

INTERNATIONAL TRAINING ON TOPONYMY

MODULES

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MODULE 5a

Geographical Names Collection Systems

SINAR: A Tool Field Collection of Geographical Names

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5a.1 SINAR (Sistem Informasi Nama Rupabumi - Geographical Names Information System)

The Geographical Names Information System, known as SINAR (*Sistem Informasi Nama Rupabumi*), is a vital tool for standardizing geographical names in Indonesia. Formerly, the standardization of geographical names in Indonesia was carried out manually, involving several tools for collecting geographical names, namely GPS handheld devices, cameras, sound recorders, and printed maps. However, in the mid-2010s, the collection forms for geographical names underwent a process of standardization, resulting in the development of a specific set of forms, namely *Form A*, *Form B*, and *Form C*. *Form A* served as a repository for the initial data provided by local or national authorities, whereas *Form B* constituted a detailed form designed for capturing information about individual geographical names. Lastly, *Form C* played a crucial role in data verification recapitulation.

In 2012, the Geospatial Information Agency (BIG) pioneered the exploration of novel methodologies for acquiring toponym data. This innovative approach leveraged open-source applications such as GPS Essential and Quantum GIS, aiming to optimize the efficiency and convenience of the data collection process.

The subsequent year, in 2013, a dissemination system was established via the website <https://namarupabumi.org>. The web platform served the crucial purpose of disseminating the geographical names collected throughout Indonesia.

Throughout the application of the manual method, BIG recognizes local government needs in the Geographical Names collection associated with natural features. BIG collaborated closely with a select group of experts and other members of the National Team for the Standardization of Geographical Names in 2014 to resolve the problem. This collaborative effort culminated in the development of a cutting-edge toponym data acquisition system known as “Topkit”. *Topkit* required a running GNSS RTK device to operate properly, a constraint that proved inconvenient during fieldwork operations. *Topkit* was integrated as an embedded application within the GNSS RTK receiver.

Building upon previous advancements, BIG embarked on the development of a digital geographical name collection application for Android and web-based platforms in early 2016. This application's primary objective, SAKTI (*Sistem Akusisi Toponim Indonesia - Toponym Data Acquisition System*), was to replace the requirement for multiple surveying equipment with a single device, thereby streamlining the data collection process. The SAKTI application encompassed functionalities such as GPS handheld capabilities, a camera, and a sound

recorder and facilitated access to printed maps within the Android-based data collection application.

In 2018 the early stage of SINAR development was initially designed only for disseminating Geographical Names data. The data collection and verification are performed through SAKTI in Android and web-based applications. In the same year, Indonesia conducted official training sessions to empower local authorities to effectively utilize the SAKTI application for data collection within their respective regions. This training initiative provided a valuable opportunity for BIG to receive feedback and further refine the application's features.

Furthermore, in 2020, the SAKTI and SINAR system was integrated into SINAR as a single web-based and Android-based application for data collection, verification, and publication. The Android app was purposefully tailored for capturing geographical names data, with seamless synchronization of the captured data to the web-based platform for subsequent verification and standardization processes. The Android version of the application was readily accessible via the Google Play Store, while the web-based application could be accessed through the dedicated website: <https://sinar.big.go.id/>. It is worth noting that an iOS version of the application was not yet available at that time, but its development was under consideration for future implementation.

On January 6, 2021, the Indonesian government enforced Regulation Number 2 of 2021, which primarily addresses the standardization of geographical names (referred to as GR 2/2021). This regulatory measure prominently highlights the necessity of establishing a dedicated platform to facilitate standardization. SINAR is positioned to emerge as the foremost application for ensuring the standardization of geographical names within the country. It is a practical tool for collecting geographical names data, effectively streamlining the data collection process. The wealth of data housed within SINAR is easily accessible and extensively available to users while simultaneously employing robust security measures to safeguard against potential data loss or damage. All data is securely stored on the BIG server, supplemented by additional backup protocols implemented on remote servers. To summarize the development of the Geographical Names Information System in Indonesia, the following graphic illustrates its progression.

