STRATEGIC INNOVATION ROADMAP

1 Creating a position within a co-creation industry
Build long-term strategic relationships with external environment which will result in environmental, social and economic outcomes.

2 Establishing a sustainable system
Align strategic goals and aspirations with sustainable business practice and support local community by engaging them in processes.

3 Strengthening the transport infrastructure within system
Align strategic infrastructure development with future needs, to be innovative, adaptable and ready for future changes.

2020

MRTT 1

2022 - 2050
Electrification of operations

MRTT 2 & 3
MRTT 4
MRTT 5

2025

2030

2030 - 2045
Transition hybrid aircraft

2035

2040

2040 - 2050
Transition electric aircraft

2045

2050

1 — **2018 - 2020**
1. Connect operations with Eindhoven Airport
2. Set up centred coordination
3. Set up a joint implementation team
4. Facilitate adaptivity by creating internal bottom-up connection

1 — **2019 - 2035**
Set up and establish connection external environment

3 — **2020**
Develop energy generation at airbase and implement within operations

2 — **2020**
Improve transport infrastructure around airbase

1 — **2021**
Connect with co-developers and Eindhoven city

3 — **2022**
Improve electric (transport) infrastructure around airbase

1 — **2023**
Start automation transition
Start connectivity transition

2 — **2026**
Create loop of aircraft and materials with suppliers and co-developers around the airbase

3 — **2028**
Connect electric (transport) infrastructure of airbase with Eindhoven city

1 — **2030**
Start electric aircraft transition

3 — **2030**
1. Create shared electric network
2. Upgrade system by implementing renewables

2 — **2033**
On demand short electric flights

3 — **2035**
Create automated and connected electrical system

2 — **2040**
Combined and connected air- and land transport

2 — **2045**
On demand long electric flights

3 — **2045**
Connect self-sustaining airbase system with co-developers and suppliers to create a circular economy

Eindhoven Airbase needs to mutually operate as the first self-sustaining transport city in the world in 2050

Since the mid-1980s, passenger numbers have more than doubled and freight traffic has increased almost three-fold (ATAG, 2005). This trend is expected to continue over the next 20 years, with world passenger traffic (by revenue passenger-kilometers) expected to grow 5% annually and air cargo (by revenue tonne-kilometers) 5.2% per year (Boeing, 2012).

2020
14% reduction of greenhouse gas emission
15% renewables of total consumption

Constantly change (aviation) regulation to support developments regarding automated (unmanned aircraft) systems.

A new trend is the development of electrical aircrafts, where Zunum Aero, the Boeing and JetBlue-backed hybrid-electric aviation start up, just set a delivery date for its first next-gen airplanes: 2022 (Williams, 2017).

UAS can be used for search and rescue, news reporting, crop spraying, air quality monitoring, after-the-fact crime scene investigation, surveying, disaster response, wildlife tracking, research into the dynamics of violent storms, spotting wildfires, filmmaking, and traffic monitoring (Villasenor, 2014).

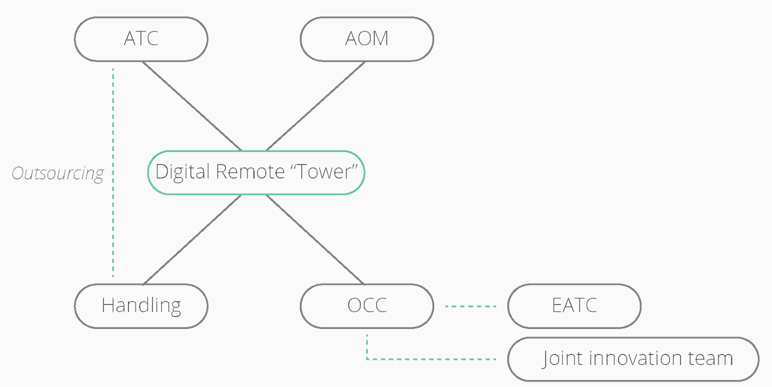
2030
27% renewables of total consumption

Although it starts as a hybrid, its design allows for a smooth transition to full electrical propulsion when new battery technology becomes available (CNN travel, 2017). Next to that, EasyJet could be flying planes powered by batteries rather than petroleum to destinations including Paris and Amsterdam within a decade (The Guardian, 2017)

The Unmanned Aircrafts Systems, as mentioned before, are electric battery-powered aircraft and already in service. As battery power improves one can expect to see battery-powered light aircraft and small helicopters as well within 2050 (Agarwal, 2012).

