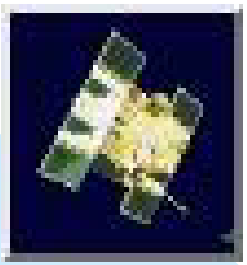


GPS Activities at BUCU Permanent Station Status Report - 2003

Tiberiu RUS , Johan NEUNER

Technical Univ. of Civil Engineering Bucharest
Faculty of Geodesy

- 1. Introduction
- 2. Station Configuration
- 3. Data Flow
- 4. Projects
- 5. Future Plans
- References

1. Introduction

- GPS Permanent Station ***Bucu*** was first GPS permanent station installed in Romania in February 1999 by **BKG** (Federal Agency for Cartography and Geodesy) Frankfurt a.M., Germany and Technical University of Civil Engineering (TUCE), Faculty of Geodesy Bucharest (**FGB**) in the frame of *CERGOP* (Central European Regional Geodynamic Project);
- The station improved EPN network in the Central European area;
- The main goal of the station is to collect and deliver GPS static data, to EUREF and IGS, hourly and daily (at 30s interval);
- New facility > DGPS data (RTCM 2.0 format) - 1s interval by internet to BKG, Frankfurt a.M. – *Project EUREF-IP*;
- No meteo data from Bucu GPS permanent station.

2. Station Configuration

HARDWARE

•GPS receiver **ASHTECH Z-XII-3**;

• **ASHTECH DORNE MARGOLINE** (700936 D_M radom) antenna;

• data storage **computer Fujitsu** (2Gb, 200MHz, 64Mb RAM);

• communication systems: **internet** (ftp data transfer) and as a spare **GSM modem** (Falcom A2);

• **"watch dog"** in case of power failures;

• power supply;

• air conditioning inside the station;

