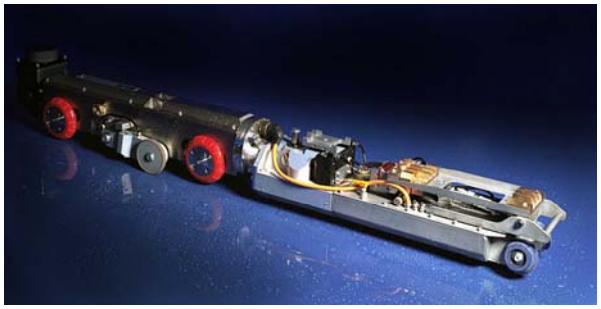
FAST ROBOT AG

Bridging the fibre gap in cities….through sewers networks



Altendorf (Switzerland), December 2.010

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FAST Robot AG belongs to well renowned KA-TE Holding AG, owner of KA-TE Pmo AG, the sewer re-habilitation robot manufacturer leader in the industry

- KA-TE AG was a pioneer in the manufacturing of fully automated robot devices to re-habilitate bad sewer pipes, quickly becoming a reference for quality and reliability in the industry
- His founder, Mr. Erich Himmler, has a vast number of patents that led to a number of improvements in the sewer industry helping municipalities and contractors to get solutions for previously non-resolved problems
- The re-habilitation robot systems were the baseline used by KA-TE to develop a new generation of robots capable of deploying fibre inside non-man entry sewers
- The concept of FAST was developed jointly with Alcatel, IK-T and the Hamburg Water Company, in 1.997
- The company experimented a boost in their business thanks to the commercialization of over 40 fibre FAST robot systems in year 2.000 for a large initiative in the USA: Citynet Incorporated, whose plans were to deploy fibre all over the USA
- Since then, a vast number of cities have embraced the FAST technology as a clean, non-agressive, non obstructing methodology to deploy fibre inside non-man entry sewers
- FAST stands for 'Fibre Access Sewer Tube' and at the same time that is one of the key success drivers together with cost efficiency and relialibility
- A list of references where the technology has been utilized is supplied ahead in this presentation

The FAST Robot AG Board and Executive Members is a complete set of professionals involved in the industry over the years

Erich Himmler
Chairman

Markus Oberle
Managing Director

Dr. Hans Bunschi
Technical Director

Francisco Joya
Sales & Mkt. Director

Josef Schuler
Chief Financial Officer

Monica Hernandez
Head HR, Administration

The Team

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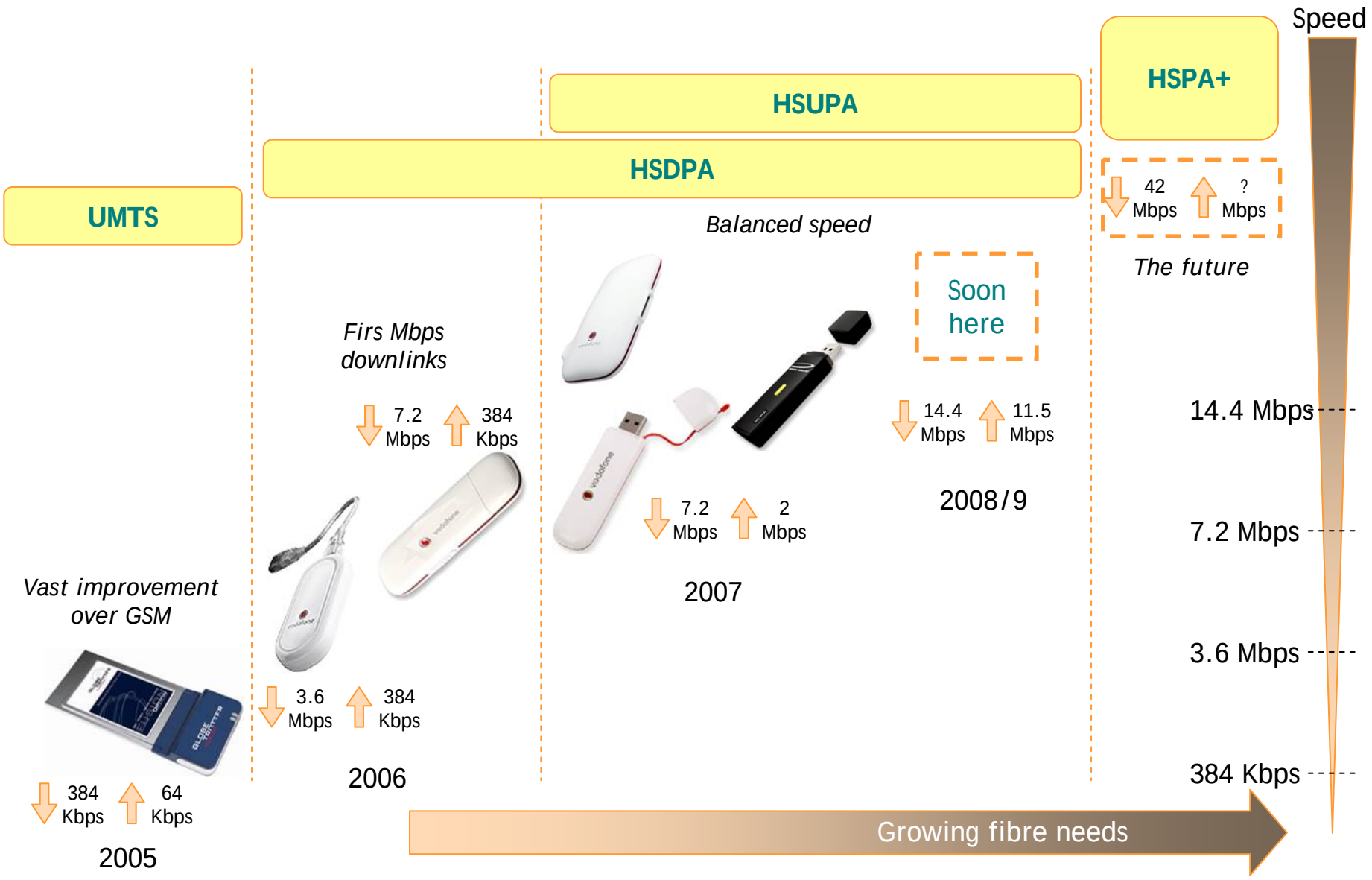
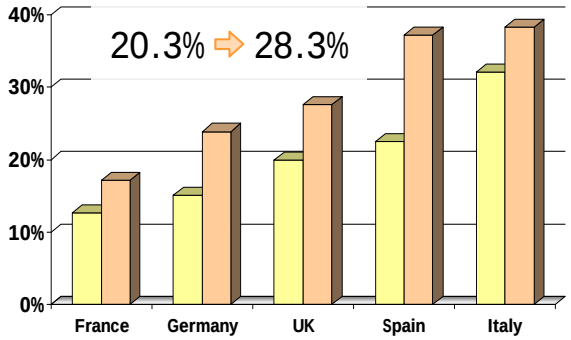
It is not only the fixed line operators who are increasingly growing their need for fibre, but also mobile operators: SPECIALLY MOBILE OPERATORS !!!