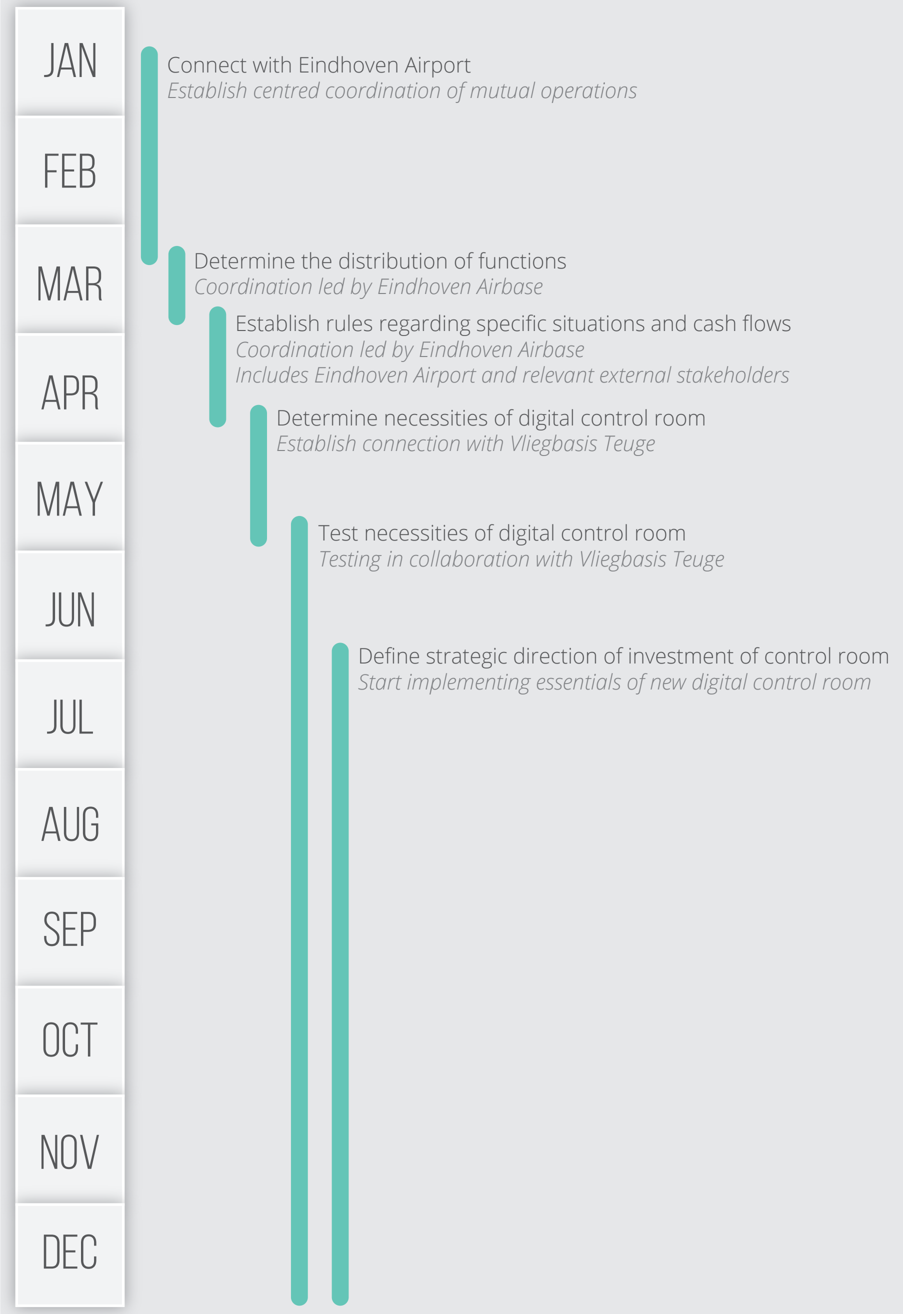
2050
80% renewables of total consumption

CENTRED COORDINATION



A set-up of the centred coordination when Eindhoven Airbase and -Airport will be mutually operating. Mutual operations will decrease human error and the amount of employees needed for certain tasks. It will increase adaptivity and it will save money in the end. In addition, it will prevent fragmentation of the operations during growth. The coordination will be located in a digital control room. The centred coordination consists of ATC, AOM, Handling and OCC. Where ATC and handling can be outsourced and OCC will have a close connection with EATC and a joint innovation team. Eindhoven Airbase is in lead of this centred coordination, because it could run military- and civil operations. When needed Eindhoven Airbase needs to take action easily. The first step Eindhoven Airbase has to take is establishing regulation concerning finances and task devision of both companies.

