



GIGA
infosystems

GST Framework

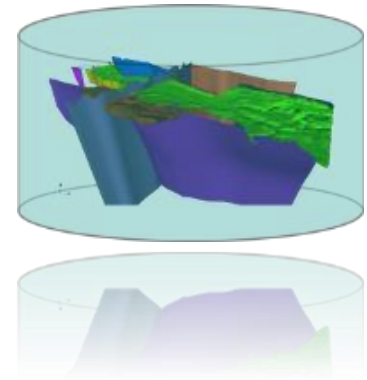
Efficient management of 3d subsurface models
and its metadata

Paul Gabriel



GiGa infosystems | About us

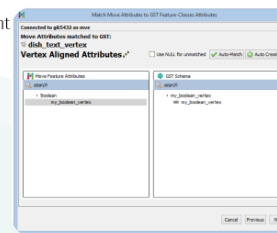
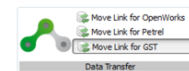
- * Team of 7 persons
- * **Oracle Partner, Won GIS Award**
- * Close Cooperation with TU Bergakademie Freiberg
- * Working with
 - * Midland Valley [MOVE], DHI-Wasy [Feflow]



In app plugin

Move link to GST

- * Direct save/load models to GST
- * define Project Extents to be used for the current session
- * work with features from GST (retrieve, lock/unlock, save edits, upload and delete)
- * view a summary of work undertaken during the session





EU Project ProMine (2009-2013)

Aims

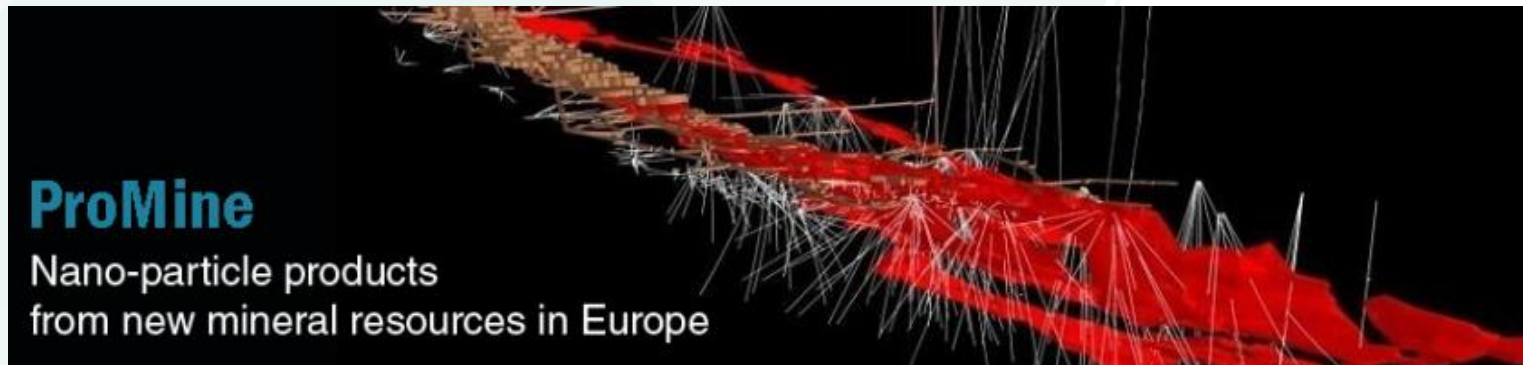
New nano-particle products from new mineral resources in Europe

Partners

27 in Europe in 11 countries

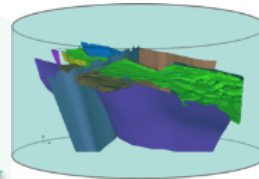
Infrastructure

Developed by TU Freiberg





GEMCOM SURPAC™
Geology and Mine Planning



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Petrel 2011

FEFLOW

GSI3D Research Consortium
(Geological surveying and investigation in three dimensions)