With a clear impact on their ability to supply huge broadband mobile data demand

Growth of 3G devices

3G devices: July 07 vs. July 08

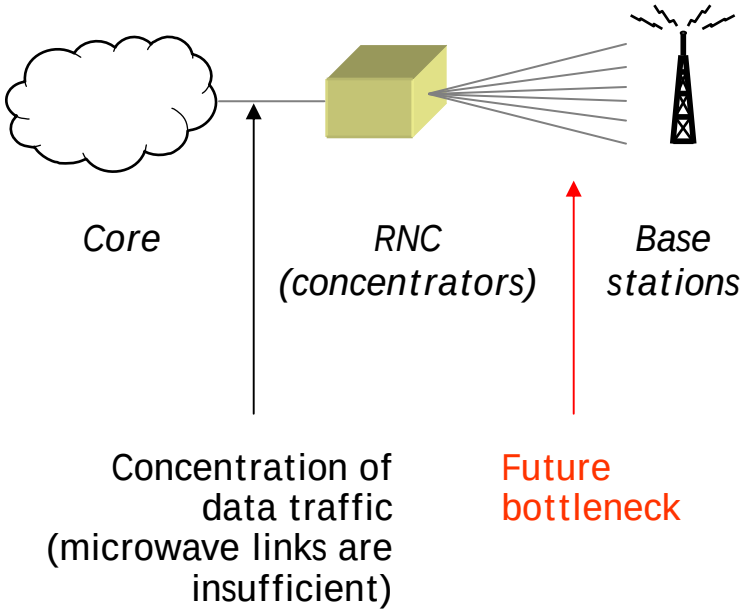


Growth of mobile data

Vodafone Q3 '06 vs. Q3 '07

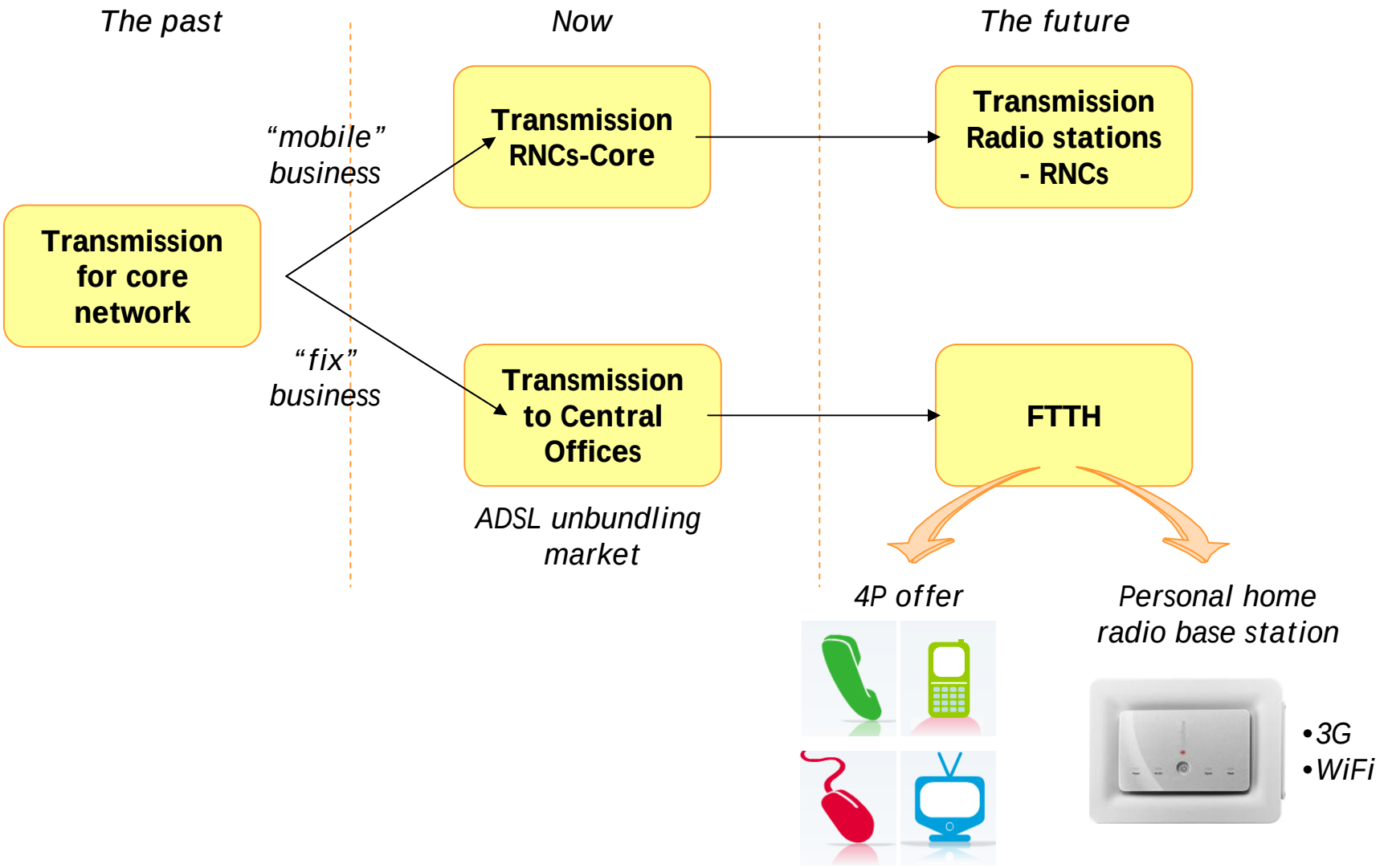
voice	⇧ +2%	
messaging	⇧ +8%	
data	⇧ +42%	Growth driver

Mobile network needs to hope with quickly increasing data traffic



Source: Yankee Group, Light Reading, Vodafone press releases (organic growth Q3 '06 versus Q3 '07)

So the future key players in the industry are asking themselves : where is all that fibre we need ????



Traditionally there has been a permanent divergence in telecom operators and municipalities that have made the massive deployment of fibre everything but easy

The Telecom Manager

Needs

- New fibre deployments everywhere
  Achieve corporate targets
  Provide additional services
  Avoid bottle-neck in his networks
  Spend his budget for the year
  Prove his abilities to get access to public domains
  Keeping his job !!!