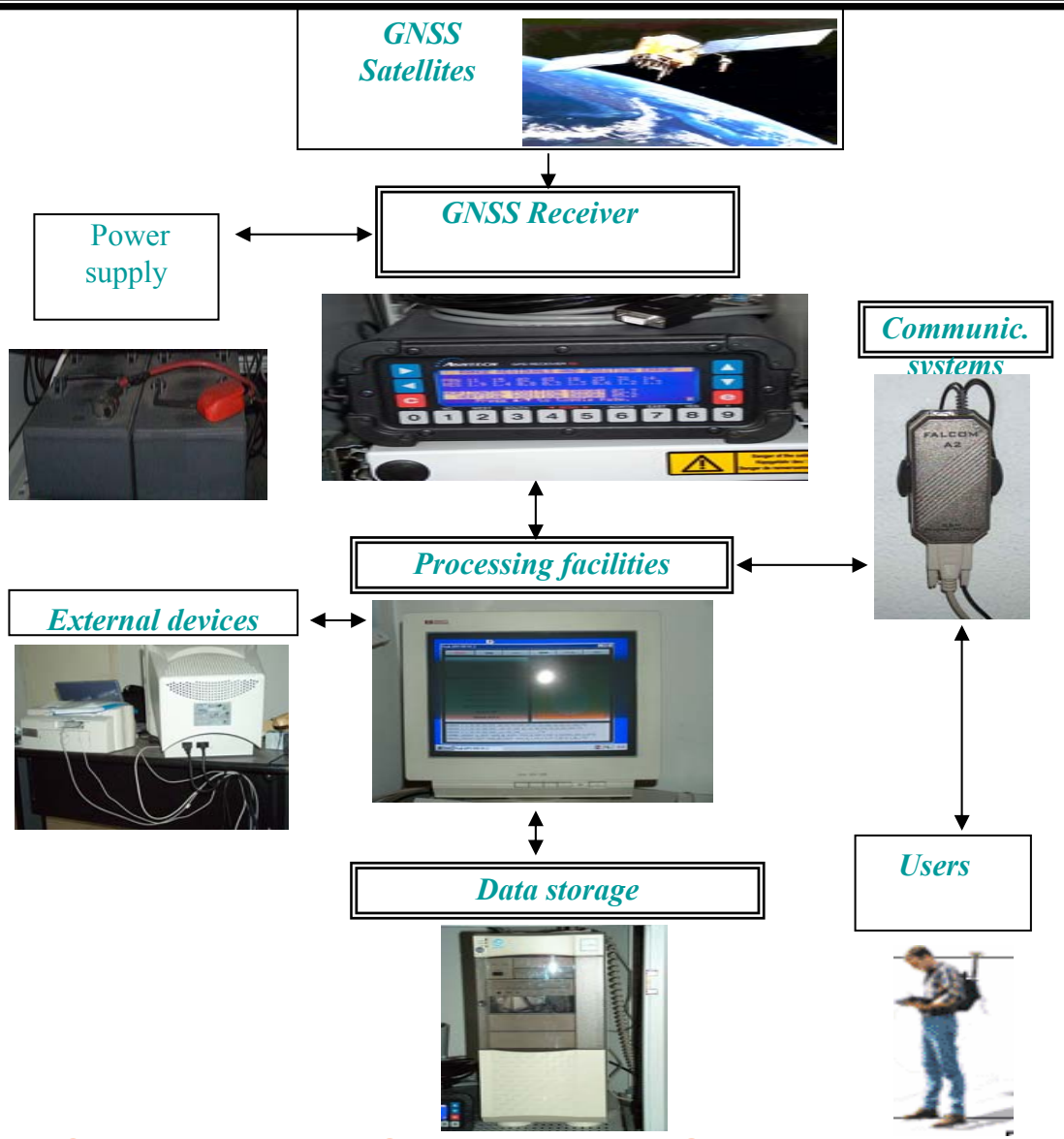
SOFTWARE

• **Win NT4.0 (SP3)** operating system;

• **GPS-Base (Terrasat)** – GPS data management software;

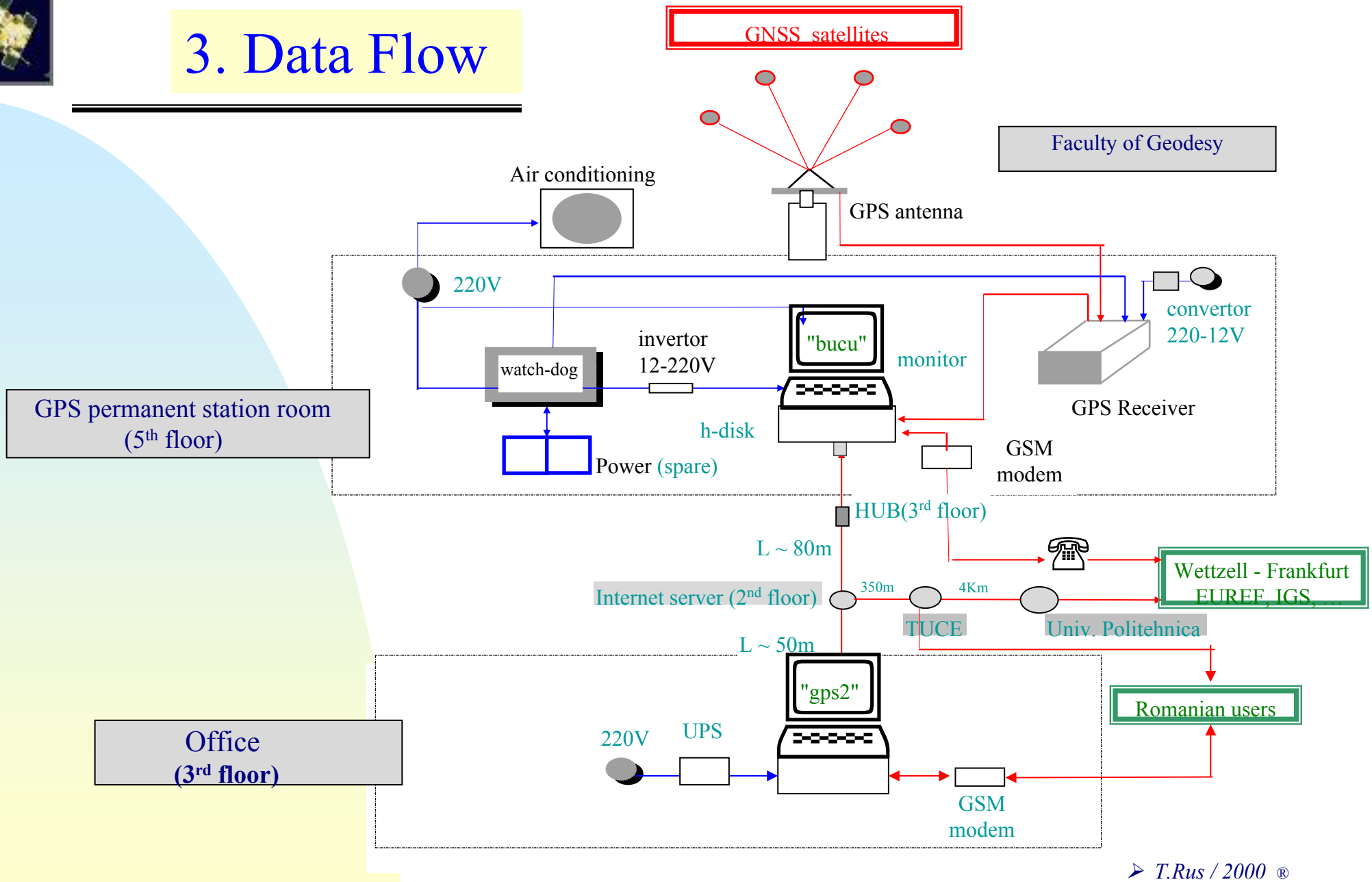
• **PolyPm** – Remote Services Management Professional Edition 4.2A – remote management software.