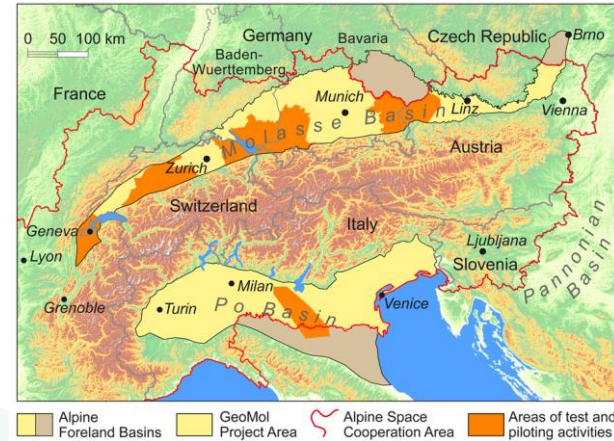
EU Project GeoMol (2012-2015)

Aims

Creation of 3D subsurface model for the Alpine Foreland basins

Partners

Bavaria, Baden-Wuerttemberg, Switzerland, Austria, Italy, Slovenia, France, TU Freiberg



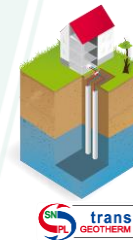
Projectarea

Infrastructure

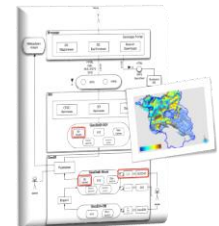
Provided by TU Freiberg and GiGa infosystems



Swisstopo - 3D Geology



Trans Geotherm
(Poland <-> Saxony)



Brandenburg 3D

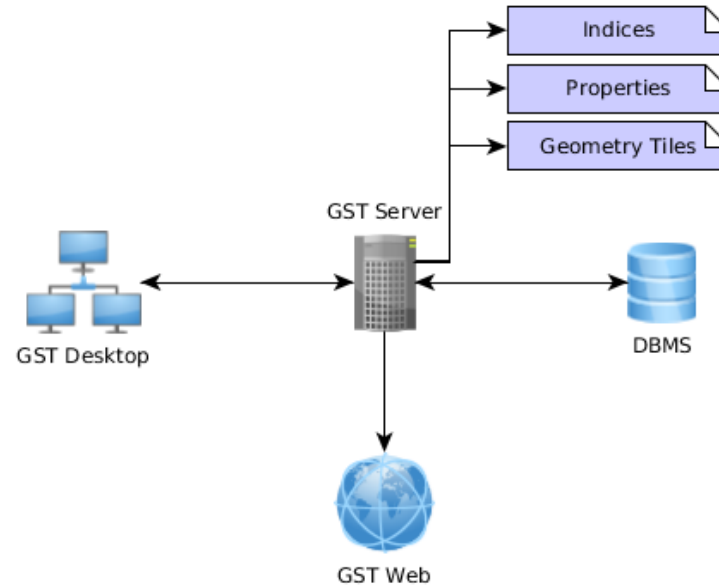
GST is used at



<p>Brandenburg (Landesamt für Bergbau, Geologie und Rohstoffe Brandenburg, LBGR)</p> 	<p>Bavaria (Bayerischen Landesamt für Umwelt, LFU)</p>  <p>Bayerisches Landesamt für Umwelt</p>
<p>Saxony (Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie, LfULG)</p>  <p>LANDESAMT FÜR UMWELT, LANDWIRTSCHAFT UND GEOLOGIE</p> <p>Freistaat SACHSEN</p>	<p>Switzerland (Bundesamt für Landestopografie swisstopo)</p> 
<p>Saxony-Anhalt (Landesamt für Geologie und Bergwesen, LAGB)</p>  <p>SACHSEN-ANHALT</p>	<p>Hesse (Hessisches Landesamt für Naturschutz, Umwelt und Geologie, HLNUG)</p>  <p>Für eine lebenswerte Zukunft</p>
<p>North Rhine-Westphalia (Geologischer Dienst Nordrhein-Westfalen, GD.NRW)</p>  <p>Geologischer Dienst Nordrhein-Westfalen – Landesbetrieb –</p>	<p>Lower Saxony (Landesamt für Bergbau, Energie und Geologie, LBEG)</p>  <p>Landesamt für Bergbau, Energie und Geologie</p> <p>GEOZENTRUM HANNOVER</p>
<p>Geneve (Département de l'environnement, des transports et de l'agriculture, DETA)</p>  <p>REPUBLIQUE ET CANTON DE GENEVE</p> <p>POST TELEGRAS LUX</p>	



What's GST?