GEOGRAPHICAL NAMES INFORMATION SYSTEM IN INDONESIA

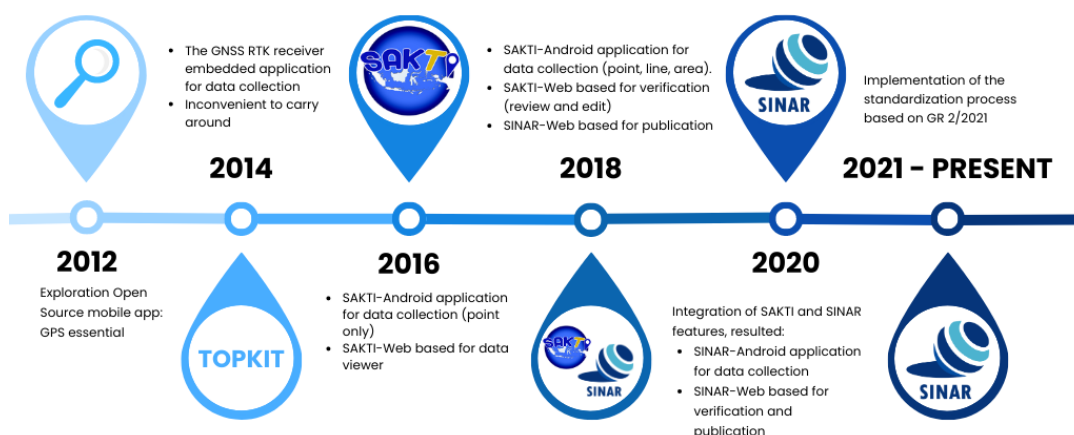


Figure 1. Development of Geographical Names Information System in Indonesia

5a.2 Field Collection of Geographical Names using SINAR

5a.2.1 Users

User roles within SINAR are designed to align with the specifications outlined in Regulation Number 2 of 2021 on the Standardization of Geographical Names. These roles encompass a range of management features, ensuring efficient field collection of geographical names:

Table 1. User Roles Specification

No	User	User Origin	Login required?	View the Data	Platform
1.	Public	Public	No	Yes	Web
2.	Contributor	Public	Yes	Yes	Android and Web
3.	Surveyor	BIG, Local Government, Central Government	Yes	Yes	Android and Web
4.	Municipality Verificator	Municipality Government	Yes	Yes	Web
5.	Provincial Verificator	Provincial Government	Yes	Yes	Web
6.	National	BIG and Central	Yes	Yes	Web

	Verificator	Government			
7.	Badan Informasi Geospasial (BIG)	BIG	Yes	Yes	Web
8.	Ministry of Home Affairs	Ministry of Home Affairs	Yes	Yes	Web
9.	Administrator	BIG	Yes	Yes	Web

This module will focus on the Contributor and Surveyor user categories to comprehensively explain the data collection process. Both categories are authorized to gather geographical name data in the field and perform data editing within the web platform. The Surveyor role necessitates a proposal from a certified user, typically a government representative, and a letter of assignment as supporting documentation. The role of surveyor must submit their letter of assignment via the web or Android platform and await approval from the administrator. Meanwhile, the Contributor user category does not require any specific procedural requirements.

5a.2.2 Database Structure

The primary structure of the toponym database serves as the foundational framework or organization within the SINAR application for the storage and management of geographical name data. The main toponym database structure is thoughtfully designed to ensure the efficient storage and retrieval of extensive geographical names data acquired through the SINAR application. This design likely incorporates diverse components, such as tables, fields, and relationships, which contribute to the systematic organization of the data.

Dedicated tables are likely responsible for housing critical information about geographical names within this structure. These tables may include fields to store the names themselves, location coordinates, associated attributes, and administrative divisions. Furthermore, supplementary tables might be integrated to accommodate metadata, encompassing data sources, collection dates, and quality assurance indicators. Specific details regarding the precise characteristics of the existing main toponym database structure are provided below:

Table 2. Main Table Structure of Geographical Names in SINAR

No	table_catalog	table_schema	table_name	column_name	column_name_eng	is_nullable	data_type	character_maximum_length	numeric_precision
1	sinar8	public	toponim	id_toponim	id_toponym	NO	integer	NULL	32
2	sinar8	public	toponim	geom	geom	NO	USER-DEFINED	NULL	NULL
3	sinar8	public	toponim	id_pengguna	id_user	NO	integer	NULL	32
4	sinar8	public	toponim	id_unsur	id_feature	NO	integer	NULL	32
5	sinar8	public	toponim	negara	country	YES	character varying	255	NULL
6	sinar8	public	toponim	id_provinsi	id_province	YES	character varying	3	NULL
7	sinar8	public	toponim	id_kabkota	id_regency	YES	character varying	7	NULL
8	sinar8	public	toponim	id_kecamatan	id_district	YES	character varying	11	NULL
9	sinar8	public	toponim	id_desa_kelurahan	id_village	YES	character varying	16	NULL
10	sinar8	public	toponim	id_lingkup	id_scope	NO	integer	NULL	32
11	sinar8	public	toponim	id_status_pembakuan	id_status_pembaakuan	NO	integer	NULL	32
12	sinar8	public	toponim	id_status_data	id_status_data	NO	integer	NULL	32
13	sinar8	public	toponim	id_status_publicasi	id_status_publicasi	NO	integer	NULL	32
14	sinar8	public	toponim	nlp	sheet_num	YES	character varying	15	NULL
15	sinar8	public	toponim	namlok	generic	YES	character varying	254	NULL
16	sinar8	public	toponim	namespe	specific	NO	character varying	254	NULL

No	table_catalog	table_schema	table_name	column_name	column_name_eng	is_nullable	data_type	character_maximum_length	numeric_precision
17	sinar8	public	toponim	alias	alias	YES	character varying	254	NULL
18	sinar8	public	toponim	aslbhs	origin_languang	YES	character varying	50	NULL
19	sinar8	public	toponim	artinam	meaning	YES	character varying	254	NULL
20	sinar8	public	toponim	sjhnam	history	YES	character varying	500	NULL
21	sinar8	public	toponim	nambef	nambef	YES	character varying	254	NULL
22	sinar8	public	toponim	namrec	namrec	YES	character varying	254	NULL
23	sinar8	public	toponim	elevasi	elevation	YES	double precision	NULL	53
24	sinar8	public	toponim	foto1	photo1	YES	character varying	50	NULL
25	sinar8	public	toponim	foto2	photo2	YES	character varying	50	NULL
26	sinar8	public	toponim	foto3	photo3	YES	character varying	50	NULL
27	sinar8	public	toponim	foto4	photo4	YES	character varying	50	NULL
28	sinar8	public	toponim	rekaman1	rec1	YES	character varying	50	NULL
29	sinar8	public	toponim	rekaman2	rec2	YES	character varying	50	NULL
30	sinar8	public	toponim	narsum	informant	YES	character varying	50	NULL
31	sinar8	public	toponim	tglsurvei	survey_date	YES	date	NULL	NULL
32	sinar8	public	toponim	akurasi	accuration	YES	double precision	NULL	53
33	sinar8	public	toponim	sumber	data_source	YES	character varying	254	NULL
34	sinar8	public	toponim	remark	remark	YES	character varying	254	NULL

No	table_catalog	table_schema	table_name	column_name	column_name_eng	is_nullable	data_type	character_maximum_length	numeric_precision
35	sinar8	public	toponim	sketsa	sketch	YES	character varying	50	NULL
36	sinar8	public	toponim	ucapan	pronunciation	YES	character varying	255	NULL
37	sinar8	public	toponim	ejaan	spelling	YES	character varying	255	NULL
38	sinar8	public	toponim	created_date	created_date	NO	timestamp without	NULL	NULL
39	sinar8	public	toponim	created_by	created_by	NO	integer	NULL	32
40	sinar8	public	toponim	updated_date	updated_date	YES	timestamp without	NULL	NULL
41	sinar8	public	toponim	updated_by	updated_by	YES	integer	NULL	32
42	sinar8	public	toponim	pendataan_type_id	collection_type_id	NO	smallint	NULL	16
43	sinar8	public	toponim	pendataan_nonsi_id	collection_nonsi_id	YES	integer	NULL	32
44	sinar8	public	toponim	dokumen1	document1	YES	character varying	50	NULL

