

Operations Plan

Recovery COVID-19



Extraordinary Edition
version 1.0
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SISCEAB
Sistema de Controle
do Espaço Aéreo Brasileiro



**Departamento
de Controle do Espaço Aéreo**



CGNA
Centro de Gerenciamento
da Navegação Aérea

EXECUTIVE SUMMARY

General Context

As a consequence of the declaration of coronavirus pandemic (COVID-19) by the World Health Organization (WHO), several States declared the closure of their borders and, consequently, of their airports for international operations and, in some cases, even domestic flights.

In Brazil, the total number of air movements registered in April 2020 had a reduction of 74.6% in comparison with the same month in 2019. Amongst the three main segments of aviation in the country, commercial, general and military, the impact was even more expressive for commercial aviation, which fell by 89.5% compared to the same period in 2019. The other two aviation segments also had considerable, but smaller, declines. Following a trend already observed in other countries, general aviation has suffered less impact than commercial aviation. Nevertheless, there was a reduction of 47.2% in comparison with the figures for the same period last year.

Such scenario imposes a need to adapt the capacity of the Brazilian Airspace Control System (SISCEAB) to the new demand. However, considering the transitional nature of the current scenario, it is necessary to develop an action plan aimed at balancing SISCEAB's capacity with the gradual increase in demand that will certainly occur in the coming months.

The Operations Plan - Recovery COVID-19 is an extraordinary edition of the SISCEAB Operations Plan, developed by Air Navigation Management Center (CGNA) collaboratively along with all SISCEAB stakeholders, under the exceptional circumstances of the COVID-19 pandemic.

Objective

The Operations Plan - Recovery of COVID-19 objective is to structure the following actions during the period of air operations recovery:

- a) to adjust SISCEAB's capacity to the gradual increase in demand through the following measures:
 - i. development of a mechanism for closely monitoring demand and possible capacity constrains;
 - ii. optimization of airspace so that the restrictions usually existing due to high demand are temporarily suspended, or even eliminated, depending on the new scenario;
 - iii. search for the feasibility of executing the optimal flight profiles planned by users; and



- iv. maintenance of delay rates at adequate levels, depending on demand and possible capacity restrictions.
- b) to contribute to the recovery and sustainability of the air transport system at a national, regional and global levels in the new projected scenario, through the prioritization of projects currently underway that aim to improve the SISCEAB performance, pursuing schedules and deliveries.

Scope

This Plan applies to the 22 million km² of airspace under Brazilian jurisdiction - 8.5 million km² in continental area and 13.5 million km² over the Atlantic Ocean, according to international treaties, corresponding to the following areas of the Flight Information Regions (FIR): Brasília, Curitiba, Amazônica, Recife and Atlântico.

Validity and update

The present Plan starts on June 1, 2020, and will be updated periodically, whenever necessary, up to December 31, 2021, and may be cancelled or extended according to the recovery period required for the air transportation system at national, regional and global levels.

Rio de Janeiro, May 15, 2020.

A blue ink signature of Sidnei Nascimento de Souza is written above a horizontal line.

Sidnei Nascimento de Souza Colonel
Commander of CGNA

A black ink signature of Liutenant-Brigadier Heraldo Luiz Rodrigues is written above a horizontal line.

Liutenant-Brigadier Heraldo Luiz Rodrigues
General Director of DECEA



VERSION HISTORY

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ABBREVIATIONS

The abbreviations used in this Plan have the following meanings:

ABEAR	-	Brazilian Association of Airlines
ACC	-	Area Control Center
AIP	-	Aeronautical Information Publication
AIS	-	Aeronautical Information Service
AMHS	-	ATS Message Handling System
AOM	-	CGNA Subdivision of Airspace Organization and Management
APP	-	Approach Control
ATC	-	Air Traffic Control
ATFM	-	Air Traffic Flow Management or CGNA Subdivision of Air Traffic Flow Management
ATM	-	Air Traffic Management
ATS	-	Air Traffic Services
CCO	-	Airline Operations Control Center
CDM	-	Collaborative Decision Making
CGNA	-	Air Navigation Management Center
CIRCEA	-	Airspace Control Circular
COVID	-	<i>Coronavirus Disease</i>
DECEA	-	Airspace Control Department
EMBRAER	-	Brazilian Aeronautical Company
EST	-	CGNA Subdivision of Statistics
FIR	-	Flight Information Region
FMC	-	Flow Management Cell
FPL	-	Flight Plan Message Presented
FRTO	-	<i>Free Route Airspace</i>
FUA	-	Flexible Use of Airspace
GEPEA	-	Study Group of Airspace Planning
IAF	-	Fixed initial approach
IATA	-	International Air Transport Association
IPEV	-	Flight Research and Testing Institute
NOTAM	-	Notice to Airmen



