlova, G.S. Kurbasova	157
DETERMINATION OF NUTATION BASED ON OBSERVATIONS WITH THE PULKOVO POLAR TUBE O.V. Kotreleva	160
CAN THE CORE-MANTLE BOUNDARY TOPOGRAPHY INFLUENCE THE EARTH’S NUTATION? V.V. Bykova	161
ON THE CALCULATION OF LOW FREQUENCY OSCILLATIONS OF THE EARTH’S CORE S.V. Dyakonov	163
MEAN POLE OF THE MOON’S ROTATIONAL AXIS AND THE GENERAL SELENOCENTRIC COORDINATE SYSTEM Barkin, Yu.V.	165
ON THE ASTROMETRICAL METHODS V.G. Shkodrov, V. Ivanova	166
REFERENCE SURFACES AND GLOBAL FIGURE PARAMETERS OF THE TERRESTRIAL PLANETARY BODIES K.K. Kamensky	167
POSSIBLE CONTRIBUTIONS OF CLASSICAL ASTROMETRIC INSTRUMENT TO THE STUDY OF GEOSCIENCE AND REQUIREMENTS ON STAR CATALOGUES Han Yanben, Li Zhisen	169
DYNAMICAL REFERENCE FRAMES IN THE PLANETARY AND EARTH-MOON SYSTEMS E.M. Standish, J.G. Williams	173
THE MAIN STAGES OF THE CONSTRUCTION OF AE89— THE NUMERICAL EPHEMERIDES OF THE PLANETS AND THE MOON M.L. Belikov, V.N. Boyko, N.I. Glebova, G.I. Eroshkin, L.I. Rumyantseva, M.L. Sveshnikov, E.S. Sveshnikova, R.I. Smekhacheva, A.A. Trubitsyna, M.A. Fursenko, L.I. Chunaeva, A.A. Shiryaev	183
EFFECT OF THE NEW EQUINOX DEFINITION ON THE ZERO-POINT OF LONGITUDE OF THE INDIAN CALENDAR A.K. Bhatnagar	186
THE CONSTRUCTION OF A FRAME OF HOMOGENEOUS ACCURACY BASED ON SPACE OBSERVATIONS B.I. Vlasov	186
HIGH ACCURACY ALGORITHMS OF NUMERICAL PREDICTION OF THE MOTION OF SOLAR SYSTEM BODIES T.V. Bordovitsyna, V.A. Shefer	187

ON THE ERRORS OF THE EPHEMERIDES DERIVED FROM OPTICAL OBSERVATIONS OF PLANETS A.S. Kharin, Yu. B. Kolesnik	189
DIFFERENCES BETWEEN DYNAMIC AND STELLAR REFERENCE FRAMES: RESULTS BASED ON ASTROMETRIC OBSERVATIONS OF MARTIAN SATELLITES N.V. Emel'yanov, Yu.F. Kolyuka, S.M. Kudryavtsev, K.V. Kuimov, V.F. Tikhonov, V.V. Chazov	191
THE POSSIBILITY TO LINK RADIO AND OPTICAL REFERENCE FRAMES WITH ARTIFICIAL SATELLITES Tong Fu	194
ANCIENT CHINESE ASTRONOMICAL OBSERVATIONS RELATED TO THE STELLAR BACKGROUND IN THE SKY Wu Shou-xian, Liu Ci-yuan	195
SIDEREAL YEARS—CATALOGUE USES IN ARCHAEOASTRONOMY K. Barlai, I. Ecsedy	197
IMPROVED METHOD FOR ORBITAL ELEMENTS DIFFERENTIAL CORRECTION A. López García, J.A. López Ortí, R. López Machí	199
ON THE LUNAR SECULAR ACCELERATION: A POSSIBLE APPROACH V. Protitch-Benishek, M.B. Protitch	201
FLUCTUATIONS OF THE EARTH'S ROTATION BY STELLAR OCCULTATIONS C. Jordi , G. Rosselló	203
SYSTEMATIC ASTROMETRIC ERRORS IN PULSAR TIMING L. Fairhead	205
PULSAR ASTROMETRY—AVAILABILITIES AND RELATIVISTIC ASPECTS OF A PULSAR REFERENCE FRAME O.V. Doroshenko, Yu.P. Ilyasov, S.M. Kopejkin, M.V. Sazhin	213
POINTS: A GLOBAL REFERENCE FRAME OPPORTUNITY J.F. Chandler, R.D. Reasenberg	217
RELATIVISTIC REDUCTION OF ASTROMETRIC OBSERVATIONS AT POINTS LEVEL OF ACCURACY V.A. Brumberg, S.A. Klioner, S.M. Kopejkin	229
ASTROMETRIC INTERFEROMETRY— CAN IT ESTABLISH A FUNDAMENTAL SYSTEM? G.H. Kaplan	241