2018



Connect with Eindhoven Airport
Establish centred coordination of mutual operations

Determine the distribution of functions
Coordination led by Eindhoven Airbase

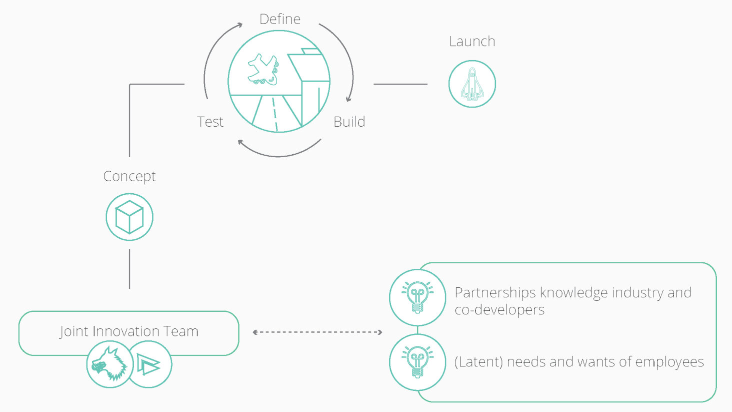
Establish rules regarding specific situations and cash flows
Coordination led by Eindhoven Airbase
Includes Eindhoven Airport and relevant external stakeholders

Determine necessities of digital control room
Establish connection with Vliegbasis Teuge

Test necessities of digital control room
Testing in collaboration with Vliegbasis Teuge

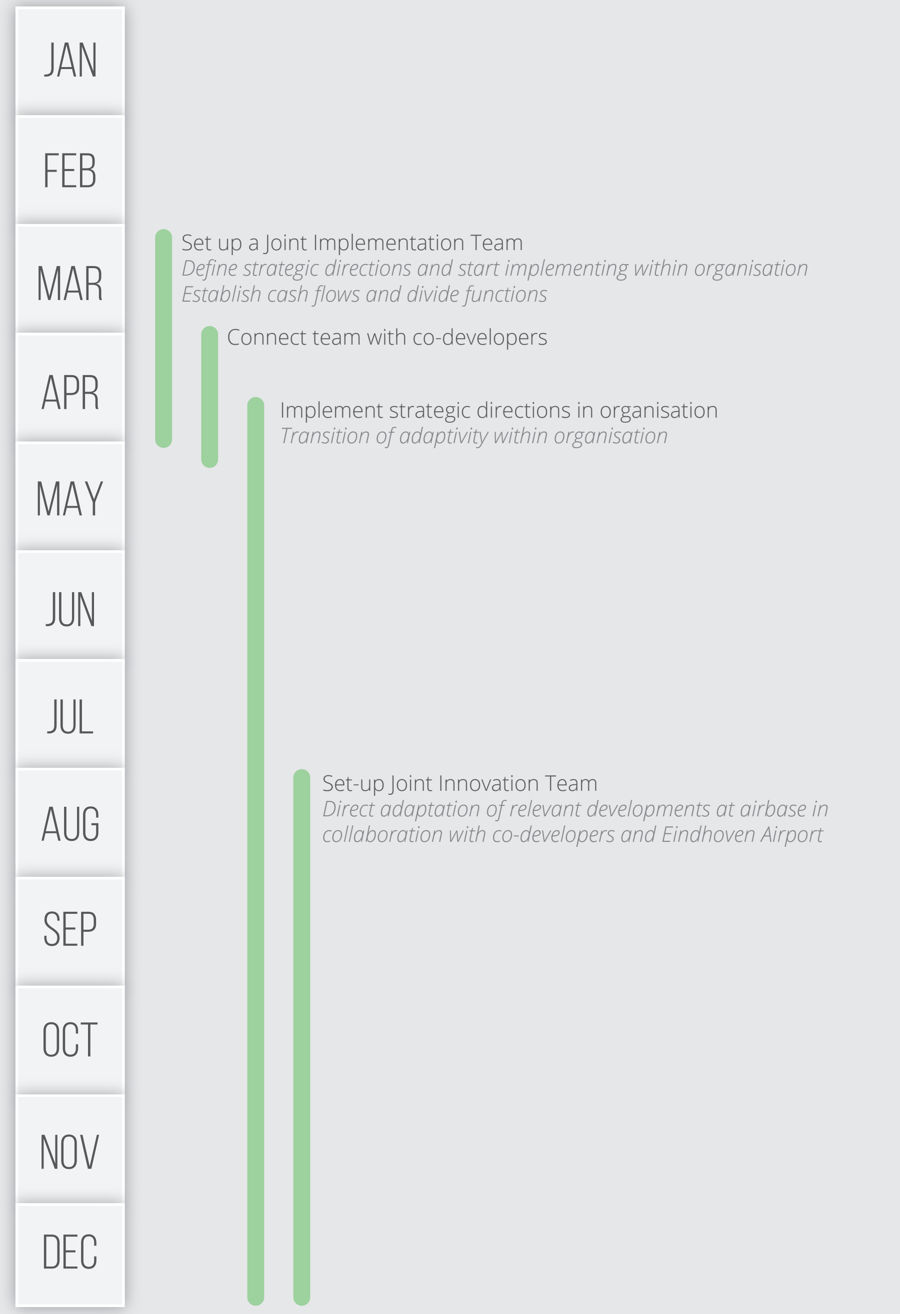
Define strategic direction of investment of control room
Start implementing essentials of new digital control room