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OACI	-	International Civil Aviation Organization
OPC	-	Optional Route
PFF	-	Performance Framework Form
RPL	-	Repetitive Flight Plan
RRSM	-	Reduced Separation Minimum between Aircraft Using the same Runway
SID	-	Standard Instrument Departure
SIGMA	-	Integrated Air Movement Management System
SISCEAB	-	Brazilian Airspace Control System
STAR	-	Standard Instrument Arrival
SWAP	-	Severe Weather Avoidance Plan
TMA	-	Terminal Area

1 INITIAL SCENARIO

Shortly after the declaration of a pandemic on the new COVID-19 and, consequently, the adoption of the first actions in terms of isolation and social distance were announced by the Brazilian authorities, the CGNA initiated the actions below detailed in order to optimize flights in the departure, route and arrival phases in the main terminal areas (TMA) in order to meet the new demand scenario with the greatest efficiency possible. These actions were held by the GEPEA *Adhoc* Group CDM Routes, whose coordination is under its responsibility along with the participation of representatives from the main Brazilian air traffic control units (ATC), airlines, the International Air Transport Association (IATA) and the Brazilian Association of Airlines (ABEAR).

1.1 Route Optimization

The optimization work started with enroute airspace and was divided into phases. In Phase 1, 211 Preferential and Alternative Routes in the Route Playbook were analyzed. Of this total, 184 routes were immediately turned into Optional Routes (OPC) and are no longer mandatory, allowing airspace users a greater flexibility in flight planning.

In Phase 2A, a feasibility analysis of direct routes between city pairs was carried out, with the objective of connecting the last point of the Standard Instrument Departure (SID) from the airport of origin to the first point of the Standard Instrument Arrival (STAR) of the destination airport. The Group concluded that it was possible to implement such changes and then a total of 34 direct routes were created.

In Phase 2B, the feasibility analysis of an early implementation of the Free Route Airspace concept (FRTO ASBU/0) throughout Amazônica and Recife FIR was carried out. Such concept is also being conducted by CGNA via GEPEA *Adhoc* Group Airspace Management. The specialist team concluded that it was feasible to implement the FRTO ASBU/0 in Amazônica and Recife FIR and decided that the procedures would be included in the respective AIS publications.

1.2 Arrivals and Departures Optimization

The enroute optimization was carried out and the optimization feasibility analysis on the arrivals and departures of the main TMA was initiated, based on the use of intermediate points of SID and STAR, as well as the shortening of aircraft to the Initial Approach Fixed (IAF) of the approach procedures. It

should be noted that such optimization was already being carried out at the initiative of the responsible ATC units at tactical level. However, we sought to standardize and structure this procedure within the scope of each ATC unit, allowing greater predictability to airspace users.

The Group concluded that it was feasible to optimize arrivals and departures, having implemented forty routes, which were denominated Programmed Tactical Routes and are available on the CGNA Operational Portal, at RESOURCES tab.

1.3 Flexible Use of Airspace (FUA)

In order to improve the efficiency of flights in Brazilian airspace, and based on the FUA concept, CGNA reinforced its coordination with users of certain restricted areas in order to increase the availability of these areas for the use of civil aviation, optimizing air operations in all phases of the flight.

Thus, taking into account the difficulties of civil aviation in maintaining its flights regularity in the current scenario, coordination was done with the Flight Research and Testing Institute (IPEV) and with the Brazilian Aeronautical Company (EMBRAER) in order to develop a plan in a way that test flights would be concentrated as much as possible within ENSAIO areas, avoiding XAVANTE A and B areas. In this way, UZ10 airway, which is used by aircraft approaching to Campinas and Guarulhos airports, would be available for the operation of civil aviation, without any constraints.