Part 4

Realization and comparison of reference frames

THE DEFINITION AND STABILITY OF LOCAL INERTIAL REFERENCE FRAMES R.N. Truhaft, S.T. Lowe	253
AN EXTRAGALACTIC REFERENCE FRAME FROM DSN VLBI MEASUREMENTS — 1989 O.J. Sovers	261

REALIZATION OF AN INERTIAL REFERENCE FRAME FROM MARK III VLBI Chopo Ma	271
A PROGRESS REPORT ON THE ESTABLISHMENT OF THE RADIO / OPTICAL REFERENCE FRAME J. L. Russell, K. J. Johnston, C. de Veigt, N. Zacharias, C. Ma, D. Shaffer, D.J. Jauncey, J. Reynolds, G. White, G. Nicolson, A. Kembal, R. Hindsley, J. Hughes	281
CORRECTIONS TO THE LUNI-SOLAR PRECESSION FROM RADIO POSITIONS OF EXTRAGALACTIC OBJECTS H.G. Walter	285
DEDICATED SOVIET VLBI-NETWORK "QUASAR" A.M. Finkelstein, G.S. Golubchin, V.M. Gorodetsky, V.G. Grachev, V.S. Gubanov, A.V. Ipatov, M.N. Kaidanovsky, E.I. Korkin, E.I. Nikolaev, S.G. Smolenzev, A.A. Stotsky, N.D. Umarbaeva, Ya.S. Yatskiv	293
A NEW APPROACH TO THE CONSTRUCTION OF A COMPILED CATALOGUE OF POSITIONS OF EXTRAGALACTIC RADIO SOURCES Ya.S. Yatskiv, A.N. Kuryanova	295
IN-ORBIT STATUS OF THE HIPPARCOS ASTROMETRY MISSION M.A.C. Perryman	297
THE TYCHO PROJECT ON-BOARD THE HIPPARCOS SATELLITE E. Høg	307
HIPPARCOS AND REFERENCE SYSTEMS F. Mignard	311
A STRATEGY FOR LINKING HIPPARCOS TO AN EXTRA-GALACTIC REFERENCE FRAME A.N. Argue	323
THE REFERENCE FRAME DETERMINED FROM THE OBSERVATION OF MINOR PLANETS BY HIPPARCOS B. Morando, A. Bec-Borsenberger	329
ON THE IMPROVEMENT OF THE SYSTEM OF FUNDAMENTAL CATALOGUES BASED ON ASTEROID OBSERVATIONS D.P. Duma, P.M. Fedij	337
EXPECTATIONS FOR ASTROMETRY WITH THE HUBBLE SPACE TELESCOPE R.L. Duncombe, W.H. Jefferys, G.F. Benedict, P.D. Hemenway, P.J. Shelus	339
SPACE ASTROMETRY AND THE HST WIDE FIELD/PLANETARY CAMERA P.K. Seidelmann	347
THE LOMONOSOV PROJECT FOR SPACE ASTROMETRY V.V. Nesterov, A.A. Ovchinnikov, A.M. Cherepashchuk, E.K. Sheffer	355
REGATTA-ASTRO PROJECT : ASTROMETRIC STUDIES FROM SMALL SPACE LABORATORY G.A. Avanesov, V.A. Vavaev, Ya.L. Ziman, A.Yu. Kogan, V.I. Kostenko, V.A. Krasikov, V.P. Fedotov, V.N. Khejftetz, Yu.M. Chesnokov	361