•**A deformation network** (composed of 4 ground markers) around the Bucu station was established in order to observe the possible local deformation of the antenna pillar.



2. Station Configuration

3. Data Flow



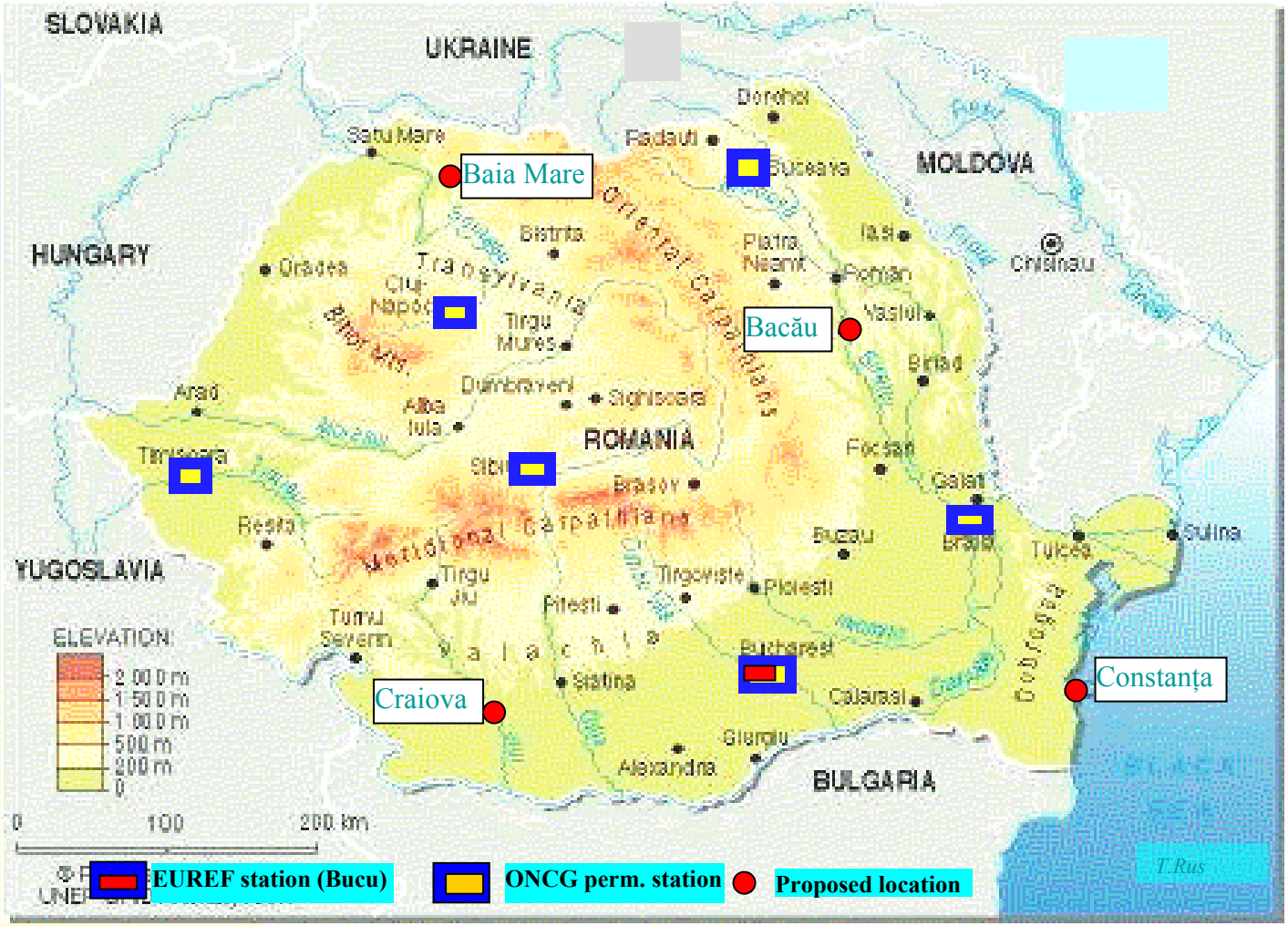
➢ *T.Rus / 2000* ®

4. Projects - *Bucu*

- **EUREF special projects - BUCU station included in:**
  - *"GPS Permanent Stations Time Series Monitoring";*
  - *EUREF-IP project – starting from June 2003 – DGPS data – RTCM 2.0 data*
  - DGPS data for car navigation and real-time monitoring – Garmin 35 receiver;
- **Geodynamic Projects:**
  - CERGOP - Central European Regional Geodynamics Project – CGS11 (CERGOP Group Study) – *"Plate Kinematics in Romania"* – GPS data for CEGRN"99,2001,2003 campaigns;
  - Geodetic Institute Karlsruhe (GIK) network established in Romania for geodynamic purposes combined with earthquake research in *Vrancea* region - GPS data for 2000,2003 campaigns;
- **Romanian Array of GPS Permanent Network:**
  - Bucu permanent station can contribute to the Romanian GPS Permanent Network (5+1 stations in 2003);
- **Other Research Projects:**
  - *"Studies and Systems for Romanian Participation to the GNSS-Galileo (ESA – EC)"* project, promoted by Romanian Space Agency and realized by a consortium of state (university and aviation) and private companies (geodesy, GIS);
  - GPS data from Bucu for aerotriangulation projects inside Romania, geodetic and cadastral networks, GIS et al.;
  - Local deformation network around Bucu station;
  - GPS data for PhD and Diploma thesis studies;

5. Future Plans

GPS PERMANENT STATIONS IN ROMANIA



5. Future Plans

- To continue to maintain and to improve the BUCU permanent station performances by: new computer with better performances, GPS firmware software update, meteorological instrument installed, RTK data spreading, DGPS data improved format; if possible – new ***GPS/GLONASS receiver*** (to join IGLOS project);

- To participate in new *international* projects. In this direction we like to join the **SCIGAL**: Earth Applications Using ***GALILEO*** group, as a Romanian representative academic research centre. Following the format in *Expression of interest submitted in response to Call EOI.FP6.2002, for an Integrated Project from June 2002*, FGB propose to be included in the Consortium ;

- To join CEI (Central European Initiative) WGST Section C "Geodesy" – Working Group on "Satellite Navigation Systems"(SNS) proposals regarding the cooperation on SNS;