1.4 Flight plan

Regarding the flight plan presentation, NOTAM was issued stating that this presentation must be done via INTERNET or TELEPHONE, in order to avoid crowding in AIS units.

Additionally, considering the current scenario of uncertainties and the consequent difficulties in planning of flights, CGNA and airlines, collaboratively, decided to use, on a temporary basis, the complete Flight Plan (FPL) in lieu of the Repetitive Flight Plan (RPL), via SIGMA or AMHS.

1.5 Results

The initiatives on optimizing departures, enroute and arrival phases inside the main Brazilian TMAs resulted in fuel savings for the three largest national companies, in April 2020, equivalent to a sum of 200 flight segments between Guarulhos Airport/São Paulo and Galeão Airport/Rio de Janeiro, as detailed in Tables 1 to 3.

Table 1 – Results of enroute optimization initiatives

	NM	Min	FUEL (kg)	CO₂ (kg)
AZUL	11515	1439.375	47499.38	150098
GOL	17230	2153.75	94765	299457.4
LATAM	9042	1130.25	37298.25	117862.5
TOTAL	37787	4723.375	179562.6	567417.9

Table 2 – Results of departures and arrivals optimization initiatives

	NM	Min	FUEL (kg)	CO₂ (kg)
AZUL	2626	525.2	14705.6	46469.7
GOL	21248	4249.6	152985.6	483434.5
LATAM	9410	1882	52696	166519.4
TOTAL	33284	6656.8	220387.2	696423.6

Table 3 – Total result of airspace optimization initiatives

	NM	Min	FUEL (kg)	CO₂ (kg)
AZUL	14141	1964.575	62204.98	196567.7
GOL	38478	6403.35	247750.6	782891.9
LATAM	18452	3012.25	89994.25	284381.8
TOTAL	71071	11380.18	399949.8	1263841

2 OPERATIONS RECOVERY SCENARIO

Once having adopted the immediate airspace optimization actions listed in the previous Chapter, it is mandatory to develop new actions aimed at the resumption of operations considering this a challenging scenario, due to its dynamism and lack of precedents. Such actions should adapt SISCEAB's capacity to the gradual increase in demand and besides contribute to the recovery and sustainability of air transport system at a national, regional and global levels in this new projected scenario.

Regarding the adequacy of SISCEAB's capacity to the gradual increase in demand, the following actions allow:

- a) to define a process for closely monitoring of demand and possible capacity constraints;
- b) to optimize the airspace so that restrictions caused by high demand are temporarily suspended or even eliminated according to the new scenario;
- c) to search the performance of optimal flight profiles planned by the users; and
- d) to maintain the delay rates at adequate levels.

Regarding the contribution to the recovery and sustainability of the air transport system as a whole in this new projected scenario, it is necessary to prioritize projects that aim to improve SISCEAB performance, pursuing schedules and deliveries. Within these projects, which are detailed below, we highlight AGILE GRU, AGILE RIO, AGILE VCP, GEPEA and the Airport Infrastructure Committee, as they are an industry initiative, making use of a collaborative and cooperative environment and, consequently, representing their own necessities.

2.1 Enroute Optimization

The maintenance of the enroute optimization achieved in Phases 1 and 2 mentioned in the previous chapter will be pursued as far as possible due to the gradual increase of air traffic demand.

Regarding the Optional Routes, its maintenance will be evaluated on a case-by-case basis, giving priority to those that bring the greatest benefit to airspace users, considering the volume of traffic and the reduction in distance flown. In this sense, small adjustments in the published routes and/or resectorization of an ACC/APP may be necessary, among other measures.

Regarding the Free Route Airspace concept (FRTO ASBU/0) implemented in Amazônica and Recife FIR, the feasibility of implementing it on a permanent basis should be evaluated.

It is estimated that enroute optimization in these terms, in a scenario with an air traffic volume of around 50% from the period before COVID-19, could generate savings up to 900 tons of fuel per month and a reduction of CO₂ emission around 2900 tons, which is equivalent to about 450 flight segments between Guarulhos Airport/São Paulo and Galeão Airport/Rio de Janeiro, compared to the scenario of the Preferential Routes prior to COVID-19.

