AECDIMEEIA

# Business Plan

## *Project AECDIMEEIA*

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# 1. Need and market analysis

The human society relies on the exchange of commodities and information. While the digitalization gradually enhanced the connection in between major cities and metropolises, the rural areas are often left under-serviced, due to the daunting cost of network infrastructure and the lack of anticipatable revenue. Such a lack of reliable internet access raised another problem: the already late weather and market information is now even later for farmers, and sometimes even totally inaccessible (several examples were given in the technical report). The farmers cannot dynamically adjust their farming plans and at the first time make decisions on disaster preventions. Such situations could easily cause a loss of thousands of dollars and human lives.

The target group and market are quite clear therefore: farmers and rural communities. With roughly 4.5 billion of farmers currently on this planet, even if only half of them need information access it is safe to say the market is incomparably larger than almost any other industry and business on the planet. However, they might be represented by government, organizations, and designated dealers due to the lack of professional knowledge and experience in this field. Therefore, the report will be expanded from the perspective of mass distribution, rather than individual.

# 2. Advantages and value proposition

## 2.1 Advantages

You might ask: “Okay, I read through (hopefully so) your technical report. It’s very impressive, but why should I buy your product instead of using SMS or USSD-based solutions? You know, they are already there, people know about it and everything seems still fine.” The reason can be summarized in 9 words: cheap, flexible/multifunctional, reliable, direct and easy to implement.

### 2.1.1 Cheap

Let’s start from cheap. The entire system with minimum operational functions (MOF) costs less than 5 USD. What are necessary for one unit are listed below:

| Item | Quantity | Unit Price |
|---|---|---|
| ATMEGA1608-MF | 1 | 0.927 USD |
| Resistors, SMD | Around 10 | 0.006 USD |
| Capacitors, SMD | Around 10 | 0.015 USD |
| Battery holder/USB port | 1 | 0.97 USD |
| Spring antenna | 1 | 0.1 USD |
| PCB | 1 | 0.3 USD |
| Screen | 1 | 0.87 USD |
| LM741 | 1 | 0.23 USD |
| ESP8266 | 1 | 1.3 USD |
| SUM | N/A | 4.91 USD in total |

The author would like to point out that the price is listed as retail price from well-reputed electronics handler like Mouser, Farnell and RS. If more 20000 units are bought together the prices can go even cheaper. Besides, it is guaranteed by several electronics factories that if the manufacture of this product is entirely commissioned to a single factory and a minimum of 10000 units are ordered, the price is expected to go even lower, and the transportation, storage and distribution costs can be covered from the "5 USD" budget, as the device is expected to weigh only around 20 grams each.

### 2.1.2 Flexible and Multifunctional

The technical design is suitable for all applications that demand different configurations. Even in the MOF design, due to the very nature of this device being an IoT system, it can work with multiple WIFI protocols and still have some room for application of future algorithms and techniques. With slightly increased budget, a plastic casing can be made for the device, which serves as a protection case for the phone as well (if the device is powered by USB). With an additional increase in budget, then an additional ESP32-WROOM-32 can be fitted to enable peer-to-peer (P2P) WIFI or P2P Bluetooth/Bluetooth Low Energy (BLE) communication. If there is even more budget, additional modems can be fit on board for more protocols including LoRa.

### 2.1.3 Reliable, direct, and easy to implement

The product on the farmer side is very reliable and needs almost no maintenance, as only very simple components are used. The author designed the device to be very robust against dust and moisture. In fact, even if some water is spilled on the board, the farmer could simply drain the board and remove the water droplet, and the device would still work just fine. The system overall doesn't need any fancy modification of existing

infrastructures. Extra base station, transmission band, enhancement of SMS/USSD capacity, and satellite bandwidth are not required at all. The only necessary modification is a software update on participating aircrafts and weather stations.

## 2.2 Value Proposition

Then you thought for a while and asked again: “Okay. So, your design is IoT-based, future proof, and technically advanced.  Now I understand that it is a good thing for the farmers. But still, why should I buy the product or be the handler and advertise it to the people? What and how much does it saves me?”