JOINT INNOVATION TEAM



The Joint Innovation Team is the follow-up of the Joint Implementation Team. This innovation team can increase the adaptivity at Eindhoven Airbase and create the connection with the nearby co-developers. This creates a co-creation industry together with the external environment. Next to that, this team will be operating at the airside and is therefore close to the needs of all employees on that site. A joint innovation team will support the restoration of operational readiness. Additionaly, this joint innovation team has to repeat the strategic design process annually. Repeating this process supports in adapting quickly to the fast changing environment.

2018



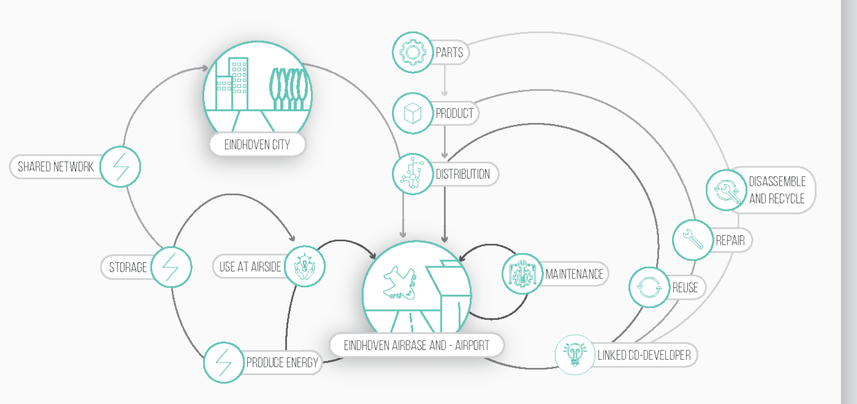
Set up a Joint Implementation Team
Define strategic directions and start implementing within organisation
Establish cash flows and divide functions

Connect team with co-developers

Implement strategic directions in organisation
Transition of adaptivity within organisation