5a.2.3 Application Flow

In order to enhance comprehension of this platform, it is essential to analyze the application flow for collecting geographical names on both the Android and web platforms. The following section provides a detailed overview of this process:

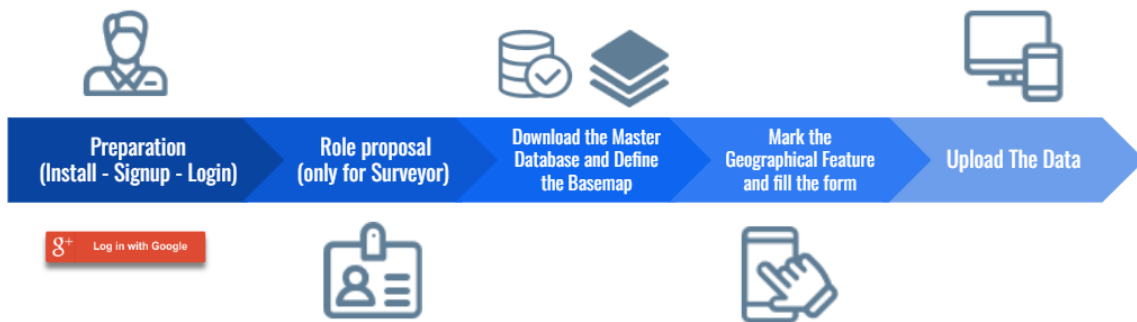


Figure 2. Android Application Flow for Data Collection



Figure 3. Web Application Flow for Data Collection

5a.2.4 Device Requirements

In order to utilize the Android-based application, the Android device must meet the following minimum criteria:

- Operating System: Android 6 (Marshmallow) or a newer version.
- RAM: At least 4GB of Random Access Memory.
- Minimum remaining memory: 1GB.
- Smartphone screen size is a minimum of 5 inches.

Moreover, the functionality of the Android app is influenced by various device limitations, including:

- Features that heavily rely on the device signal, such as online base maps, the number of Global Navigation Satellite System (GNSS) satellites captured by the device, GPS accuracy value, and elevation. A stronger signal reception leads to higher accuracy.
- Features dependent on the device type, such as the camera's picture quality and the voice recording's clarity.
- The duration required to upload and download master data from the BIG server depends on factors such as file size, device signal strength, and the server's condition.

On the other hand, to access the web-based application, the personal computer must meet specific requirements, which include:

- Recommended access through the Google Chrome web browser.
- RAM: A minimum of 16GB.
- HDD: At least 512GB of storage capacity.
- Processor: Minimum quad processor or better.
- Internet speed: A minimum of 50 Mbps.

5a.2.5 Application Features

Android Application

The Android application can be obtained from the Google Play Store by entering the keyword "SINAR Toponim" in the search box. The application will then be displayed as shown below.

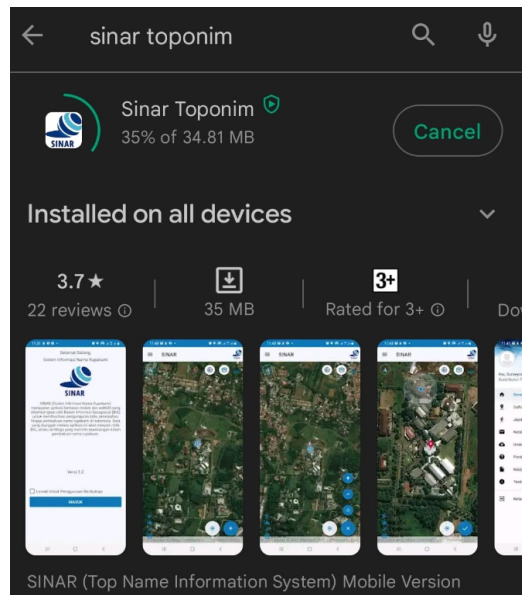


Figure 4. Installation of SINAR

The application's main page will be displayed immediately upon the user's successful login or signup. The following image depicts the main page interface:

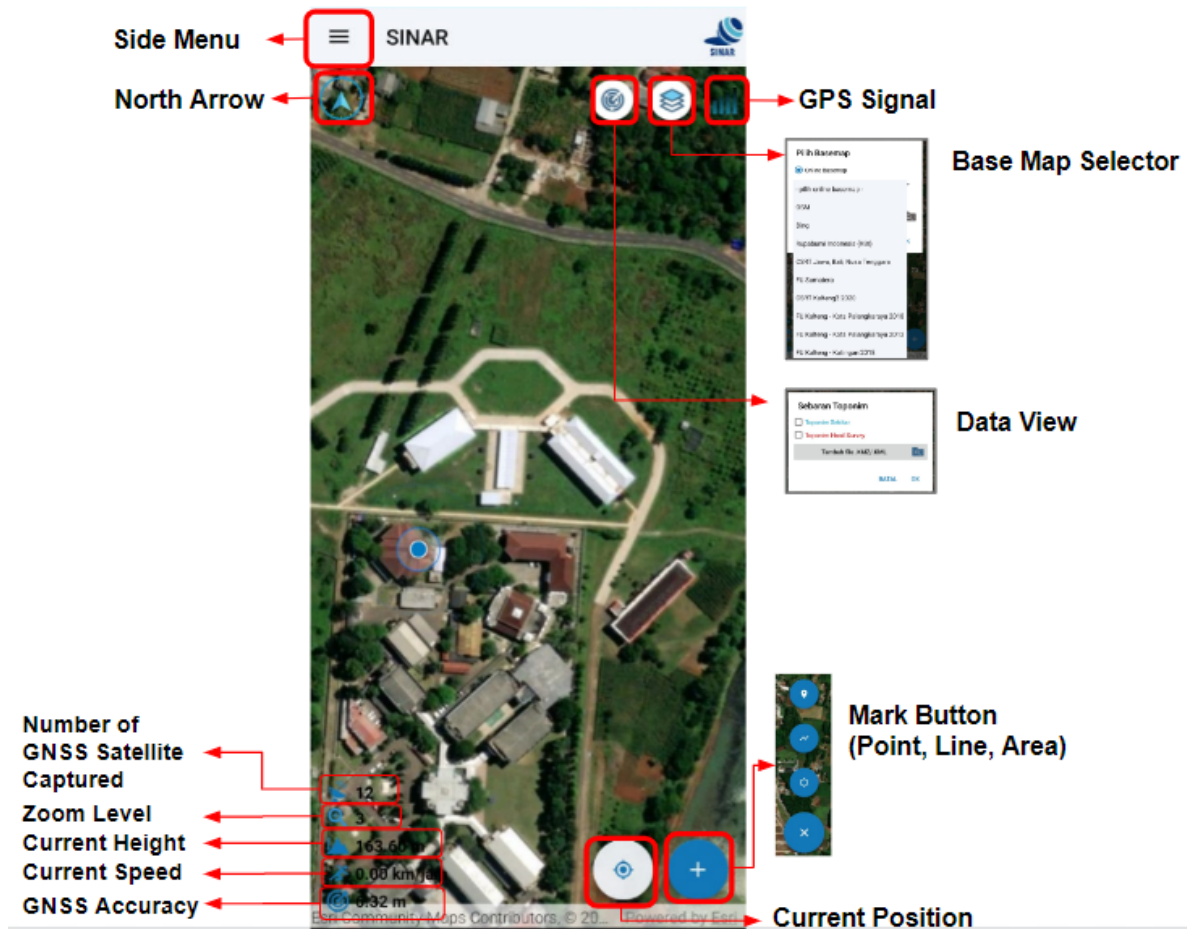


Figure 5. Main Page of SINAR Android



The side menu will be presented upon clicking this button, as depicted below.