For international organizations with different aims and goals and different positions and attitudes, it would be too broad to discuss this question. Let’s put the scope a little bit narrower and onto the government as an example.

On the government side, the first and most important benefit is enhanced information delivery with reduced cost, as originally intended. Building a network of weather forecast and information delivery across entire country can be extremely costly (which is seen from many reports of EU members, China and Japan), especially for regions where mountains and hills occupies a large amount of available land, like Switzerland. The human-populated areas, in specific, villages and communities, are scattered in a region and shaded by terrain. Geographically the size of the habited area is small, but the infrastructure needed to deliver the information to each region is very difficult to build.

In fact, the author visited Switzerland this June and noticed that in many rural communities, it is necessary to build transmission towers on both the top and bottom of the hill, and link them with a cable. Such repetitive construction results in a waste of governmental fund, also causing a huge maintenance demand. A rough estimation suggests the cost to construct such network nationwide should be counted at least in hundreds of millions of USD.

With AECDIMEEIA, information is broadcasted via air or space-borne systems, and can be accessed by every user within a mesh, thus greatly improving data accessibility. The management cost can also be reduced considerably. For example, in the DF-24 system to be used for ground facilities, a message can be sent to the users to indicate the status of the facilities (“Everything fine”, “Send Engineer”, or something else). Maintenance work

can then be planned according to the need. It also enhances the farmers' capabilities to avoid emergency situations and dynamically adjust farming and marketing decisions.

Meanwhile, with AECDIMEEIA, more flexibility with airway and navigation design can be obtained. In many cases, due to public opposition of the community, the airway and navigation points must avoid certain areas. But now, to get the timely service and information, the aircraft must be closer. Then it can be left to the residents to decide which way they will take. Typically, tolerating some noise is preferred over being left behind. An optimized airway not only reduces fuel burn and emission of the aircraft, but also providing more flexibility to air traffic controllers and therefore also enhancing operation safety, which in turn contributes to the environment status of the country.

It also promotes social engagement on the topic of environment protection. From the author's observation, localized weather data is typically not easily accessible for peoples within a rural community. They need to gather around an information point to see the update from sensor stations, and therefore they might not be aware of the real conditions of the regions around them. With AECDIMEEIA, the weather information is accessible any time to anyone.

## 3. Outreach and customer engagement strategies

From the government's perspective, it is not such a big challenge to reach out to the communities.  It can also put AECDIMEEIA into force as compulsory "customer engagement". But this is not a desirable answer for this part. So here it would be advisable to put the perspective onto the electrical handler, whose position is special in rural communities.

Assuming that only one or two handlers is present in the small rural communities, the outreach is primarily carried out by information propagation. That is, the handler receives permission and some support from local government to advertise the product at the initial stage. When residents visit the store, the handler should promote the device to all visitors and customers. Some discount could be offered as an initial booster. When the first batch of purchasers visit the shop again, feedbacks can be collected to be used as advertisement materials, and if they would agree to promote the device to their friends and relatives and make valid purchases, some more discount can be offered to them.

When the first small circle of users is established, then it is much easier to establish the reputation for the device. At this time, the mass advertisements can be posted on the main exits and entrances of the village. The farmers will be more willing to pay when there is an already established user group and positive remarks.

To let the farmers to further engage in this project, it is recommended to setup seminars and hand-on experience with interactive programming in primary school and middle schools where the kids of the farmers attend (a house collapses itself from inside). Meanwhile, without any violation of the advertisement laws, the promotion strategy can be made more oriented. Technical specifications could be omitted, while the benefit of the device should be emphasized.

As mentioned above, the project might receive supports from the government. If so, some favorable side policies can be implemented at the initial stages. For example, in China, there are two policies, namely “exchange old for new” and “white electronics goes to the rural communities”. They separately focus on stimulating the farmers to purchase more environmental-friendly devices and promote the use of white electronics to reduce the waste and improve hygienics of villages. Free or discounted devices can be distributed alongside, and the following procedures should follow as delineated above.