Timing GST2

Größe	t	t [%]	Anzahl der Vertices	Anzahl der Simplices
100 km ²	3 m 35.373 s	100	148.083	295.045
500 km ²	3 m 49.610 s	107	758.894	1.514.869
1.000 km ²	4 m 06.198 s	114	1.330.009	2.656.502
5.000 km ²	5 m 51.551 s	163	5.232.024	10.452.377
10.000 km ²	7 m 44.335 s	216	8.335.560	16.656.928

Timing GST3

Größe	$t_{download}$	$t_{download}$ [%]	t_{upload}	t_{upload} [%]
100 km ²	0.198 s	100	0.345 s	100
500 km ²	0.603 s	305	1.629 s	472
1.000 km ²	0.984 s	497	2.879 s	834
5.000 km ²	3.606 s	1821	11.776 s	3413
10.000 km ²	5.721 s	2889	19.026 s	5514
<i>komplett</i>	14.537 s	7342	1 m 40.321 s	29.078



Central Datastore

- * Metadata storage in a relational database
 - * Easy to integrate
 - * SQLite, Oracle, PostgreSQL, Microsoft SQL Server
- * Storage in a generic format
 - * Software independent
 - * No unclear data management
 - * No costly individual solutions

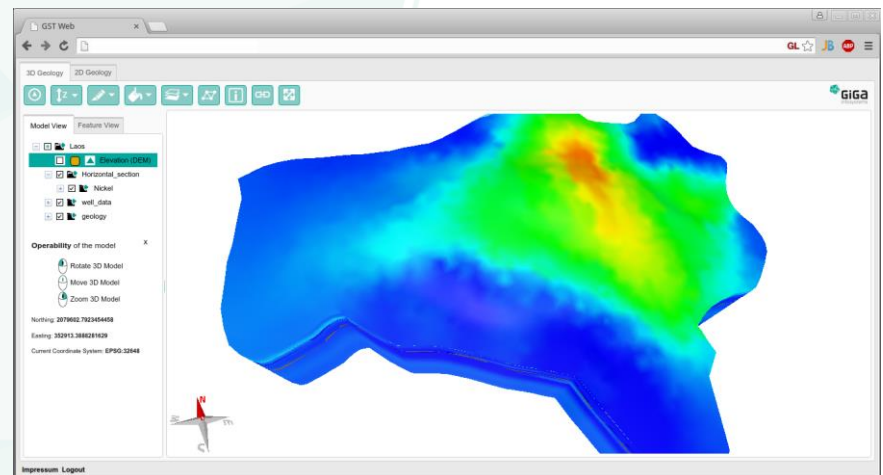
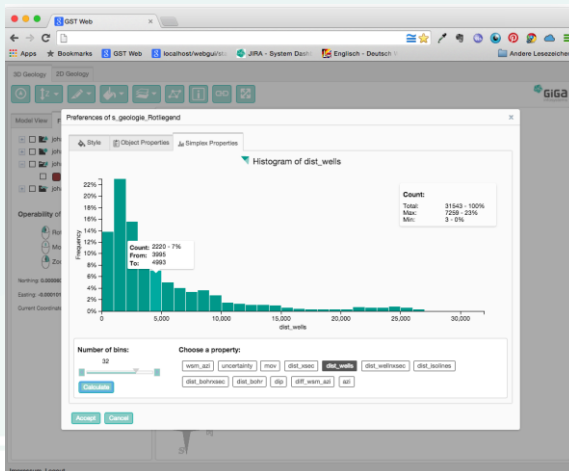
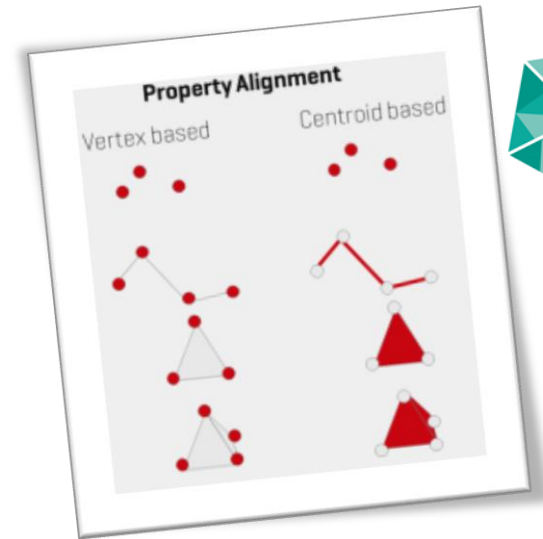