2.2 Arrivals and Departures Optimization

The maintenance of the arrivals and departures optimization achieved (see previous Chapter) will be pursued as far as possible according to the gradual increase in demand. The use of the Tactical Programmed Routes on a permanent basis will be analyzed as well. The intention is to allow its use in times of low demand or during times when other busy airports within the same TMA are closed to air traffic, such as São Paulo and Rio de Janeiro; during the closing operations period of Congonhas (SBSP/CGH) and Santos Dumont (SBRJ/SDU) Airports, which would be beneficial for air traffic departing and arriving at Guarulhos and Galeão Airports, respectively.

2.3 Flexible Use of Airspace (FUA)

The maintenance of the flexible use of areas XAVANTE A and B achieved (see previous Chapter) will be pursued as far as possible so that optimization in all phases of flight is fully achieved.

In addition to that, a thorough mapping of the main restricted areas in Brazil is being carried out in order to propose solutions for making their use even more flexible, through the PFF005 of the SIRIUS BRASIL Program and the GEPEA *Adhoc* Group Airspace Management, both under CGNA's coordination, among other solutions. Instruction areas of the Air Force Academy and the BARREIRO and PARAÍBA 1 areas are also being studied in order to optimize them as well.

2.4 Flight Plan

The maintenance of the actions taken in relation to the flight plan presentation (see previous Chapter) will be pursued as far as possible due to the gradual increase in demand. In addition, the lessons learned in the use of FPL by airlines and their impact on CGNA/ATC operations should be considered when resuming the application of the RPL, considering that the information from the FPL is more accurate than that from the RPL. An assessment of the maintenance of the use of FPL by users in the resumption of air

traffic demand should be based on the impact for the airlines and the need to receive the flight intentions with reasonable advance for analyses at the ATFM strategic level.

2.5 Severe Weather Avoidance Plan

The Severe Weather Avoidance Plan (SWAP) is an initiative of the AGILE GRU Project and was implemented on an experimental basis for Guarulhos Airport on December 15, 2019. SWAP aims to guide actions at the strategic level, adopted at the tactical on the occasion of operational scenarios with severe weather conditions that imply the need to avoid a certain airspace, contributing to the maintenance of minimum levels of operational efficiency in SISCEAB.

Due to the characteristics of the climate in Brazil, in which the severe convective weather appears more frequently from September, the possibility of activating SWAP between May and September is remote. However, in view of the work program of the SWAP *Adhoc* Group of the AGILE GRU Project, coordinated by IATA, meetings have been held in order to identify opportunities for improvement and to revise the Plan actually in force to increase its efficiency in the high season (2020/2021).

Among the main opportunities for improvement identified, the improvement of the decision-making process must be mentioned, which involves the ATFM service, aeronautical meteorology, the airlines CCO and the SWAP Routes Playbook.

SWAP is expected to contribute to a reduction in the number of alternate flights, as well as a reduction in the number of holding patterns and as an experience for the plan to be expanded to other airports soon.

2.6 Reduced Minimum of Separation Between Aircraft Using the Same Runway (RRSM)

The implementation of Reduced Separation Minimum between Aircraft Using the same Runway (RRSM) will provide additional conditions for greater operational efficiency in landing and take-off operations, contributing to the reduction of the number of flights holding, reduction of the TAXI OUT time and increase of runway capacity.

Although the implementation of RRSM is already underway at Guarulhos and Viracopos Airports, as an initiative of the AGILE GRU and AGILE VCP Projects, the implementation at other airports is being motivated by CGNA due to its contribution to increase runway capacity.

2.7 Runway Occupancy Reduction Program and Optimization of Aircraft Separation

The Runway Occupancy Reduction Program and Optimization of Aircraft Separation program was an initiative of the AGILE GRU Project, having been implemented at Guarulhos Airport, with the updating of information at Brazil AIP, using a specific campaign folder and a monitoring of operational performance indicators.

The implementation of the program provided an increase in efficiency, contributing to the application of the minimum separation of 3NM on final approach, increasing runway capacity, reducing number of holdings and reducing TAXI OUT time.

The experience at Guarulhos Airport contributed to the start of implementation at Campinas Airport, as an initiative of the AGILE VCP Project, in order to contribute to the application of the minimum separation of 5NM, with an interleaved take-off, or 3NM between successive approaches. such implementation in other airports is being fostered by CGNA due to its importance in the increase of runway capacity.