## 4. Financial and operational model

Due to the very special nature of this solution, the cost and necessary funding for implementation are much smaller than any other solutions based on SMS/USSD or robotics. A detailed analysis yielded the necessary cost being the material cost of manufacturing the device, and some logistic and storage costs. As for human labor cost, the task of updating the software on aircraft and weather stations can be integrated into normal maintenance operations. A separate work request is not necessary. For the first batch of product (10000 units) to go into the market, only 150,000 to 300,000 USD is necessary. In the worst situation, private funding from charities and organizations are more than sufficient.

But still, to persuade the handlers and governments who intends to sell or distribute the device that it doesn’t result in a negative revenue, it is necessary to talk about how to

sustainably run the business. Currently, the envision is that as it is assumed that the solution is not profit-oriented, for handlers, the extra revenue primarily comes from the tax exemption or reduction from the government (depending on the policy). Besides, for handlers with some experience in electronics repair, they can also be entitled the privilege for maintenance works, and make revenue out of it. But still, if they feel like to sell the device at USD 50 and people are still happy to buy it, the author doesn't have any opposition either.

If the project is run fully by government, the situation is a little bit more complex. On the one hand, a full subsidiary, although doable, is not favored, as residents might later take it for granted that this is a free government service. On the other hand, if the government runs such a program and force the residents to pay, things might be even worse. Therefore, the author suggests that a larger subsidiary is offered to the residents who wants to cooperate, and gradually over the years decreases the subsidiary. When the residents are accustomed to using the device, then the subsidiary stops. The exact content and amount of subsidiary might be further discussed (land tax, VAT or something else), but this policy was proven successful. Actually, this is exactly what the German government do to promote the installation of clean energy (solar cells). The government guarantees a price which the residents can sell the electricity generated by their device to the grid for a time period, but meanwhile decreasing the price every year.

Project AECDIMEEIA does not need a well-established organization to run. A team of five people is more than sufficient for the project to properly run. As long as the standard for ADS-B doesn't change, updates for programs and codes are not necessary. Being an IoT system itself, the device is designed to be autonomous. Besides, to cope with privacy policies such as GDPR (also named as DSGVO, Die Datenschutz-Grundverordnung; and RGPD, Règlement général sur la protection des données), no information will be collected from the user side. The support for the product will be carried out primarily in the form of an open-source online community, which is more or less in the same structure as the Arduino community.



## 5. Partnership

The major partners of the project are the governments and airlines (of course...who else should we expect?) Meanwhile, electronic handlers, organizations, electronics factories, packaging companies, logistic provider and storage provider should also be included into this cycle.

It is not so difficult to include the government into this project. The benefit of implementing the system has already been properly analyzed. It is also not a must to directly implement it on a national level. It can be first implemented in a region with the help with local government, and gradually extend it to county, province, and then to a country. Implementing the project would not cause any significant administrative labor either, but the benefit is real. For countries with capability of bringing mission loads up into the orbit, they can also choose to cooperate with the project to develop an information delivery system. The large number of users and devices naturally forms an alert and warning network. For example, in country like China, which has a large population but underdeveloped emergency notification system, this option will probably be very attractive.

To get airlines into the play, first of all, for state-sponsored companies, like Air China and some others, an administrative order would be sufficient. For private business, they can be rewarded with tax reduction for cooperation. Emission tax, noise tax, airspace utilization tax and some other fees could be discussed and correspondingly adjusted. Although for each flight the amount reduced would be small, but over the years it will still be a considerable amount, and also a very nice example of "social and environmental care" of the companies. All of these comes at almost no cost for companies, as the apparatuses have already been installed, and extra fuel consumption is even less than the fuel leak during refill. Most of the airlines would likely be more than willing to support.

Electronics manufacture and packaging could be carried out all in the same factory, which is also a common practice in the industry. However, if some information is known prior to the manufacturing of the device and a large market need can be concluded, it is recommended to commission the production into several factories to avoid interruption. A cooperation with famous electronic handlers is strongly recommended, as they have an established international distribution network, and could facilitate in the component price negotiation as well.