- To continue with better performances the participation on **EUREF – IP** project: RTK data dissemination, DGPS data in RTCM 2.2(3)format;

- To participate in ***national* GNSS research projects** as *"Studies and Systems for Romanian Participation to the GNSS-Galileo (ESA – EC)"* project, promoted by Romanian Space Agency;

5. Future Plans

❖Based on theoretical and practical experience (including data processing with Bernese software at BKG) we ***propose to establish a LAC (Local Analysis Centre) at FGB*** including:

- Data (post)processing from few neighbor EPN station and future stations;
  - Data (post)processing from international projects as CERGOP;
  - Data (post)processing from national array of GPS permanent stations.

Romanian LAC will be situated at TUCE – FGB including all the "Bucu" permanent station facilities (hardware, software, communications) and other required facilities (scientists, computers, office) offered by our University.;

•The unsolved requirements would be the *Bernese software* and some help in BPE (Bernese Processing Engine) installation;
•This LAC will cover a "white" area from Europe regarding GPS/GNSS data processing.




Thank you !

Contact:

E-mail: neuner@geodezie.utcb.ro; rus@hidro.utcb.ro

http://www.geodezie.utcb.to **(Faculty of Geodesy www site)**

http://193.231.4.70 **(Bucu GPS permanent station site)**

5. References

- Becker M., Reinhart E., Neumaier P., Seeger H., Rus T., Ghiţău D., Marcu C., Rădulescu F., Roşca V.: Technical Report, "*German And Romanian Activities In The Frame of CERGOP",* Mitteilungen des Bundesamt fuer Kartographie und Geodaesie, Band 12, 1999;

- Ghitau D., Rus T., *First GPS Permanent Station in Romania*, Scientific Bull. Technical Univ. of Civil Engineering Bucharest, No.1, 2000;

- Rus T., Becker M., *Data Evaluation of the CEGRN-99 GPS Campaign at BKG Processing Centre - Romania"99,* EGS Symposium, 2000, Nice, France;

- Rus T., Neuner J., GNSS *Applications in Technological and Natural Hazard Areas*, Regional Workshop on the Use of Space Technology for Disaster Management for Europe,19-23 May 2003, Brasov, Romania;

- Rus T., Somardolea I., *Kinematic GPS Applications for Aerotriangulation*, IAG2001 Symposium, 2-7 September, 2001, Budapest, Hungary;

- http://193.231.4.70:8888 (Bucu permanent station www site);
- http://www.geodezie.utcb.ro; (Faculty of Geodesy Bucharest site);