



D7.5 Intermediate periodic activity and management report

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Table of Contents

1 Executive Summary	4
2 FuturePulse	5
2.1 Rationale	5
2.2 Partnership	5
2.3 Use Cases and Business Scenarios	5
2.4 Scope and Objectives	6
3 Summary of activity during M13-M24	8
3.1 Gantt chart	8
3.2 Deliverables	8
3.3 Milestones	9
3.4 Events and Presentations	9
3.5 Papers	11
3.6 Project meetings	12
4 Work carried out by WP during M13-M24	13
4.1 Work Package 1: Open innovation, User Requirements and Design	13
4.2 Work Package 2: Music Data Collection, Analysis and Indexing	13
4.3 Work Package 3: Predictive Analytics and Recommendations	13
4.4 Work Package 4: Platform Integration and Application Development	14
4.5 Work Package 5: Pilots and Evaluation	14
4.6 Work Package 6: Innovation Management, Dissemination and Exploitation	14
4.7 Work Package 7: Project Management	15
4.8 Work Package 8: Ethics requirements	15
5 Update of the data management plan	17

1 Executive Summary

This deliverable includes a public summary of the activity performed by H2020 project FuturePulse (Grant Agreement Number: 761634) throughout its second year of execution.

Section 2 describes the aims and objectives of the project and its use cases. Section 3 depicts a summary of the activity performed during the period, section 4 presents the work carried out by every Work Package of the project and Section 5 summarises the updates of the Data Management Plan.

2 FuturePulse

2.1 Rationale

Music is one of the **fastest evolving media industries**, currently undergoing a **transformation** at the nexus of **music streaming, social media and convergence technologies**. As a result, the **music industry** has become a **mixed economy of diverse consumer channels and revenue streams**, as well as **disruptive innovations** based on **new services** and content **distribution models**. In this setting, music companies encounter daunting challenges in dealing successfully with the transition to the new field that is shaped by streaming music, social media and media convergence. The availability of huge music catalogues and choices has rendered the problems of recommendation and discovery as key in the competition for audience, while the continuous access to multiple sources of music consumption has resulted in a dynamic audience, characterised by a highly diverse set of tastes and volatility in preferences which also depend on the context of music consumption.

The project will **help music companies** leverage a variety of music data and content, ranging from broadcasters (TV, radio) and music streaming data, to sales statistics and streams of music-focused social media discussions, interactions and content, through sophisticated analytics and predictive modelling services **to make highly informed business decisions, to better understand their audience and the music trends of the future**, and ultimately **to make music distribution more effective and profitable**. **FuturePulse** will offer these capabilities over a **user-friendly, highly intuitive and visual web solution** that will enable the immersion of music professionals in the realm of music data, and will support them to make highly informed and effective business decisions (e.g., artist/venue to book, marketing budget).

2.2 Partnership

The **FuturePulse** partnership consists of eight partners: three pilot partners (PLAYGROUND, Soundtrack Your Brand -SYB- and Advanced Music (SONAR)), each of them coming to the project with unique business cases with high innovation potential. These are supported by two leading EU research Organisations (CERTH, IRCAM), and three IT, technology and data providers (BMAT, ATC and MUSIMAP) to ensure that a market-ready system and a set of cutting edge services will be delivered after being thoroughly evaluated in real-world business settings.

The pilot partner BASS NATION terminated their participation due to force majeure in FuturePulse in July 20th, 2019, being substituted by SONAR as the pilot leader for the Live Music use case and BMAT for the leadership of WP5 (Pilot Management).

2.3 Use Cases and Business Scenarios

To serve the increasingly complex needs of the music ecosystem, **FuturePulse** will **develop and pilot test a novel, close to market music platform** in three high-impact use cases:

- **Record Label use case:** FuturePulse platform will help music professionals grasp how all the different signals (music streaming, music play in radio/TV, social media sharing) translate to future music sales and revenues (digital sales/streaming/ads), and what are the best strategies to optimise them.
- **Live Music use case:** FuturePulse platform will collect and analyse data from

multiple sources around artists in order to predict the ticket sales that an artist would bring for a particular venue, the audience demographics (e.g., age composition), discover and recommend artists that will be a good match for a venue, and support the end-users on the task of pricing the artists for live events. FuturePulse will make the results of this analysis accessible to the main live music stakeholders: a) venues, b) promoters and c) festival organisers.