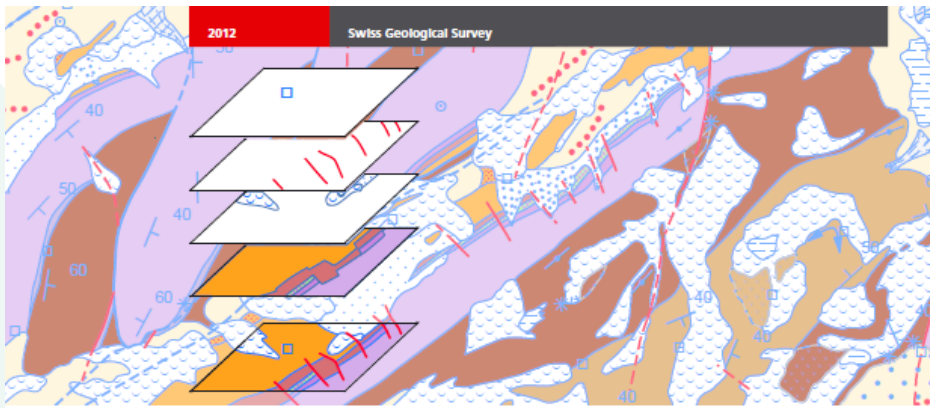


Feature classes in GST

* Feature class ...

- * ... adjustable template for data
- * ... can be shared between users
- * ... allows to store metadata (=Object Properties)
- * ... allows to store a set of petrophysical, geochemical, geothermal (or other) properties (=Simplex Properties)



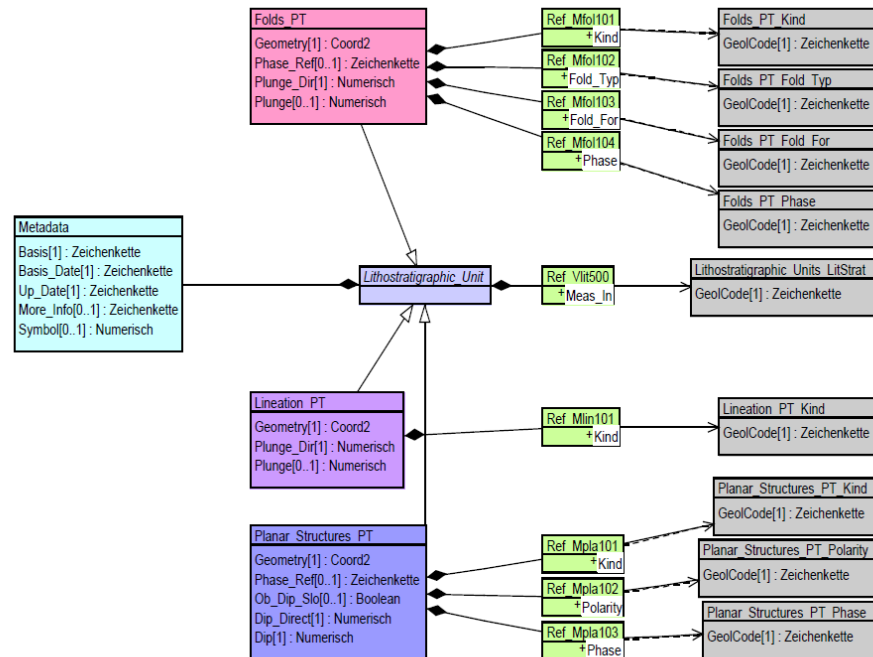


Feature classes

Data Model Geology

Description in UML Format and Object Catalogue, Version 2.1

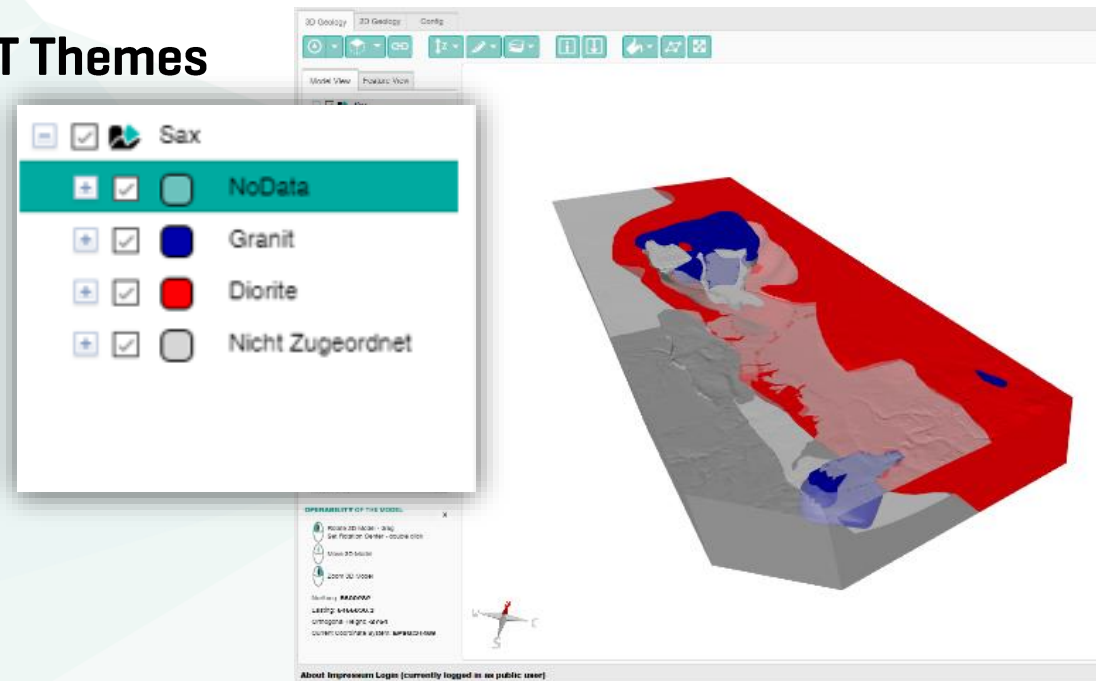
October 2012





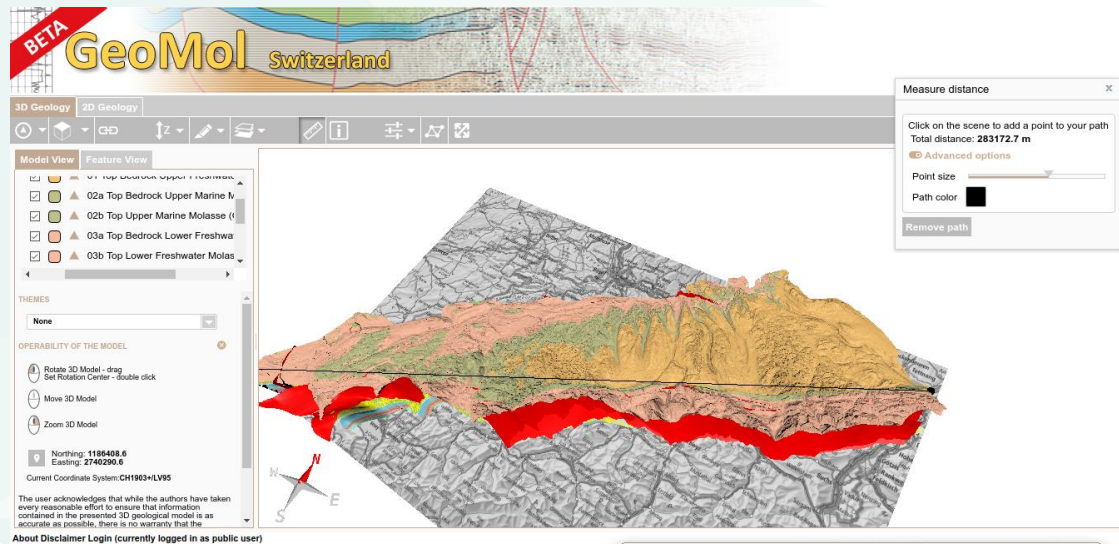
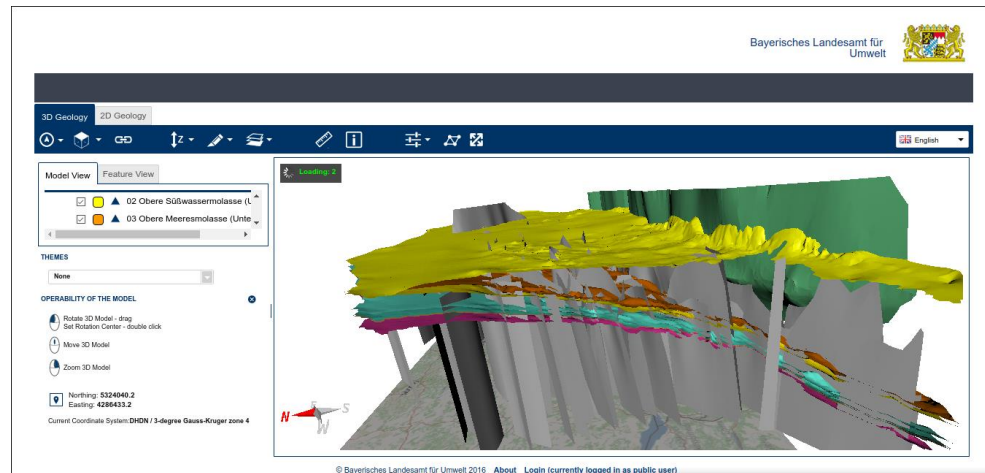
Constrained Object Properties in GST