ON THE ROLE OF STAR CATALOGUES FOR AUTONOMOUS SPACE NAVIGATION V.V. Ivashkin	367
THE USNO (FLAGSTAFF STATION) CCD TRANSIT TELESCOPE AND STAR POSITIONS MEASURED FROM EXTRAGALACTIC SOURCES R.C. Stone, D.G. Monet	369
THE FK5: PRESENT STATUS AND SOME DERIVED RESULTS H. Schwan	371
CELESTIAL COORDINATE SYSTEM AND THE FK5 CATALOGUE A.P. Gulyaev	383
SYSTEMATIC DIFFERENCES INSTRUMENT MINUS FK5 IN THE SOUTHERN HEMISPHERE G. Carrasco, P. Loyola	385
EFFECT OF THE FK5 – FK4 CATALOGUE CORRECTIONS FOR THE OBSERVATIONS OF THE PHOTOELECTRIC ASTROLABE AT SHANGHAI OBSERVATORY Xu Tong-Qi, Li Zheng-Xin	387
DIFFERENCES IN CHANGES OF BOROWIEC GEOGRAPHICAL COORDINATES CAUSED BY THE REPLACEMENT OF FK4 CATALOGUE BY FK5 M. Lehmann	389
OPTICAL REFERENCE FRAME DEFINED BY CARLSBERG MERIDIAN CATALOGUE LA PALMA NUMBER 4 L.V. Morrison, R.W. Argyle, L. Helmer, C. Fabricius, O.H. Einicke, L. Quijano, J.L. Muiños	391
FIRST RESULTS FROM THE NEW MICROMETER ON THE CARLSBERG AUTOMATIC MERIDIAN CIRCLE C. Fabricius, L. Helmer, O.H. Einicke, L.V. Morrison, M.E. Buontempo, R.W. Argyle, L. Quijano, J.L. Muiños	403
THE CONSTRUCTION OF 4 DENSE ASTROMETRIC STANDARD AREAS WITH THE CARLSBERG AUTOMATIC MERIDIAN CIRCLE G. Chiumiento, C. Fabricius, M.G. Lattanzi, G. Massone	406
PROPER MOTIONS WITH RESPECT TO THE EXTRAGALACTIC REFERENCE FRAME A.R. Klemola	407
THE YALE-SAN JUAN SOUTHERN PROPER MOTION PROGRAM (SPM) W.F. van Altena, T. Girard, C.E. López, J.A. López, E. Molina	419
CORRECTION TO ABSOLUTE PROPER MOTION USING THE IAS-GALAXY MODEL K.U. Ratnatunga	427
PHYSICAL DATA OF THE FUNDAMENTAL STARS Luo Ding-jiang, Zhang Bao-cai	430
REALIZATION OF THE LOCAL INERTIAL GEOCENTRIC FRAME IN RELATIVITY He Miao-Fu, Huang Cheng	430
THE GENERAL CATALOGUE OF STELLAR PROPER MOTION WITH RESPECT TO GALAXIES WITH ASTROPHYSIC SUPPLEMENT N.V. Kharchenko	431