For logistics and storage, because of the robustness of the design against temperature and humidity, it could be stored in a regular warehouse without air-conditioning to save the cost. The author suggests cooperating with a logistic company endorsed by the country, especially Deutsche Post-DHL group. Using the post service provided by the network of UPU (universal post union) is also an option. Otherwise, it is also a wise choice to cooperate with some reputed international or local logistic provider.

Finally, it is time to talk about the last but extremely important pillar of our castle: the organizations. As mentioned, a close cooperation with UN, UPU and ICAO is extremely important. ICAO, especially, is the most important. Without their support, the ideas and solution envisioned will never be able to be realized. Apart from these, the support from ISO, IEC, IEEE, DIN, VDE etc. is also of great importance. The transmission protocol and message construction scheme need to be standardized for global application. Also, although currently listening to the 1090MHz signal doesn't need a particular radio license, if the weather station will transmit the information also in 1090MHz after the aforementioned update, then a license would probably be necessary. Therefore, it is still necessary to figure out if 1090MHz can be categorized as a license-free frequency, which further requires cooperation with governments, committees and organizations such as FCC. Last but not least, cooperation with weather information institute/administration like NOAA and external service provider should also be planned well in advance.

## 6. Scaling and replication strategy

Scaling and replication can mean a lot of different things in the context of a business. Here the author would like to discuss from the perspective of how to enlarge the size of the business and correspondingly make a larger user group.

As the author has already mentioned several times, the project is very different and non-traditional comparing to any other solutions proposed. It is also not profit-oriented, putting it in sort of a "weird position". Therefore, the replication and scaling cannot be based on the traditional model which is profit-driven. But meanwhile, it is also a chance for us to take some unprecedented approaches.

One possible but least favorable solution is to make use of administrative orders. If we would like to avoid this option, then it will be very important to catch the social hotspots and/or rely more on public propaganda. For example, during the past six months, the Swedish-girl-driven action has caught much attention globally, which is exactly one of the best occasions to advertise the device to the general public. Also, in many countries, there are nationally-recognized days on topics concerning agriculture and environmental protection. During the celebration, volunteers of the community could distribute or sell some devices in the venue. Local televisions and radio stations could also be invited to give interviews. The most important thing here is not about selling those several extra pieces of device, but rather, we need to catch the attention and raise discussion on our device. Only when the society are engaged in the topic and the device is in the spotlight

can we enhance our influence. Only with sufficient influence can the user group grow exponentially.

The only work to make the scale up is probably localization of the software (translation of user interface) and establish support community. The device itself does not have any country-specific configurations or options by now.

## 7. Conclusion

To conclude this lengthy business report, Project AECDIMEEIA has a huge potential group of customers, and the prospective is very promising. While the device is not developed in profit-oriented manner, it still enjoys significant advantages over traditional solutions: cheap, flexible/multifunctional, reliable, direct and easy to implement. Business outreach can be carried via various approaches, primarily via information propagation, while the customer engagement should be preferably carried out along with some governmental policies. The entire project would not require a huge funding or complex organization support. With the support of open-source initiative, the project can be properly supported during its life cycle. For the project to be successfully implemented, a combined effort from governments, handlers, factory, logistics and international organizations is necessary. Finally, to enlarge the influence and size of the project, it is necessary to get as much attention as possible and promptly make use of social events and trends.

## Information and Acknowledgements

The author, Zihao LIU, graduated from Germany as Bachelor of Science. The assistant, Hanyu LIU, graduated from United States as Bachelor of Science. The illustrator, Yuhai CAO, graduated from China as Bachelor of Arts.

Being a novice in the field of business, the author himself is open to criticism and suggestions to this report, and hopes to make it better and more mature.

The author would like to appreciate the efforts and patience of the reviewers of this project, and meanwhile appreciate the United Nations for offering such an interesting topic to challenge.



Finally and most importantly, have a nice day.

Auf Wiedersehen!