The Municipal Politician

Does not need

- Trenching everywhere
  Citizens complaining of noise and molesting civil works
  Traffic congestion because of civil works
  Potential lose of votes in ballots
  Other services affected by trenching
  Head-aches
  Losing his job !!!

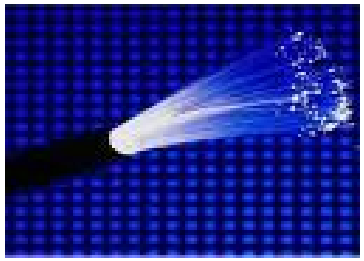
FAST Robot AG, through its FAST technology plays a master-key to match both sides of the equation, thus improving fibre infrastructures in virtually every single spot of a city

Why sewers network to deploy fibre?

- Because there is a sewer pipe below literaly every single street in every single city in the world
- Because sewers are well protected at depths up to 20 mts in some cases. No other environment is safer to deploy such a sensitive element as the optical fibre
- Because the sewer network itself is built with redundancy: this allows the fibre infrastructure to be built using redundancy to prevent service fails in one of the ways
- Because sewer networks are an infra-utilized infrastructure since it is tipycally designed to host a larger volumen of flowing water than what is expected in average
- Because no trenches are required (usually not over 5% of the entire deployment) to deploy fibre inside sewers
- Because the FAST technology contemplates a perfect transition from inside the sewers to outside in the real life
- Because, although conditions down there are highly agressive (corrosion, rodents, acids) a solid infrastructure like that of FAST protects the fibre at maximum levels of demand

Don’t forget the concerns of politicians….

So in FAST we believe that times for trenching are now (almost) over and using existing public infrastructures (i.e. sewers) is the future



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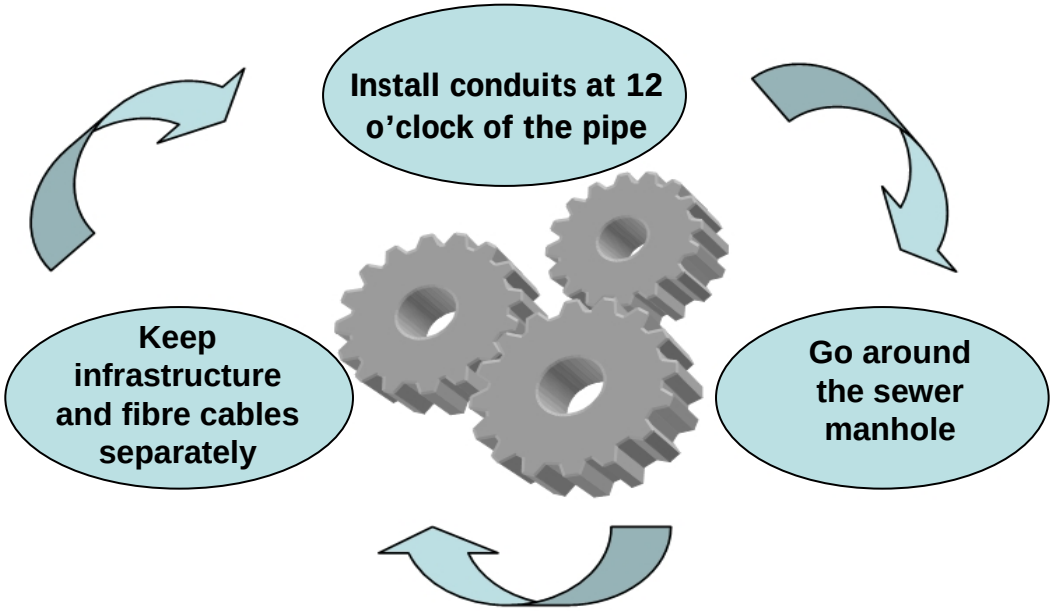
When approaching the deployment of fibre inside non-man entry sewers, three elements need to be taken care of

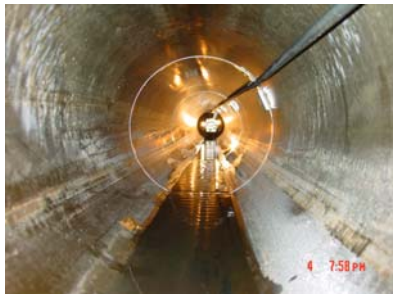


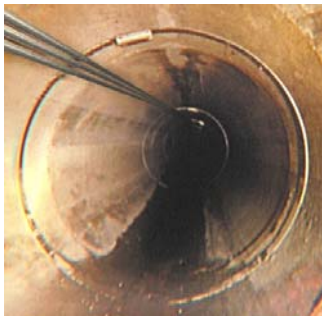
And, PLEASE, don't let anyone drill your non-man entry sewers (at least not below 700 mm)

If you don’t keep those elements in mind you will be a contractor who makes things like this

Who did this ??!!!!

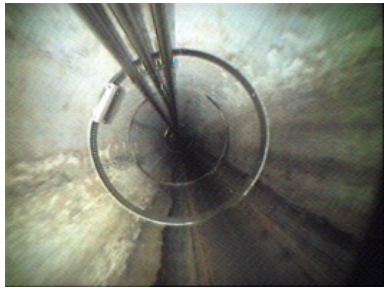
In FAST we take care of sewers, and follow the three elements with our sewer access module system….and this is how it looks !!

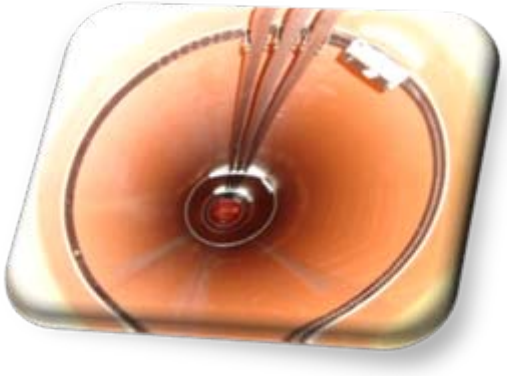


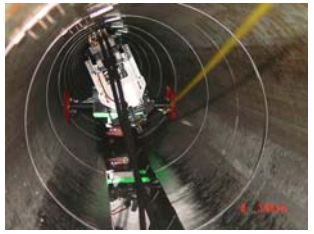


This was done by

FAST ROBOT AG



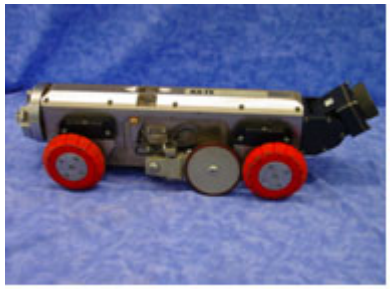




But let’s back to what is interesting for you: the FAST robot technology

FAST’s special guest is our ‘sewer access module robot system’

FAST 200 series



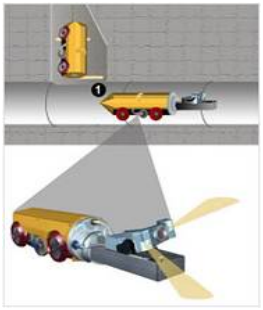
The **200 series robot** can install from 200mm up to and including 300mm diameter sewers

FAST 350 series

The **350 series robot** covers all other sewer diameters from 350mm to 700mm.