2.8 TMA-SP's New Airspace Concept (TMA-SP NEO)

The new airspace concept of the São Paulo TMA is an initiative of the TMA-SP NEO Project and aims to increase airspace capacity and reduce its complexity, absorbing future demand.



The implementation of the new airspace concept will provide a reduction in the number of flight holdings, due to the use of the Point Merge concept, and a reduction in TAXI OUT time at the main airports, due to the increase in capacity of the departure ATC sectors.

2.9 Runway Capacity

Recent developments in terms of runway capacity at major Brazilian airports are an initiative of the Airport Infrastructure Committee (CIA). Created in 2018 by DECEA, this Committee established targets for increasing runway capacity values for the main airports between S18 and W20 seasons. The approved values for each season are shown in the table 4.

Table 4 – Increase in hourly runway capacity per season

Airport	S18	W18	S19	W19	S20	W20
SBGR	52	55	55	57	57	57
SBKP	31	31	33	35	37	40
SBBR	53	64	68	72	76	80
SBGL	44	48	52	54	56	60
SBCF	31	31	31	35	35	37
SBCT	24	24	24	28	30	32
SBFL	15	15	17	25	25	25
SBPA	26	26	28	30	32	34
SBSV	28	28	30	30	34	36
SBRF	29	30	29	34	36	38
SBFZ	28	28	28	32	34	36
SBBE	20	20	20	24	26	28
SBEG	26	26	26	32	34	38
SBGO	26	26	26	32	34	38

-  Values above the target of the Airport Infrastructure Committee (CIA)
-  Values below the target of the Airport Infrastructure Committee (CIA)

Although this is a work that has already been completed, the real gain in terms of capacity for the W20 season (from 10/25/2020 to 03/27/2021) will certainly contribute to the recovery and sustainability of the air transport system as a whole. Although there are no bottlenecks in terms of hourly capacity at some airports, the values predicted for the W20 will contribute to a more efficient accommodation of flights in intervals of 15 and 5 minutes.

2.10 Vertical Sectorization

The vertical sectorization is an initiative of the GEPEA *Adhoc* Group ATC Capacity, coordinated by CGNA, and aims to increase the capacity of specific ATC sectors of enroute airspace, reducing the number of flight holdings in certain bottleneck areas and increasing the fluidity of airspace.

Phase 1 of vertical sectorization will be implemented in the Rio de Janeiro Region of Brasília ACC, constituting an essential tool for the optimization of some Preferential Routes, which have been used to

avoid congested sectors of that ACC. It is also expected that the vertical sectorization will add to the new airspace concept of São Paulo TMA once it will increase SISCEAB's capacity to absorb greater demands in the future with adequate levels of efficiency and operational safety.

2.11 Coordination with the SAM Region

The sharing of this Plan with the other States of the South American (SAM) Region, as well as the maintenance of close coordination between States, as the resumption of air operations advances in the region, will provide a harmonization of actions at a regional level, benefiting both users and ATC units involved.

Thus, during the resumption phase, the relationship with the International Civil Aviation Organization (ICAO) can be focused, mainly, on actions aimed at supporting an effective recovery from the current situation, which may include:

- a) regional cooperation with the States of the CAR/SAM Region;
- b) interregional cooperation with other ICAO Regions; and
- c) centralization of information from the States of the CAR/SAM Region in a WEB environment, such as the NOTAM related to COVID-19, which were centralized and are being disseminated daily on the CARSAMMA website on the World Wide Web, through the link: <http://portal.cgna.gov.br/carsamma>.

3 PERFORMANCE MONITORING

This Chapter provides an overview of SISCEAB's performance, considering strategic analysis and post-operations. While the strategic analysis addresses the prognosis of demand and the capacity available for the period in issue, the post-operations take into account the previous months and the behaviour of the system, so to speak, before actual demand.

The demand preview is based on information provided by airlines and airports and it is complemented by the demand envisaged for general and military aviation prepared by CGNA, which will be based on recent historical data base. The analysis of the capacity available considers infrastructure or staffing restrictions during the period considered, based on information provided by ATC units and airports.