FAINT REFERENCE STARS T.E. Corbin, S.E. Urban	433
ASTROMETRY WITH THE TAUTENBURG SCHMIDT TELESCOPE K-G. Steinert.....	443
COMPARISON OF ASTROMETRICAL ACCURACY OF BIG SCHMIDT TELESCOPES E. Schilbach, S. Hirte, J-L. Heudier	449
DETERMINATION OF ABSOLUTE PROPER MOTIONS BY USE OF AUTOMATED MEASUREMENTS OF TAUTENBURG PLATES R.-D. Scholz	451
OPTICAL ASTROMETRY OF EXTRAGALACTIC RADIO SOURCES WITH THE TAUTENBURG SCHMIDT TELESCOPE W.R. Dick, I.I. Kumkova	453
CCD PARALLAXES FOR FAINT SOUTHERN HIGH PROPER MOTION STARS C. Anguita, M.T. Ruiz	455
A COMPARISON OF THE ACCURACY OF THE DETERMINATION OF RIGHT ASCENSION BY MEANS OF TRANSIT INSTRUMENTS OF DIFFERENT TYPES S.P. Izmailov, N.G. Litkevich, S.N. Sadzakov, V.D. Simonenko, S.A. Tolchelnikova-Murri, V.I. Turenko	456
INDIVIDUAL STAR CATALOGUES OF THE UNIFIED TIME SERVICE OF KHARKOV SCIENTIFIC AND RESEARCH INSTITUTE AND KHARKOV UNIVERSITY ASTRONOMICAL OBSERVATORY S.P. Izmailov, N.G. Litkevich, V.D. Simonenko and V.I. Turenko	456
THE KHARKOV RIGHT ASCENSION CATALOG OF DOUBLE STARS AND HIGH LUMINOSITY STARS FOR THE DECLINATION ZONE +30° TO +90° V.M. Kirpatovskij.....	456
THE SRS CATALOG OF 20,488 STAR POSITIONS: CULMINATION OF AN INTERNATIONAL COOPERATIVE EFFORT C.A. Smith, T.E. Corbin, J.A. Hughes, E.S. Jackson, E.V. Khrutskaya, A.D. Polozhentsev, D.D. Polozhentsev, L.I. Yagudin, M.S. Zverev	457
PPM : A TOOL FOR ASTRONOMERS U. Bastian	465
THE SYSTEM OF THE PPM CATALOGUE S. Röser.....	469
THE MACHINE-READABLE DURCHMUSTERUNGEN: CLASSICAL CATALOGS IN CONTEMPORARY FORM W.H. Warren Jr, F. Ochsenbein, B.N. Rappaport	479
THE SECOND CAPE PHOTOGRAPHIC CATALOGUE: CPC2 C.A. Murray, M.J. Penston, N. Zacharias, Chr. de Veigt	482
AN ASTROMETRIC CATALOG OF FOUR MILLION STARS V.V. Nesterov, V.S. Kislyuk, H.I. Potter	482

A COMPREHENSIVE ASTROMETRIC DATA BASE: AN INSTRUMENT FOR COMBINING EARTH-BOUND OBSERVATIONS WITH HIPPARCOS DATA R. Wielen	483
A PRESENTATION OF THE WORK PERFORMED WITH THE BELGRADE LARGE MERIDIAN CIRCLE DURING THE PERIOD 1968–1988 S. Sadžakov, Z. Cvetković, M. Dačić	489
THE FLAGSTAFF MEASURING MACHINE G. Westerhout, D. Monet	491
CURRENT STATUS OF THE PROJECT OF PHOTOGRAPHIC FOURFOLD COVERAGE OF THE NORTHERN HEMISPHERE OF SKY V.S. Kislyuk	493
THIRD PRELIMINARY CATALOGUE OF STARS OBSERVED WITH THE PHOTOELECTRIC ASTROLABE Lu Lizhi	495
THE ESTABLISHMENT OF AN ASTROMETRIC STANDARD REGION IN THE NGP: STAR CATALOGUE L.K. Pakulyak	497
RESEARCH ON THE ERRORS IN DETERMINATION OF PRECISE OPTICAL POSITIONS OF RADIO SOURCES Lu Chun-lin, Li Dong-Ming	499
TORINO PROGRAMME ON RADIOSOURCES ASTROMETRY: PROGRESS REPORT G. Chiumiento, M.G. Lattanzi, G. Massone, R. Morbidelli, R. Pannunzio, M. Sarasso	501
OCCULTATION OF RADIO SOURCES FOR THE LINKAGE OF RADIO AND STELLAR REFERENCE FRAMES M. Sôma, M. Miyamoto, S. Aoki	503
COMPARISON OF OPTICAL AND RADIO POSITIONS OF STARS L.V. Morrison, R.W. Argyle, Y. Réquière, J.M. Mazurier	513
COMPARISON OF PROPER MOTIONS OF STARS FROM AGK3 AND SPECIAL COMPILED CATALOGUE IN REGIONS WITH GALAXIES S.P. Rybka	515
AN ADVANCED ASTROMETRIC SENSOR ARRAY D.G. Monet, H.D. Ables	517
MODERNIZATION OF CHINESE PHOTOELECTRIC ASTROLABES AND IMPROVEMENT OF OPTICAL REFERENCE SYSTEM Li Dong-Ming, Wang Hong-Qi, Zhao Gang, Wang Ze-Zhi, Wang Rui	519
INDEX	521