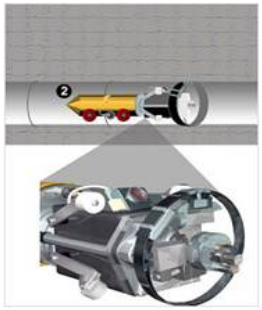
The FAST robot completes the installation process in all 4 steps here described

1.- Inspection and Mapping



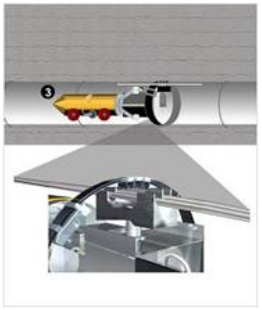
To identify what sewers are in good shape

2.- Installation of clamps



Clamps adjusted with a high pressure spring to the walls of the pipe

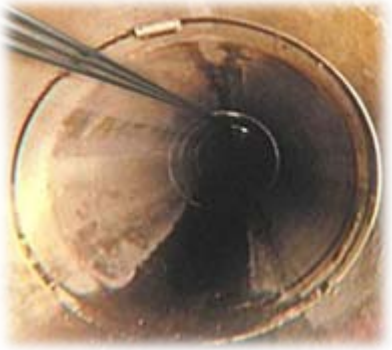
3.- Installation of conduits



Conduits inserted in special ‘harpoon shaped’ clips on the clamps

4.- Installation of fibre

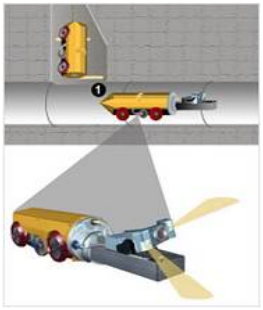
Fibre is pulled manually into the conduits



View of a completed installation

EVERY sewer pipe analyzed on cartography needs to be inspected prior to installation

1.- Inspection and Mapping



To identify what sewers are in good shape

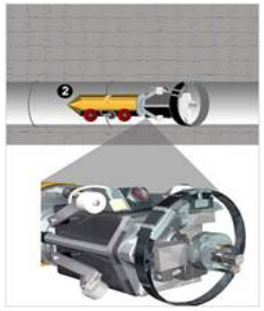
‘Let’s pull the FAST robot with inspection head to see what we find down there’

‘Ooops ! Seems like someone did a really, really bad job here. Either we fix this or we look for another pipe. And we will inform the water company as well’

‘This pipe was really dirty, we’d better clean it with high pressurized water before installing, sure the FAST robot will thank us for that !!’

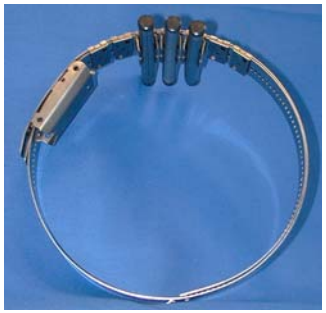
Once the inspection is approved by the water company, we are ready to start installing

2.- Installation of clamps



Clamps adjusted with a high pressure spring to the walls of the pipe

‘Pipe inspected and ready to go. Let’s change the robot-head to clamp-mode’



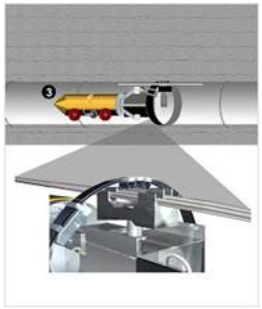
Clamps are produced in different diameters to fit in all range of sewers. No drilling needed, they adjust thanks to a strong spring

‘This FAST robot is able to install even with flowing water inside the sewer, it is real sewer-runner !!’

All FAST materials are made of top-quality V4A steel

Conduits get attached to the clamps with harpoon-shaped clips: conduits get in but they can’t get out, guaranteed !!

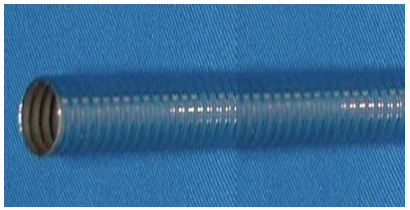
3.- Installation of conduits



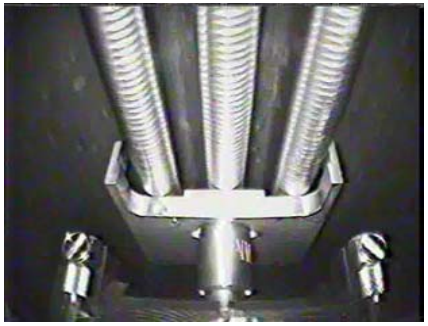
Conduits inserted in special ‘harpoon shaped’ clips on the clamps

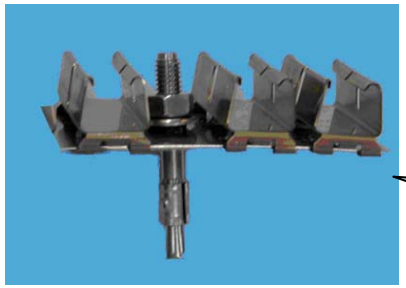
‘Clamps inserted, now let’s get the conduits inserted in the clamps, no drilling so far !!’

Conduits vary in diameter, most typically the 15.5 mm is installed (up to 288 fibres fit in there



The conduit head of the robot delicately carries conduits to its final position. A final ‘click’ and they will remain there forever





‘See the shape of the clips? Harpoon, it lets the conduits in, but does not let them out !’