- **Music Platform use case:** FuturePulse will provide a platform for joint analysis of music play data coming from the background music provider and data coming from the client business where music is played (e.g., sales data). This will allow the end-user to uncover valuable correlations and recommend music to stream to optimise business goals.

2.4 Scope and Objectives

In response to the industrial needs of the music industry the **FuturePulse** project has identified the following six specific technological and innovation objectives:

- **Objective 1:** Deliver a single tool for collecting and accessing music data from a diverse set of sources.
- **Objective 2:** Deliver a set of data-driven services for estimating the current and future popularity of songs, artists and genres.
- **Objective 3:** Deliver a set of services for enhanced audience analysis and management.
- **Objective 4:** Integrate music data collection, mining, and visualisation in a scalable Software-as-a-Service (SaaS) platform.
- **Objective 5:** Perform large-scale pilots on three clearly defined music segments.
- **Objective 6:** Develop and execute a comprehensive dissemination and exploitation plan and pave a clear path to market.



Figure 1: FuturePulse Platform and Applications

The project is already on its way to delivering a number of high-quality outcomes that will form the basis for the exploitation plan of the project. These are illustrated in the figure above and include the following:

- A robust and extensible multi-source music data ingestion and real-time indexing framework.
- A multi-modal music popularity prediction engine: This will produce short- and long-term predictions for popularity indices about specific artists, albums, songs, styles and genres, given a variety of incoming signals.

- An online music community analysis framework and a music recommendation engine.
- An integrated scalable cloud-based platform offering the full spectrum of FuturePulse services.
- Three market-driven applications serving the needs of record labels, event organisers and music platform operators.

3 Summary of activity during M13-M24

The activities undertaken during the first year of the project (M13-M24) have been carried out according to the proposed Work Plan of the project without significant deviations.

3.1 Gantt chart

	Start	End	Y1				Y2				Y3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WP1 Open Innovation, User Requirements and Design	1	15	D1.1/5	D1.2			D1.3/6/4							
T1.1 Technology and market innovation analysis	1	15												
T1.2 FuturePulse co-design process	1	15												
WP2 Music Data Collection, Analysis and Indexing	2	27			D2.1	D2.2/5			D2.3		D2.4			
T2.1 Collection of broadcast data	2	21												
T2.2 Collection of online music platform data	2	21												
T2.3 Collection of social media and open data	2	21												
T2.4 Music analysis and indexing	2	27												
WP3 Predictive Analytics and Recommendations	1	30				D3.1			D3.2/4		D3.3			
T3.1 Popularity estimation and prediction	1	24												
T3.2 Audience profiling and recommendation	7	30												
T3.3 Business-driven music mining & recommendation	10	30												
WP4 Platform Integration and Application Development	1	36		D4.1/8		D4.2/9		D4.3	D4.4		D4.5		D4.6	D4.7
T4.1 System architecture	1	18												
T4.2 Visualization and user interaction	4	24												
T4.3 FuturePulse platform development and component integration	4	36												
T4.4 FuturePulse application development	10	36												
WP5 Pilots and Evaluation	4	36			D5.1/9									D5.8/16
T5.1 Record label pilot	4	36								D5.2/10				D5.5/13
T5.2 Live music pilot	4	36								D5.3/11				D5.6/14
T5.3 Music platform pilot	4	36								D5.4/12				D5.7/15
T5.4 Pilot coordination and management	4	36												
WP6 Innovation Management, Dissemination and Exploitation	1	36	D6.1	D6.2			D6.3/7		D6.4/8					D6.5/9
T6.1 Development of engagement and communication strategy	1	12												
T6.2 Creation of FuturePulse website and dissemination material	1	36												
T6.3 Dissemination activities	7	36												
T6.4 Exploitation activities	7	36												
WP7 Project Management	1	36	D7.1	D7.2		D7.3/7			D7.4/5/8					D7.6/9
T7.1 Project coordination, resource monitoring & financial control	1	36												
T7.2 Project quality planning and monitoring	1	36												
T7.3 Data management	1	24												