- * Independent of GST [e.g. Datamodel Geology, GeoSciML]
- * Referenced in GST
- * Colors via **GST Themes**



Conclusion

- * Data pools keep growing
- * Meta data is collected more and more
- * Models get a meaning by metadata
- * **GST** has proven to be capable to store subsurface models





GEOLOGIE 3D
Genève

3D Geology | 2D Geology

Model View | Feature View

- GEOMOL GENEVE (juin 2012)
- Faltes
- Horizons
- 00_Topographie
- 01_GEOMOL GENEVE / Juin 2012

THEMES: None

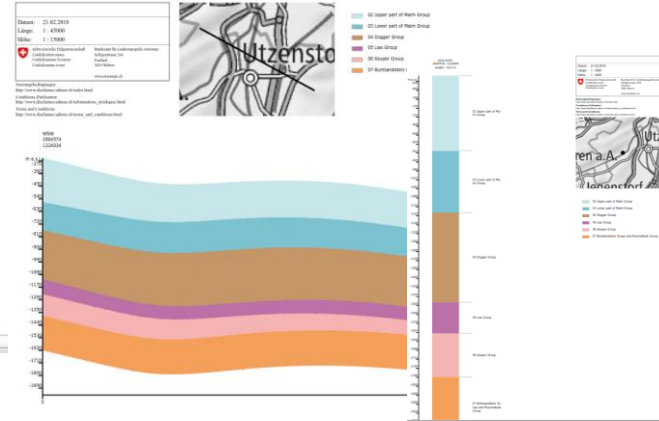
OPERABILITY OF THE MODEL

- Rotate 3D Model - drag
- Set Relation Center - double click
- Move 3D Model
- Zoom 3D Model

Manual

Northing: 1960357.4
Easting: 2504568.1
Current Coordinate System: Swiss CR

The user acknowledges that while the authors
About Disclaimer Login (currently logged in as public user)



NIBIS3D Geologische 3D-Modelle des
Niedersächsischen Landesamtes für
Bergbau, Energie und Geologie

Model View | Feature View

- Geotektonischer Atlas 3D
 - CC2310
 - CC2318
 - CC3102
 - CC3110
 - CC3118
 - CC3126
 - CC3902
 - CC3910
 - CC3918
 - CC3926
 - CC4718

THEMES: None

Northing: 5899783.1
Easting: 32432955
Vertical Exaggeration: 6
Current Coordinate System: ETRS89 / UTM zone 32N (pE-N)

Impressum

LBEG Landesamt für Bergbau, Energie und Geologie

Measure distance

Click on the scene to add a point to your path
Total distance: 4,144.3 m
Difference between first and last point:
Delta X: 438.1 m
Delta Y: 304.5 m
Delta Z: 4,109.9 m

Advanced options

Point size: [slider]
Path color: [black square]

Remove path

Thank you!

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aufgrund eines Beschlusses
des Deutschen Bundestages



EUROPÄISCHE UNION