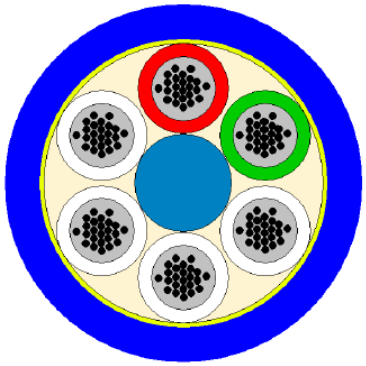
All FAST materials are made of top-quality V4A steel

Fibre cables reels are mounted on support vehicles, not inside FAST vehicle

4.- Installation of fibre

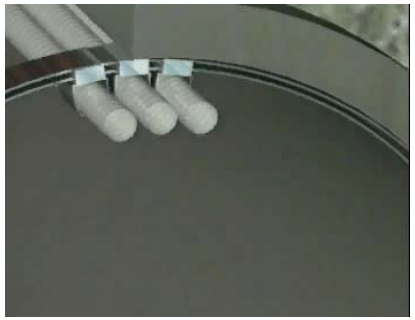
Fibre is pulled manually into the conduits

Cable configuration up to the client: tubes of 12, 24, 48,…it all can be customized by fibre manufacturer

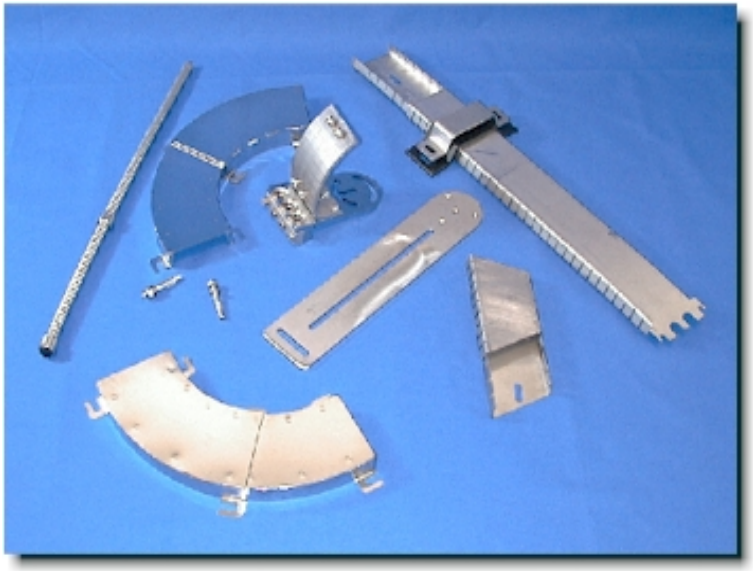


Fibre cables are thinner than usual cables because the protection of the cable is the conduit itself !!!

These conduits now ready to host the fibre cables. Fibre pulling is done manually, at a ratio of some 1.000 mts/day



Finally, FAST also takes care of the installation inside sewer manhole (remember, go around manholes !!)



When you need to make an angle-deviation you need to go around the manhole rather than leaving conduits lose on the base of the manhole, right ?

A thorough array of industrially designed parts and components to safely get around the manholes

FAST elements, specially conduits and clips can be perfectly used for a secure installation in man-entry sewers

Clip holder plate is ideal for man-entry sewers, not only for its tecnical specifications but also for its endurance conditions agains corrosion and rodents

And YES, sometimes it gets really, really cold out there…..

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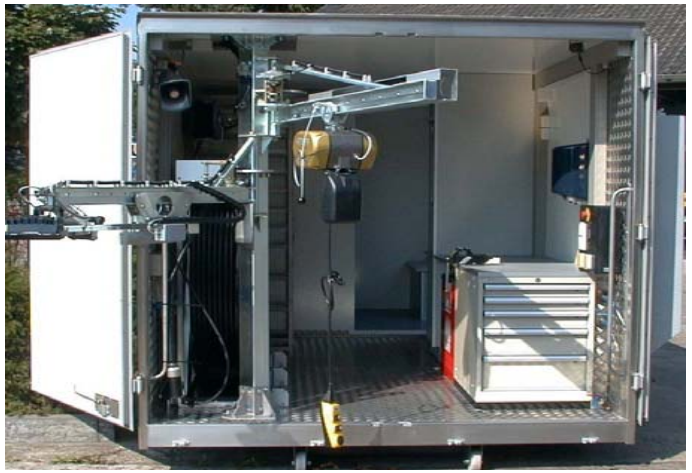
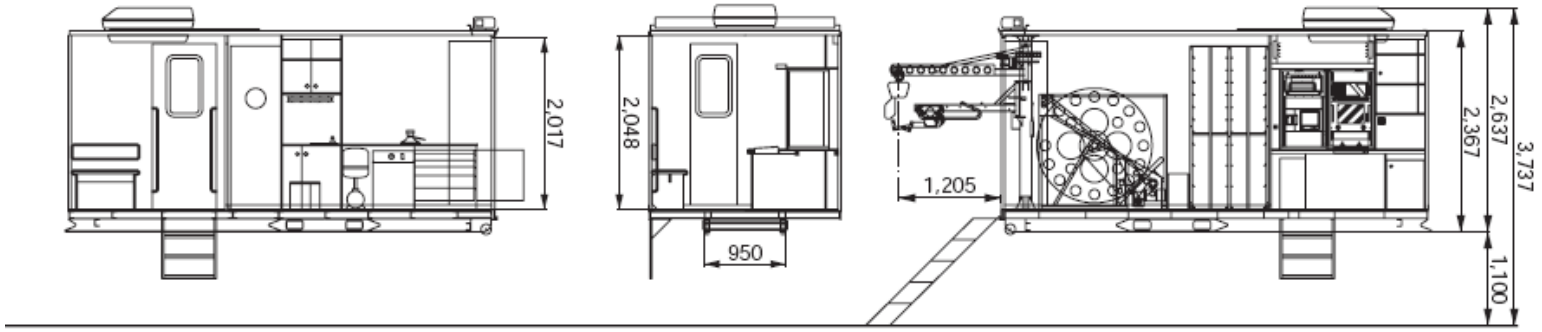
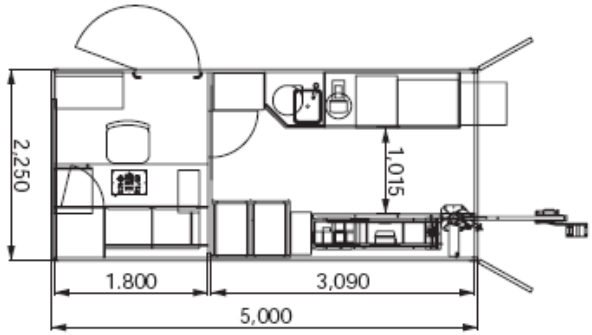
The FAST robot originally is presented in a container box version



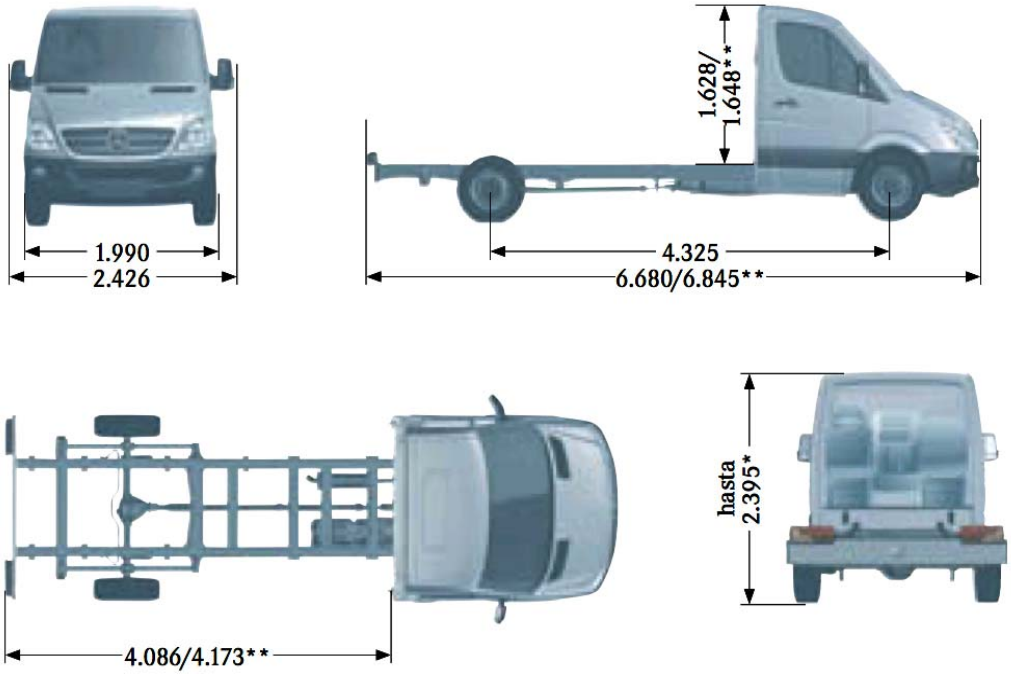
Dimensions of original FAST container box (can be mounted on local chassis-cabin vehicle)





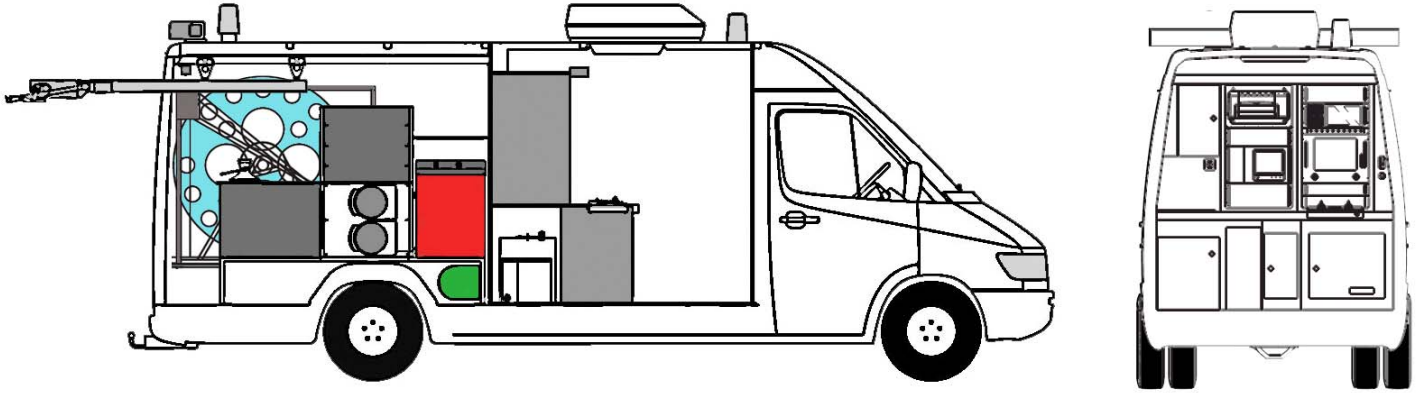
All dimensions i

FAST robot elements can be re-arranged to fit into a smaller container box



(1) Cost of re-arranging FAST robot elements into vehicle not included in FAST list price. Local vehicle to be purchased by customer locally. Reducing original FAST container into a smaller container results in discarding of certain non-critic elements from the original product with no changes in price. This modification implies some 16 weeks of additional delivery times

Another possibility is that FAST re-arranges all elements from the original container into a smaller vehicle (Mercedes Sprinter type) (1)



(1) Cost of re-arranging FAST robot elements into vehicle not included in FAST list price. Restrictions may apply if robots are to be exported to non-EU countries. Re-arranging of original FAST elements into a vehicle results in discarding of certain non-critic elements from the original product with no changes in price. This modification implies some 16 weeks of additional delivery times

In both cases the FAST robot is fully managed from the outside throuhg a sophisticated remote control

Some additional description of the FAST robot system contents



- The rear work area is supplied fully fitted, with cable drum containing 200m of cable, emergency stop controls, anti slip flooring and storage areas.
- Also installed in the rear area is an air compressor which has an auto “bleeding” function to ensure no water enters the pneumatics system. The robot has both air and electrical functions which must be kept operational
- Additional storage cupboards are supplied for tools and spares, together with robots parts. An air gun and water gun are mounted at the rear for the cleaning of the robot after installations. A retractable overhead crane is mounted to the roof of both the container and Mercedes versions to help raise and lower the robot into the manhole
- An halogen lamp is mounted at the end of the crane to point directly into the manhole during night works.

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International references (I)

International references (II)

International references (III)

Germany

- Hamburgo
- Regensburg
- Hanau
- Munich
- Dusseldorf
- Plattling
- Holzminden
- Hagen
- Lennestadt
- Kalrsruhe

Sweden

- Kalmar
- Söderakra

Japan

- Okayama
- Yokohama

Switzerland

- Berna
- Neuchatel
- Pfaffikon

Italy

- Bolonia

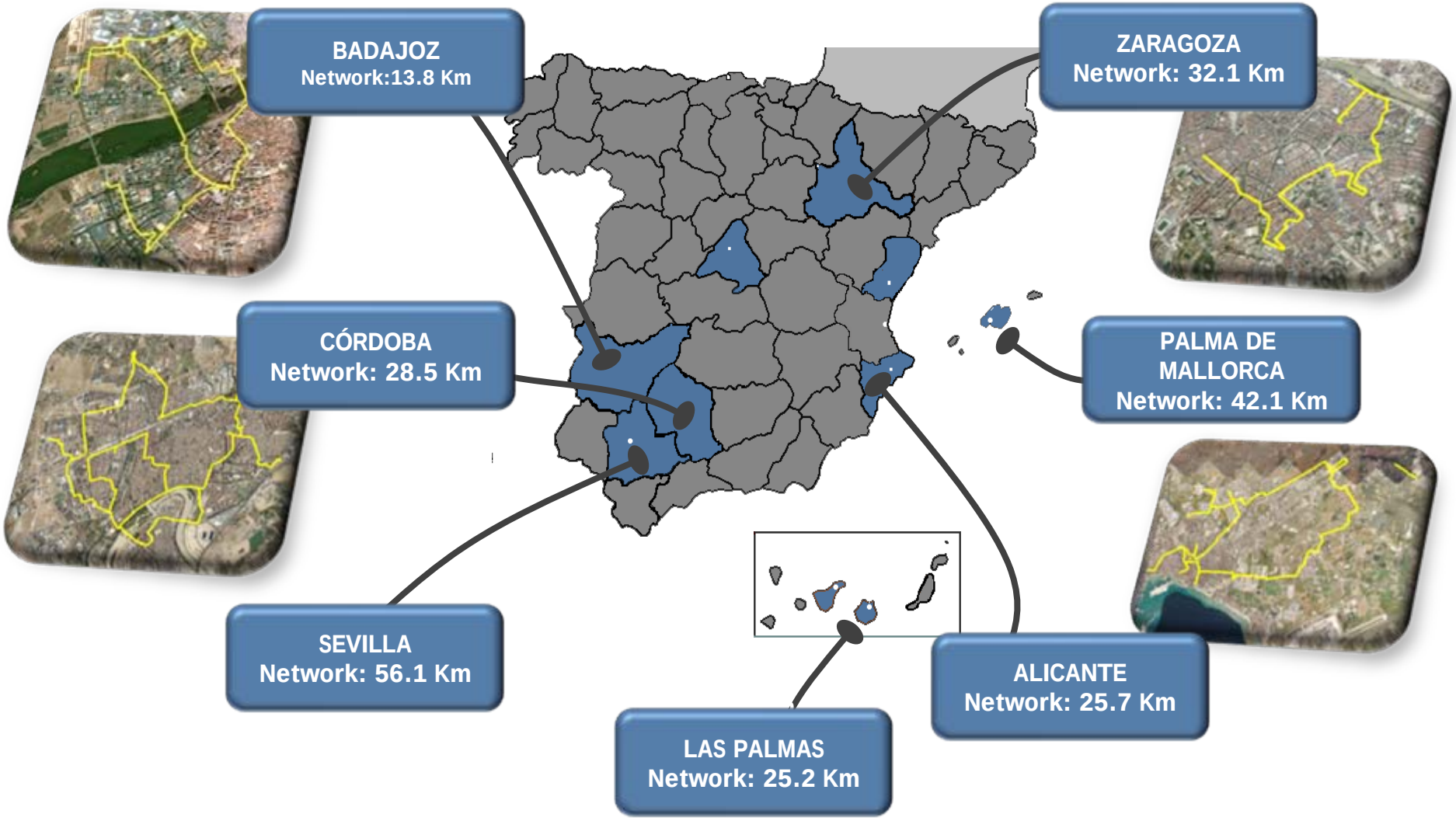
Netherlands

- Ámsterdam

Austria

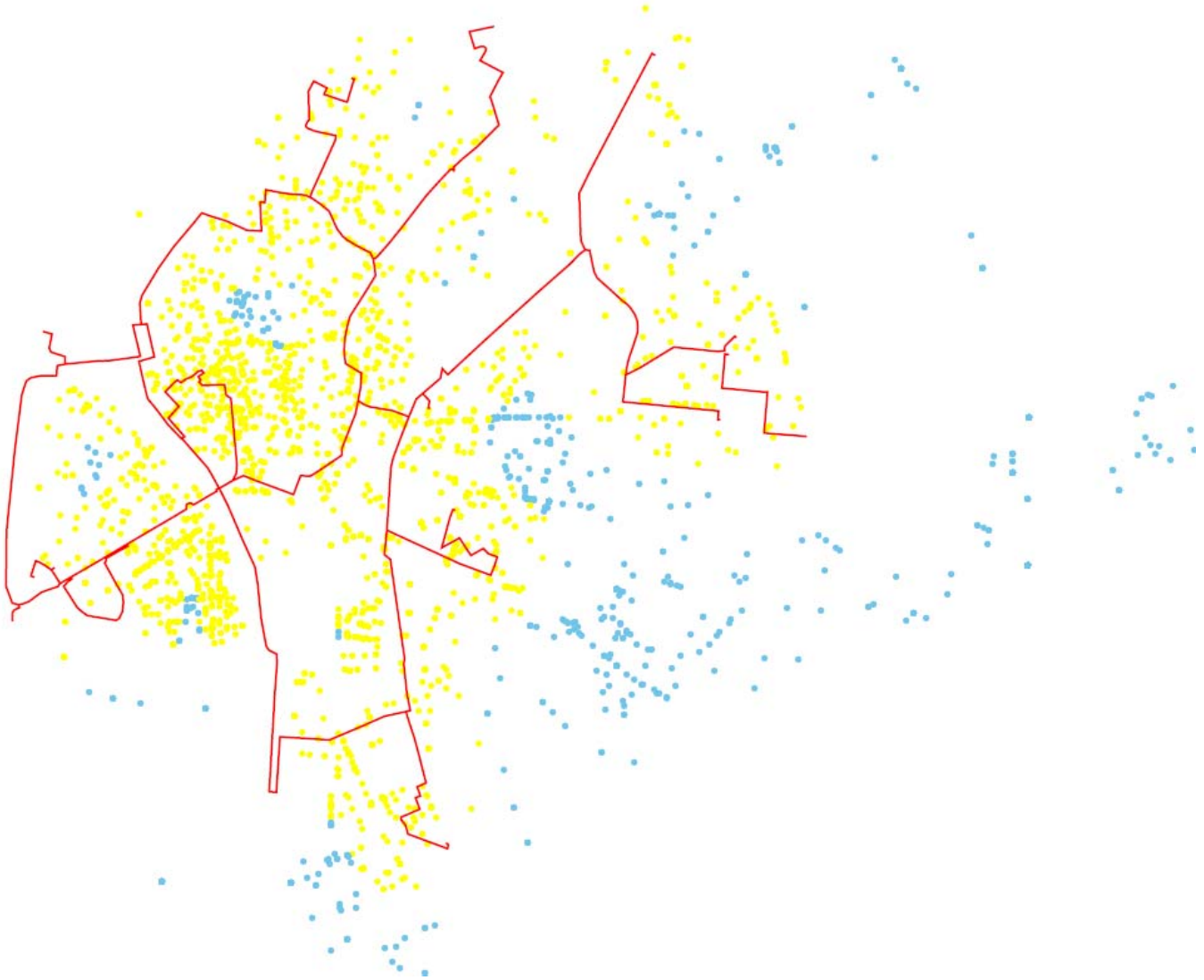
- Salzburgo
- Viena

International references: A mature country for fibre in sewers: Spain

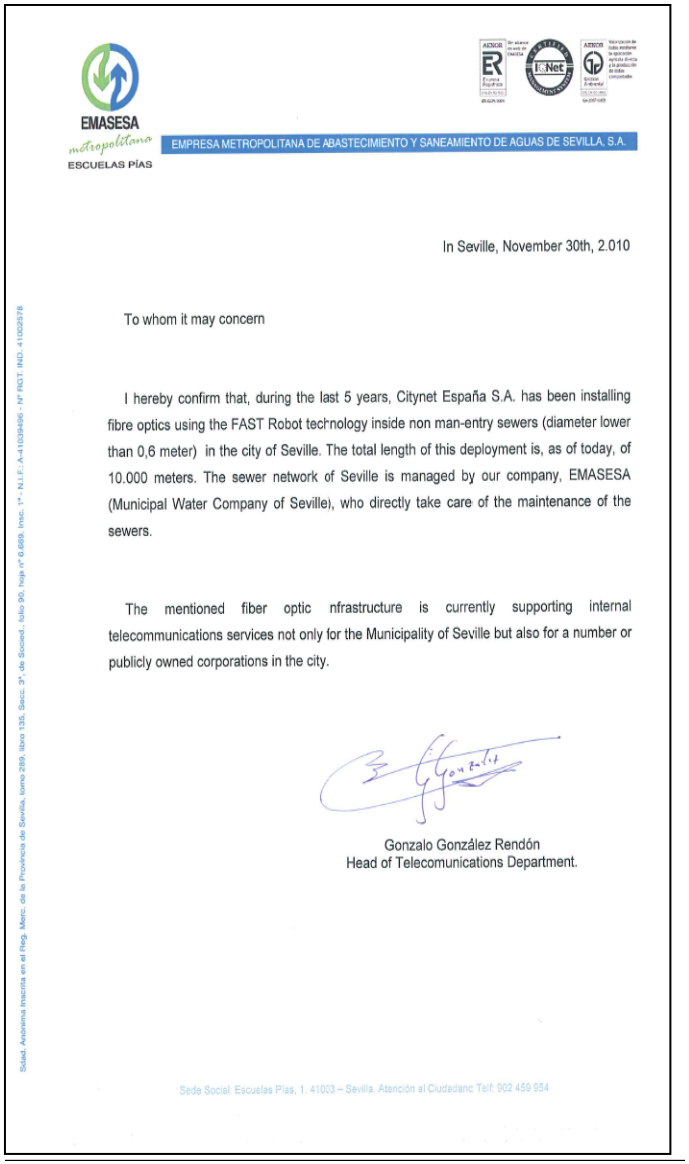


International references: Seville, the city in the world with a largest fibre infrastructure inside sewers (over 200 kms mix of man-entry and non-man entry with FAST)

80% of Businesses and Public Administration sites at 500m or less from the infrastructure



A typical recommendation letter from water authority of Seville for our Spanish distributor



EMASESA
metropolitana
ESCUELAS PÍAS

EMPRESA METROPOLITANA DE ABASTECIMIENTO Y SANEAMIENTO DE AGUAS DE SEVILLA, S.A.

In Seville, November 30th, 2.010

To whom it may concern

I hereby confirm that, during the last 5 years, Citynet España S.A. has been installing fibre optics using the FAST Robot technology inside non man-entry sewers (diameter lower than 0,6 meter) in the city of Seville. The total length of this deployment is, as of today, of 10.000 meters. The sewer network of Seville is managed by our company, EMASESA (Municipal Water Company of Seville), who directly take care of the maintenance of the sewers.

The mentioned fiber optic nfrastructure is currently supporting internal telecommunications services not only for the Municipality of Seville but also for a number or publicly owned corporations in the city.

Gonzalo González Rendón
Head of Telecomunications Department.

Sdad. Anónima Inscrita en el Reg. Merc. de la Provincia de Sevilla, tomo 289, libro 135, Secc. 3ª, de Sociedades, folio 90, hoja nº 6.669, Inscr. 1ª - N.I.F.: A-41039496 - Nº REGT. IND.: 41002578

Sede Social: Escuelas Pías, 1. 41003 – Sevilla. Atención al Ciudadano: Telf. 902 459 954

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The FAST system backstage: maintenance team and workshop environment

Team / Personal Profile

1 

Technical Engineer, (electromechanical background)

1 

Technician (electromechanical background)

Office 8 m2

220v/ 50Hz

Robotic Workshop Room 20-25 m2

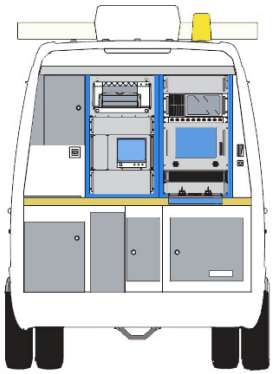
Tools and Equipments Aprox. 15.000 €

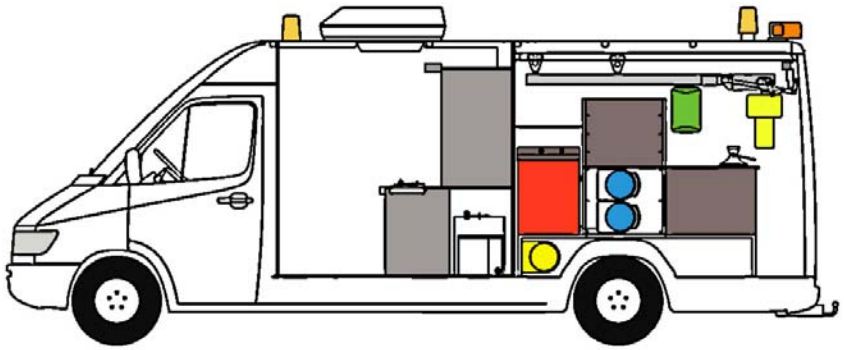
Spare Parts Stock Aprox. 50.000 €

220v/ 50Hz

Garage Work Area 100 m2

3,5 Mts





3x400v/50Hz
220v/ 50Hz