Table 1: FuturePulse Gantt chart

3.2 Deliverables

The following table includes the deliverable submitted to the Participant Portal during the period M13-M24, as included in the Description of Action (DoA). All submissions were done in time with the foreseen delivery dates.

Month	#	Title	Lead beneficiary	Type	Dissemination level
M13	D1.3	Music industry innovation report v2	Playground	Report	Public
M13	D1.6	Music industry innovation report v2 (D1.3 Confidential)	Playground	Report	Confidential
M14	D4.3	FuturePulse platform and APIs	ATC	Demonstrator	Public
M15	D1.4	FuturePulse requirements v2	BMAT	Report	Public
M15	D6.3	Exploitation plan	BMAT	Report	Public
M15	D6.7	Exploitation plan (D6.3 Confidential)	BMAT	Report	Confidential
M24	D3.2	Predictive analytics and recommendation framework v2	MUSIMAP	Report	Public
M24	D3.4	Predictive analytics and recommendation framework v2 (D3.2 Confidential)	MUSIMAP	Report	Confidential
M24	D4.5	FuturePulse use case applications v2	ATC	Demonstrator	Public
M24	D6.4	Communication & dissemination	ATC	Report	Public

		report v1			
M24	D6.8	Communication & dissemination report v1 (D6.4 Confidential)	ATC	Report	Confidential
M24	D7.4	Data management plan v2	BMAT	ORDP: Open Research Data Pilot	Public
M24	D7.5	Intermediate periodic activity and management report	BMAT	Report	Public
M24	D7.8	Intermediate periodic activity and management report (D7.5 Confidential)	BMAT	Report	Confidential

Table 2: Deliverables M13-M24

3.3 Milestones

The milestones covered during the M13-M24 period are:

Number	Title	Lead Beneficiary	Due date	Means of verification
MS2	System setup and prepilots	BMAT	M18	The project has completed the 1st annual reporting period and the 1st half of its duration. Work on the first 18 months has been successfully carried out with the design of the platform architecture, the delivery of a first implementation of the FuturePulse platform and the design and execution of the three pre-pilot tests. The first version of the predictive analytics and recommendation framework is available. The dissemination, exploitation and business planning has been elaborated to facilitate the communication, exploitation and commercialisation tasks.
MS3	R&D towards pilot v1 (small-scale)	BMAT (substituting Bass Nation)	M24	The development of the broadcast and online music platform data collection mechanisms is complete, and the requirements have been updated. The first version of FuturePulse use-case applications has been delivered and small-scale pilots have been carried out for all three use cases. The data management plan has been updated.

Table 3: Milestones M13-M24

3.4 Events and Presentations

Date	Type	Event Name	Title of Presentation	Main Contributor/ attendee
17/10/2017	Workshop	H2020 Media Projects' Workshop: Collaboration Towards	FuturePulse presentation	Daniel Molina (BMAT)