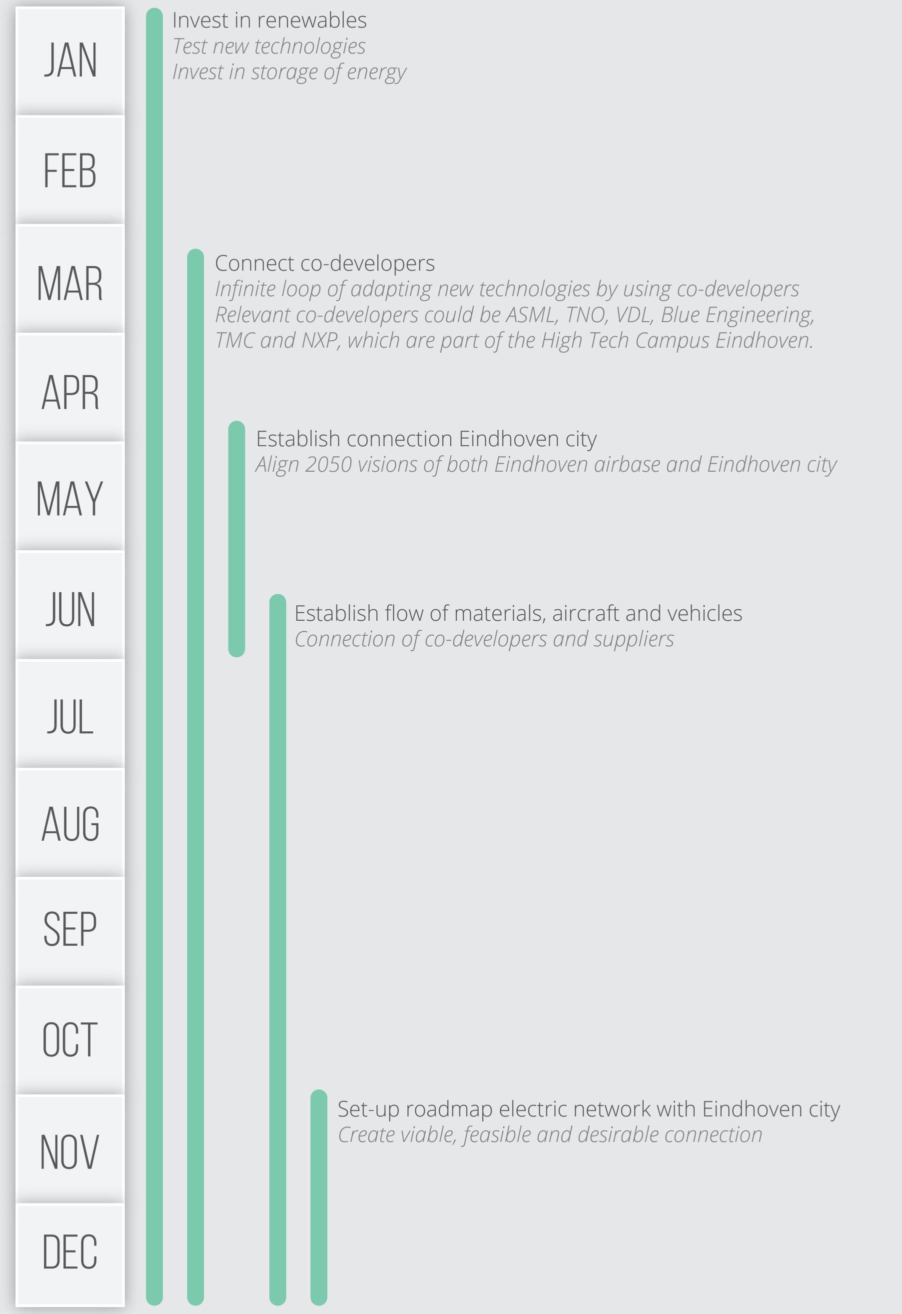
Set-up Joint Innovation Team
Direct adaptation of relevant developments at airbase in collaboration with co-developers and Eindhoven Airport

CIRCULAR ECONOMY



Important in this illustration is the connection of Eindhoven Airbase with Eindhoven city and nearby co-developers. The circular economy can consist of multiple flows, which will circle within and around the airbase. Firstly, it is important to close the flow of vehicles, aircraft and material. Maintenance can remain an operation that is carried out by the airbase, but repairing and recycling can be done by external co-developers. The parts of aircraft, vehicles and other material can be reused within the closed flow or recycled. All these processes take place nearby the airbase, which could result in decreasing transportation time, energy and positively influence the adaptivity and thus speeding up material readiness. Secondly, the energy flow will also be important to support the operations at the airbase. Eindhoven Airbase needs to produce this energy at the airbase, to become a self-sustaining airbase and provide buildings, aircraft and operations with energy. Considering the electrification it is important to find possibilities to store the energy to use it in times of need.

2018



Invest in renewables
Test new technologies
Invest in storage of energy

Connect co-developers
Infinite loop of adapting new technologies by using co-developers
Relevant co-developers could be ASML, TNO, VDL, Blue Engineering, TMC and NXP, which are part of the High Tech Campus Eindhoven.

Establish connection Eindhoven city
Align 2050 visions of both Eindhoven airbase and Eindhoven city

Establish flow of materials, aircraft and vehicles
Connection of co-developers and suppliers

Set-up roadmap electric network with Eindhoven city
Create viable, feasible and desirable connection