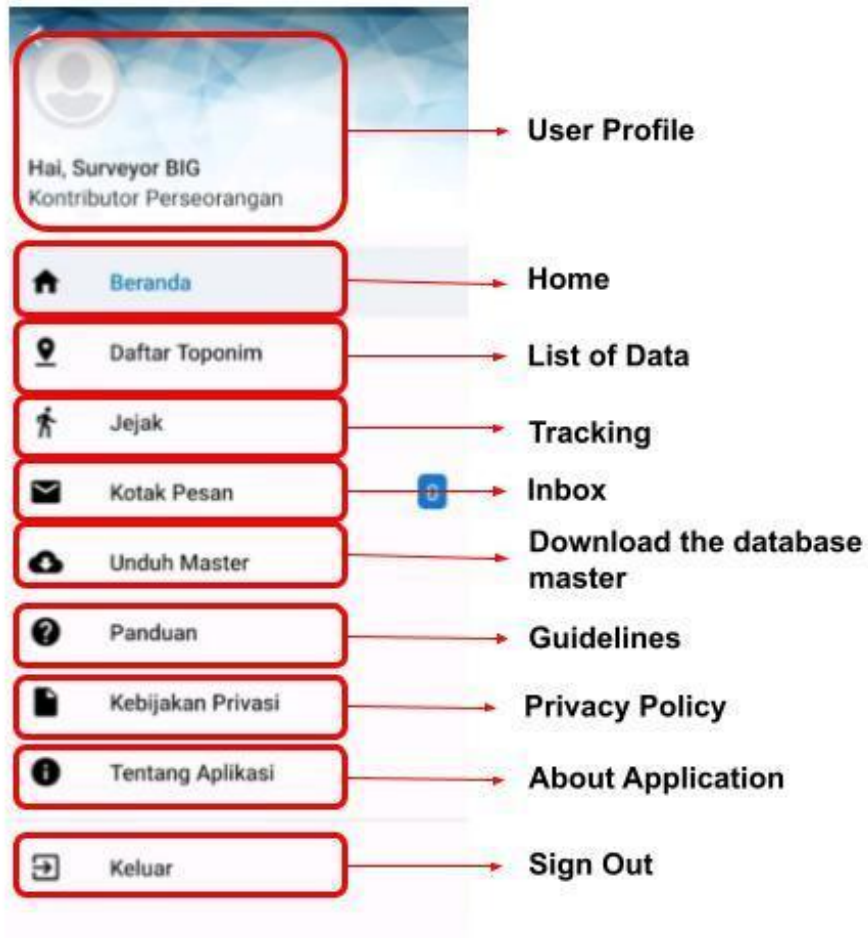


Figure 6. Menu of SINAR Android




In order to collect data, users can click on the button  located on the main page, which will prompt the appearance of geometry options (point/line/area). For instance, if the point type is selected, users can position the point above the designated feature, as illustrated below:



Figure 7. Geographical Names Point Data Acquisition



Figure 8. Geographical Names Line Data Acquisition

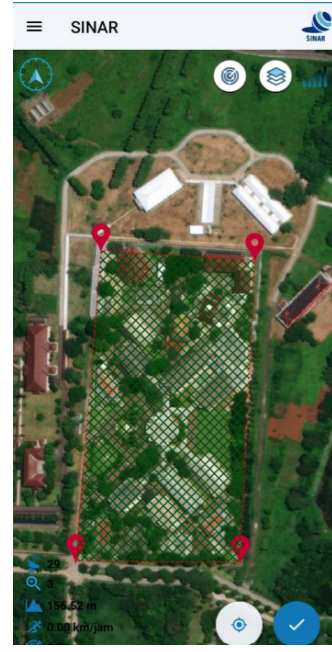


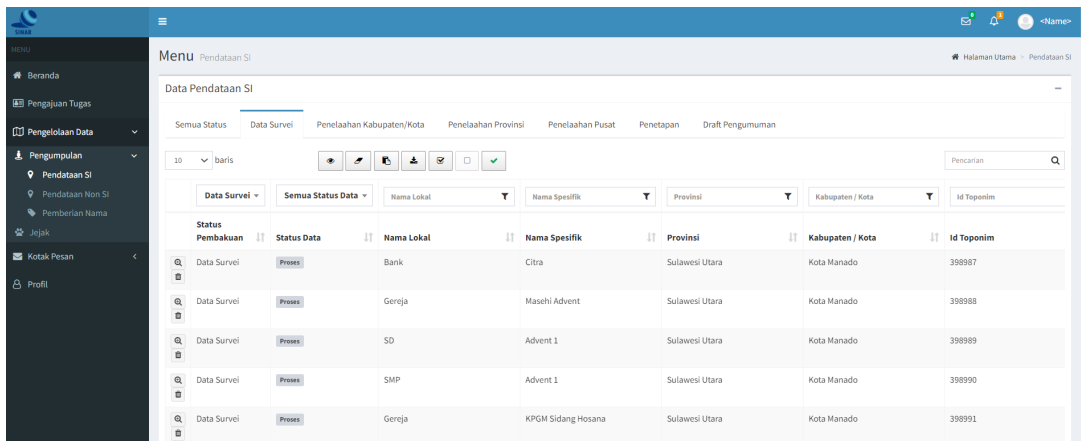
Figure 9. Geographical Names Polygon Data Acquisition

The Geographical Names form will be displayed and requires completion. Below is a visual representation of the Geographical Names form:

Figure 10. The Geographical Name Form

5a.3 Web Platform

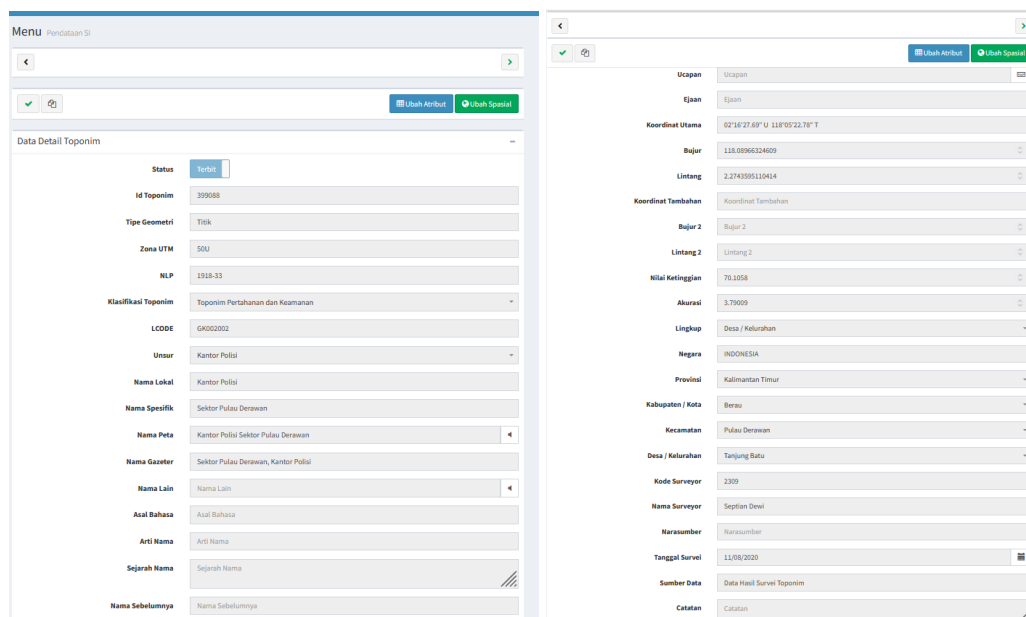
To effectively modify the spatial form of features, the finalization of survey data necessitates a larger screen. Hence, the editing of features should be conducted using the SINAR Web platform. Users can access the survey data through the *data survey* menu, as illustrated below:



Status	Nama Lokal	Nama Spesifik	Provinsi	Kabupaten / Kota	Id Toponim
Data Survei	Bank	Citra	Sulawesi Utara	Kota Manado	398987
Data Survei	Gereja	Masehi Advent	Sulawesi Utara	Kota Manado	398988
Data Survei	SD	Advent 1	Sulawesi Utara	Kota Manado	398989
Data Survei	SMP	Advent 1	Sulawesi Utara	Kota Manado	398990
Data Survei	Gereja	KPGM Sidang Hosana	Sulawesi Utara	Kota Manado	398991

Figure 11. Web Platform of SINAR

Spatial editing and attribute editing can be seamlessly performed within this platform. Presented below is the interface of the editing window:



Field	Value
Status	Terbek
Id Toponim	399088
Tipe Geometri	Titik
Zona UTM	50U
NLP	1928-33
Klasifikasi Toponim	Toponim Pertahanan dan Keamanan
LCODE	GK002002
Unsur	Kantor Polisi
Nama Lokal	Kantor Polisi
Nama Spesifik	Sektor Pulau Derawan
Nama Peta	Kantor Polisi Sektor Pulau Derawan
Nama Gazeter	Sektor Pulau Derawan, Kantor Polisi
Nama Lain	Nama Lain
Asal Bahasa	Asal Bahasa
Arti Nama	Arti Nama
Sejarah Nama	Sejarah Nama
Nama Sebelumnya	Nama Sebelumnya
Uraian	Uraian
Ejaan	Ejaan
Koordinat Utama	02°16'27.69" U 118°05'22.78" T
Bujur	118.0896324809
Lintang	2.274395110454
Koordinat Tambahan	Koordinat Tambahan
Bujur 2	Bujur 2
Lintang 2	Lintang 2
Nilai Ketelitian	70.1058
Akurasi	3.79009
Lingkup	Desa / Kelurahan
Negara	INDONESIA
Provinsi	Kalimantan Timur
Kabupaten / Kota	Berau
Kecamatan	Pulau Derawan
Desa / Kelurahan	Tanjung Batu
Kode Surveyor	2309
Nama Surveyor	Septian Dewi
Narasumber	Narasumber
Tanggal Survei	11/08/2020
Sumber Data	Data Hasil Survei Toponim
Catatan	Catatan

Figure 12. Attribute Editing Window

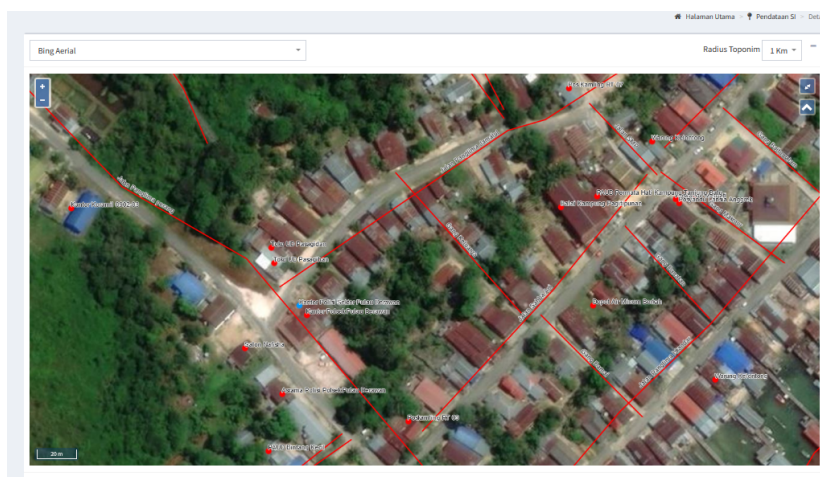


Figure 13. Spatial Editing Window

Using SINAR as the primary tool in Indonesia's geographical name standardization process has yielded significant impacts. The data acquisition process using SINAR Android is more convenient and efficient compared to conventional methods. Furthermore, the web-based SINAR platform offers a seamless and integrated process for standardizing geographical names, encompassing data acquisition through publication. SINAR, an online application, provides users unrestricted access from any location and time, making it particularly valuable in the COVID-19 pandemic. It aligns with the prevalent work-from-home culture and reduces the need for physical meetings while ensuring the continuity of geographical name standardization efforts.

5a.4 Future Development of SINAR

To enhance the interoperability and usability of geographical names among stakeholders, BIG also initiated the development of a geographical names application programming interface (API) in 2021. The API enables other systems managed by ministries and local governments to access and interact with the geographical names data stored in the SINAR database. However, the implementation of this API has encountered challenges, particularly in addressing user requirements. Further improvements are necessary, including incorporating user roles within the API system, providing an API catalog, enhancing geocoding capabilities, and adopting geographical name codification to facilitate linked data. Additionally, enhancements in metadata provision and the generation of Resource Description Framework (RDF) are imperative.

References

Lauder, M. R., & Ferdiansyah, H. (2020). Geographical name digitalization in Indonesia. *Geographical Naming in Digital Era*. Proceedings of the 26th International Seminar on Sea Names/ISBN 979-11-951305-5-9