		the Future of Media		
16/11/2017	Conference	Presentation of project at Music Industry Day	Future Pulse project	Anders Engström (Playground)
22/11/2017	Conference	Mirac research conference in Stockholm, Sweden www.mirac.se	The FuturePulse Research and Innovation Project - Multimodal Predictive Analytics and Recommendation Services for the Music Industry	Daniel Johansson, Jasmine Moradi (SYB)
29/08/2018	Presentatio n	International Federation of Phonographic Industry (IFPI)	The future of music	Daniel Johansson (SYB)
17/09/2018	Workshop/ presentation	Swedish Standards Institute - The Swedish part of ISO	A changing music industry	Daniel Johansson (SYB)
26/09/2018	Conference	International Society for Music Information Retrieval (ISMIR), Paris, France	VenueRank: Identifying Venues that Contribute to Artist Popularity	Manos Schinas (CERTH)
26/09/2018	Trade Show	Paris Electronic Week 2019	Panel	Tommy Vaudercane (BN)
26/09/2018	Conference	International Society for Music Information Retrieval (ISMIR), Paris, France	Mood Detection - demo presentation at ISMIR Industry Meetup	Thomas Lidy, Virgile Boulanger (Musimap)
14-15/11/2018	Conference	Mirac research conference in Stockholm, Sweden www.mirac.se	What is happening with music - Perspectives from research, industry and politicians	Daniel Johansson (SYB)
15/11/2018	Interview	Musikbranschpodden (Music industry podcast)	Daniel Johansson - Musikbranschforskare	Daniel Johansson (SYB)
24-26/01/2019	Trade Show	European Radio Show	Booth	Coordination: Quimi (BMAT) Attendees: Zoé Rennié Harris, Eva Pigeon (BMAT), Rémi Mignot, Hadrien Foroughmand (IRCAM), Tommy Vaudecrane, Julien Perret (BN)
06/02/2019	Workshop	Concertation Day	FuturePulse presentation	Daniel Molina (BMAT)
07-09/06/	Trade Show	MIDEM	Individual Talks	Thierry Ascarez, Philippe

2019				Decottignies (MMAp)
03/11/07/2019	Music Conference	Wallifornia music tech https://walliforniamusictech.com/	Booth	Thomas Lidy, Thierry Ascarez Frederic Notet (MMApMusimap)
03/07/2019	Music Conference	Wallifornia music tech https://walliforniamusictech.com/	Research highlights for tomorrow's sound	Hugues Vinet (IRCAM)
17-19/07/2019	International congress	Sónar+D https://sonarplusd.com/	Booth	Gonçal Calvo (BMAT), Saki Markovic (PGM), Sónar

Table 4: Events and presentations

3.5 Papers

- **“VenueRank: Identifying Venues That Contribute To Artist Popularity”**, by Emmanouil Krasanakis, Emmanouil Schinas, Symeon Papadopoulos, Yiannis Kompatsiaris, Pericles Mitkas. Presented at **19th International Society for Music Information Retrieval Conference (ISMIR2018)**, Paris, France, 23-27 September 2018, with more than 430 participants. ([Link to Zenodo](#))
- **“Music retiler: Using NMF2D source separation for audio mosaicing”**, by Hadrien Foughmand Aarabi, Geoffroy Peeters. Presented at **Proceedings of the Audio Mostly 2018 on Sound in Immersion and Emotion**, Wrexham, United Kingdom, 12 – 14 September, 2018. ([Link to Zenodo](#))
- **“Boosted seed oversampling for local community ranking”**, by Emmanouil Krasanakis, Emmanouil Schinas, Symeon Papadopoulos, Yiannis Kompatsiaris, Andreas Symeonidis. **Elsevier Journal (Information Processing and Management)**, accepted 3 June 2019, <https://doi.org/10.1016/j.ipm.2019.06.002> ([Link to Zenodo](#))
- **“Data-Driven Song Recognition Estimation Using Collective Memory Dynamics Models”**, by Christos Koutlis; Manos Schinas; Vasiliki Gkatziki; Symeon Papadopoulos; Yiannis Kompatsiaris. To be presented at **20th conference of the International Society for Music Information Retrieval (ISMIR2019)**, Delft, Netherlands, 4-8 November 2019. ([Link to Zenodo](#))
- **“Deep-rhythm for tempo estimation and rhythm pattern recognition”**, by Hadrien Foughmand; Geoffroy Peeters. To be presented at **20th conference of the International Society for Music Information Retrieval (ISMIR2019)**, Delft, Netherlands, 4-8 November 2019
- **“An Analysis of the Effect of Data Augmentation Methods: Experiments for a Musical Genre Classification Task”**, by Rémi Mignot; Geoffroy Peeters. Accepted for publication in **Transactions of the International Society for Music Information Retrieval (TISMIR)**

3.6 Project meetings

Date (M13-M24)	WP	Type	Partners	Venue
29 th -31 st October, 2018	All	Review meeting and Plenary meeting	All	Brussels, Belgium
19 th -20 th February, 2019	All	Plenary meeting	All	Stockholm, Sweden
19 th -20 th June, 2019	All	Plenary meeting	All	Thessaloniki, Greece

Table 5: List of project meetings, dates and venues

Apart from project management meetings, several technical and user requirements meetings took place during the first year of the project. In these meetings, both technical partners and use case partners attended.

4 Work carried out by WP during M13-M24

4.1 Work Package 1: Open innovation, User Requirements and Design

The objective of this Work Package is to position FuturePulse in the highly dynamic landscape of online music, to specify its unique and innovative characteristics and to deliver a set of concrete user requirements for FuturePulse.

The main activities and results of this WP during the M13-M24 period have been:

- The second version of the Music Industry Innovation Report (MIIR2) (Public and Confidential versions, -D1.3 and D1.6-) were conducted and delivered.
- An infrastructure to deliver metadata and audio files from PGM was set up.
- Initial steps in evaluating the user interface (Design) was carried out.
- The outcomes of Requirements D1.2 were assessed.

4.2 Work Package 2: Music Data Collection, Analysis and Indexing

The main objective of this Work Package is to ensure that consortium partners have timely access to music data that are necessary for developing and testing the FuturePulse capabilities.

The main activities and results of this WP during the M13-M24 period have been:

- For the prediction of track popularity, the BMAT Vericast API was integrated into FuturePulse, with 500 monitored channels.
- The implementation of the data collection was carried on: online music platform, social media and open data.
- Previous steps of the high-level music content analysis were improved.
- An analysis of the Terms of Service of third parties data sources was led.
- The deliverable D2.3 (Data specifications and collection v2) was submitted.

4.3 Work Package 3: Predictive Analytics and Recommendations

The main objective of this Work Package is to develop methods to leverage the large variety of collected music data (from WP2) for supporting decision making by various stakeholders (e.g., artists, labels, and brands).

The main activities and results of this WP during the M13-M24 period have been:

- Aggregation, estimation and prediction algorithms for track popularity were created based on various indicators from different sources (Youtube, Spotify, Deezer, etc.)
- The track recognition model was improved and tested with actual listeners.
- A non-linear composite artist popularity score and a comparison study among predictive models for the task of artist popularity online metrics' forecasting were developed. Preliminary work on artist discovery was done.
- A genre association analysis was carried out and updates were made on the genre popularity estimation model.
- REST APIs were developed, providing all the aforementioned via internal APIs to the FuturePulse platform.

- Initial steps were made towards developing a model where listening behaviour is transformed into an audience profile.
- Brand profiling and mapping target groups and audience profiles have been explored with SYB and other companies.
- Deliverables D3.2 and D3.4 (Predictive analytics and recommendation framework v2 – public and confidential version) were submitted.

4.4 Work Package 4: Platform Integration and Application Development

This Work Package is devoted to the definition of the FuturePulse platform architecture and the development of the actual platform and applications to be used by the pilot users throughout all pilot phases. The activities during this first project period, have been:

- The prototype regarding the visual interfaces to display the information generated by FuturePulse platform was updated. The new visualisation tools were developed based on information extracted from pilot users.
- Based on use cases specific requirements new platform functionalities were designed and developed.
- The FuturePulse API was delivered, integrating all available technical components of WP2 and WP3.
- The first and second prototype releases of three FuturePulse applications (Record Labels, Live Music, and Music Platform) were delivered.

4.5 Work Package 5: Pilots and Evaluation

The overall goal of this Work Package is to ensure the appropriate design and smooth execution of the large-scale pilots so that the FuturePulse outcomes are thoroughly evaluated and improved over the course of the project leading to a market-ready solution.

The main activities and results of this WP during the M13-M24 period have been:

- The technical features tested in the first phase of the pilots were defined.
- The first Pilot Users for the use cases were identified.
- The Pre-pilot phase and the 1st phase -small scale- of the pilots were performed.
- The deliverables D5.1 and D5.9 (Pilot Plan, public and confidential versions) were submitted.

4.6 Work Package 6: Innovation Management, Dissemination and Exploitation

The main objective of this Work Package is twofold: a) to generate awareness about the project and its achievements in the general public and in communities of interest, b) to pave a clear path to exploitation and sustainability for the project outcomes.

The main activities and results of this WP during the M13-M24 period have been:

- Additional promotional material was designed and created including the updated project's poster, banners and leaflets reflecting the project ideas. A video was created in order to keep the project's identity similar across all dissemination events.

- The project portal and social media accounts (Twitter, Facebook) were updated with information pertinent to project advances and news relevant to the project's research fields.
- Four scientific research papers were published to disseminate project results to the research community and more than 10 website blogs were published for raising awareness about project outcomes.
- Relevant events were attended, initial project results were presented and promotional material was distributed.
- Liaison activities with the Expert Advisory Board were performed. Functionalities of the FuturePulse platform and suggestions for improvement were discussed with the experts.
- Liaison/cluster activities continued with H2020 projects MARCONI¹, HRadio² and MediaRoad³.

4.7 Work Package 7: Project Management

The objective of this work package is to support the project in succeeding its goals through strong coordination and continuous monitoring, assessment and reporting:

The main activities and results of this WP during the M13-M24 period have been:

- Work was performed on day-to-day management, effective work and control of deadlines, work plan follow-up, deliverables and milestones follow-up, project advancement, problems to be solved, decision-making processes, motivation and cooperation.
- An amendment was submitted to terminate the participation of Bass Nation (BN) and its substitution by Advanced Music (SONAR). The amendment was approved on July 20th, 2019.
- The External Advisory Board (EAB) and User Panel (UP) were involved in the project.
- A KPI follow-up and quality assurance for the overall project was performed, together with peer-review workflow for deliverables, risk management and contingency plans.
- The quality procedures and risk management involved in the effective and efficient management of the project were defined.
- The Data Management Plan was updated defining the methodology and standards with respect to the data generated and collected throughout the FuturePulse project, including the recommendations made by the reviewers in the first review held in Brussels on October 2018.

4.8 Work Package 8: Ethics requirements

The objective of this WP is to ensure compliance with the 'ethics requirements' set out in this work package.

The Coordinator and the consortium ensured the application of the ethical considerations and requirements included in the deliverables D8.1: POPD – Requirement No. 1 (Protection of Personal Data) and D8.2: H – Requirement No. 2

1 <https://www.projectmarconi.eu>

2 <https://www.hradio.eu>

3 <https://www.mediaroad.eu>

(Humans): procedures and criteria to identify/recruit research participants, information on the informed consent procedures implemented and clarification whether children and/or adults unable to give informed consent are involved.

5 Update of the data management plan

During the period M13-M24, the consortium has delivered an updated version of the DMP: D7.4 – Data Management Plan v2 (M24)

The deliverable contains the first update of the initial DMP of FuturePulse project (D7.28) and follows the Guidelines on Data Management in Horizon 2020 (version 2.1 February 2016).

The deliverable describes the datasets, including reference and name, description (data collected and generated), standards and metadata, data sharing, and archiving and preservation.

Zenodo platform⁴

The consortium has used Zenodo to publish four papers and one first dataset of the project:

- **Papers:**
 - [“VenueRank: Identifying Venues That Contribute To Artist Popularity”](#)
 - [Music retiler: Using NMF2D source separation for audio mosaicing](#)
 - [Boosted seed oversampling for local community ranking](#)
 - [Data-Driven Song Recognition Estimation Using Collective Memory Dynamics Models](#)
- **Dataset:**
 - [T-REC Song Recognition Dataset](#)

⁴ Zenodo is a general-purpose open-access repository developed under the European OpenAIRE program and operated by CERN