Tabel 5 – Performance Analysis

Products/Events	Frequency	Deadline	Responsible
COVID-19 Capacity Plans	Monthly	Day 25	ACC/APP
Console Position Plan	Monthly	Day 20	CGNA (ATFM)
Demand Forecast for General and Military Aviation	Monthly	Day 20	CGNA (EST)
Demand Forecast for Regular and Cargo Air Transport	Weekly	D – 7	Airspace Users
Airport Infrastructure Report	Weekly	D – 7	Airports
Special Events	Weekly	D – 7	CGNA (ATFM)
Demand Forecast including General Aviation, Military Aviation and Regular and Cargo Air Transport	Weekly	D – 4	CGNA (EST)
Analysis of Demand X Airspace Capacity	Weekly	D – 2	CGNA (AOM)
Analysis of Demand X Airport Capacity	Weekly	D – 2	CGNA (AOM)
Console Position Plan Actualization	Weekly	D – 1	CGNA (ATFM)
Weekly videoconference and data availability on the CGNA Operational Portal	Weekly	D	CGNA (AOM)
Beginning of the Analyzed Period	Weekly	D + 3	--
End of the Analyzed Period	Weekly	D + 9	--
Post-operations Report	Weekly	D + 12	CGNA (ATFM)

Table 5 lists data, frequency and information source that will be used in SISCEAB's performance analysis. To manage the workload, a dedicated interface will be provided to facilitate the insertion of this information in the CGNA Operational Portal, at RESOURCES tab.

3.1 Strategic Analysis

The strategic analysis in ATC sectors and airports of interest aims to assist the administration of the service schedules of the ATC units and provide information to airports so that they are considered in the management of airport capacity. The initial focus of the analysis is an eventual reinforcement in the shifts. However, the information provided can contribute to the preparation of the regular schedule.

3.1.1 ATC Sectors Performance - ACC and APP Level

The performance perspective in ATC sectors is based on the higher value of the expected air traffic demand and the planned/maximum openings of the ATC sectors. For each ATC unit, CGNA assesses whether the planned/maximum openings of ATC sectors are sufficient to meet the expected demand:

- a) if the planned openings of ATC sectors are sufficient, there is no need to update the capacity plans;
- b) if the planned openings of the ATC sectors are not sufficient, but the maximum openings of the ATC sectors are sufficient, the ATC units shall review the planned openings in terms of the maximum openings of the ATC sectors; and
- c) if the maximum openings of ATC sectors are not sufficient, ATFM measures shall be implemented to mitigate the impact.

3.1.2 Airport Performance

The performance perspective at the airports of interest is based on the higher value of the expected air traffic demand and the actual capacity values, considering the existing or planned restrictions for the period. In this analysis, CGNA takes into account:

- a) the relation between the expected demand for landing and take-off operations at the airport of interest and the airport capacity available;
- b) the main airport restrictions that may impact capacity; and

- c) the possibilities of imbalances between capacity and demand at the airport, specifying the day and time, if applicable.

Strategic performance analysis at airports of interest can be found on CGNA Operational Portal, at RESOURCES tab.

3.1.3 Bottlenecks and Capacity Optimization Actions

For each potential bottleneck identified in the strategic analysis, mitigation solutions are required and proposed to ATC units, airports or airspace users. In this sense, measures to optimize the airspace and airports capacity include:

- a) opening of the ATC sector:
 - planned ATC sector openings
 - maximum ATC sector openings
- b) capacity reductions in the ATC sector, if any, during the recovery;
- c) availability of reinforcement to the operational team;
- d) additional information (for example, availability of technical infrastructure, other restrictions to be highlighted, etc.); and
- e) special events and implementations.

3.1.4 Special Events

Considering that the schedule of events and air operations is being reviewed by those in charge of it, it is necessary to monitor the planning of such events, in particular, due to the great possibility of a concentration of events to occur during the second half of 2020 and the first half of 2021 depending on the postponements.

Early notification, coordination and preparation of special events will be essential to ensure the least impact on air operations. CGNA will coordinate the preparation of these events, as well as the impact assessments and develop, if necessary, mitigation solutions, along with the interested parties.

3.2 Post-operations

Post-operation monitoring should compare the projected demand in the strategic analysis and the operation that actually took place, aiming to work with users to improve the mechanisms for updating information within SIGMA, as well as consolidating the best practices and lessons learned throughout this process.



Colaboration:

